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December 5, 2022
Parametrix No. 553-1625-014

Jeff Williamson
Coal Creek Development LLC
P.O. Box 1743
Bellevue, WA 98009

Re: March 2022 Groundwater Sampling Event, Newcastle Demolition Landfill

Dear Mr. Williamson:

INTRODUCTION

This report summarizes the groundwater monitoring data collected in March 2022 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. The Newcastle Coal Creek Landfill closed in 1993 and beginning in 1996 was developed as a golf course under the Model Toxics Control Act (MTCA 173-340 WAC) and Prospective Purchaser Consent Decree No. 95-2-26414-OSEA between Ecology and Newcastle Golf, L.L.C (Newcastle Golf; Ecology 1995). The Golf Club opened in 2000 (Newcastle Golf 1998).

The Landfill has undergone post-closure environmental monitoring in accordance with the Newcastle Demolition Landfill Post-Closure Plan (Parametrix 1998). MTCA (WAC 173-340-420(2)) requires that Ecology conduct a periodic review of the Landfill every 5 years. The most recent Periodic Review was conducted in 2019 (Ecology 2019). The Periodic Review determined that *"Soil and groundwater cleanup levels have not been met at the Site; however, under WAC 173-340-740(6)(f), the cleanup action was determined to comply with cleanup standards since the long-term integrity of the containment system is ensured and the requirements for containment technologies are being met."*

GEOLOGIC SETTING

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 feet 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.

EVALUATION OF WELL MW-2

Monitoring well MW-2 was evaluated prior to the 2022 groundwater sampling event. Monitoring well MW-2 has shown some changes in water quality since 2019, including higher concentrations of COD and TOC accompanied by lower measured concentrations of some other landfill indicator parameters including chloride, hardness, and dissolved calcium. The purged water has been noted to have an orange color and contain some black particulate material. This well is located approximately 1,500 ft from the former Landfill in a rough area of the golf course adjacent to a fairway and is relatively shallow compared to the other wells (screened between 38 and 45 ft below ground surface). The observed water quality changes in this well were believed to be likely related to disturbances at the golf course or possibly damage in the well.

To investigate and attempt to mitigate the potential problems with MW-2, field personnel attempted to pull out the dedicated sampling pump and PVC support piping to redevelop MW-2. MW-2 contains a dedicated Hydrostar pump that was positioned a few feet above the bottom of the well. In order to redevelop the well, the pump had to be removed. Upon pulling the pump, the PVC holding the discharge assembly for the Hydrostar pump was extremely brittle and broke in several places. The upper metal discharge piping was noted to have a bend approximately two feet below the well head landing plate (see photo in Appendix C). In addition, a crack/opening was observed in the PVC well casing approximately one to two feet below the ground surface (see photo) near the bend in the discharge pipe and the crack is allowing shallow subsurface water including irrigation to enter the well. Soil/sediment is also entering the well as evidenced by the wet coating of sediment observed on the upper portion of the support piping above the water table (see photo).

The dedicated Hydrostar pump could not be removed from the well due to the bend in the casing. The pump was lowered back down to the landing plate to attempt to pull the pump the following day with the help of additional tools. The activator rod remained holding the pump and PVC in place. Upon inspection the following day, it was discovered that without the support of the PVC, the weight of the pump caused the activator rod to slip through the plastic nut at the top, allowing the entire pump assembly to fall to the bottom of the well.

Based on the observation of the casing break allowing shallow subsurface water including irrigation to enter the well, MW-2 is not a suitable sampling point. As noted below, the March 2022 samples were collected from MW-2 using a peristaltic pump. Polyethylene tubing was carefully lowered to a depth between the well casing and the broken pump assembly to allow for sampling.

MARCH 2022 SAMPLING EVENT

Samples were collected on March 16 and 17, 2022, by Parametrix personnel. Samples were collected from well MW-1 using a dedicated Hydrostar pump, from wells MW-3 and MW-5 using dedicated electrical submersible pumps, and from well MW-2 using a peristaltic pump and new tubing. Samples from the wells were collected using low-flow purging methods. Samples from MW-5 were collected after the well went dry. Samples to be analyzed for dissolved metals were field-filtered through 0.45-micron filters. A duplicate sample (designated MW-6) was collected at monitoring well MW-3.

Samples were collected at surface water monitoring locations SW-6 and SW-7 on March 16. SW-6 was collected using a peristaltic pump and new tubing placed directly in the outlet of flow from the Richmond Tunnel mine discharge. SW-7 was collected with a grab sampler and then pumped with a peristaltic pump into the sample containers. Similar to the wells, samples for dissolved metals were field filtered through a 0.45-micron filter.

Samples were delivered directly to Analytical Resources, Inc. (ARI) in Seattle, Washington on the same day of sampling, 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. No qualifiers were added to the data as a result of the review.

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):

- pH in in the samples from well MW-2 and MW-5
- Specific conductivity and TDS in the samples from well MW-1 (upgradient) and surface water station SW-6
- Sulfate in the sample from well MW-1 (upgradient)
- Dissolved iron in the samples from wells MW-1 (upgradient), MW-2, MW-3, MW-5, and surface water station SW-6
- Dissolved manganese in the samples from wells MW-1 (upgradient), MW-2, MW-5, and surface water station SW-6
- Dissolved arsenic concentrations in samples from wells MW-1 (upgradient well), MW-2, MW-3, MW-5, and surface water stations SW-6 and SW-7 (exceeding the carcinogenic GWQS but not the MCL).

The presence of constituents above their GWQS and/or MCL upgradient from the Landfill at MW-1 indicates that the 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 using historical data from the post-closure monitoring period (1994 through 2022) for dissolved arsenic, ammonia, dissolved calcium, chloride, COD, hardness,

dissolved iron, dissolved manganese, specific conductivity, sulfate, and TOC and are presented in Appendix B. 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 was added to the data analysis because it was a constituent of interest discussed in Ecology's Periodic Review (Ecology 2013).

Based on the time-series plots, the following observations can be made:

- In upgradient well MW-1, sulfate and hardness (and dissolved calcium) concentrations continued to be higher than in the downgradient wells, and specific conductivity continued to be in the same range as surface water station SW-6.
- In MW-2, concentrations of dissolved iron continued to be lower than the relatively high concentrations measured between 1999 and 2000. However, since 2019, the results have been higher than typically observed for some parameters (dissolved iron and manganese, COD and TOC) and lower than typically observed for other parameters (specific conductivity, chloride, dissolved calcium, and hardness). The 2022 COD and TOC concentrations were substantially higher than previous measurements.
- In MW-3, concentrations of most parameters have remained stable or decreased since golf course development. 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 have been observed over the history of monitoring.
- At SW-6, concentrations of sulfate and dissolved manganese have decreased over the history of monitoring.

The water quality changes observed in downgradient wells MW-2 and MW-3 during and immediately after golf course development were likely related to clearing and grading of the previously heavily wooded area and developing it as a mixture of managed greens and fairways and roughs. Water quality was not measured at MW-3 during the period between 1998 and 2001 because the well was dry; subsequent monitoring events were adjusted to coincide with the wet season so that adequate water would be available for sampling.

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. For each well/parameter combination, the Mann-Kendall test determines whether there is an overall consistent increasing or decreasing trend in the data. As a nonparametric test, it compares each data value to every value preceding it to determine the number of positive (increasing) and negative (decreasing) pairwise comparisons. Because it does not use actual values in its calculations, the Mann-Kendall test is not influenced by the magnitudes of fluctuations in data values as shown in the time series plots. All non-detected values were given a value equal to the reporting limit (Gilbert 1987, Gibbons 1994).

As discussed in the previous section, elevated concentrations of some parameters were observed in downgradient wells MW-2 and MW-3 during golf course construction. These data suggest an apparent upward trend when combined with all historical data, as presented in previous reports. For this report, the trend analyses were calculated using data collected after golf course development was completed (i.e., 2000 through 2022). The results of the

22-year trend analyses following completion of the golf course are summarized in Table 2. The Mann-Kendall tests indicate the following:

- MW-1: statistically significant increasing trends in dissolved calcium, COD (may reflect increasing reporting limit), hardness, and specific conductivity; statistically significant decreasing trends in dissolved arsenic, chloride, dissolved iron, and TOC, upgradient from the Landfill.
- MW-2: statistically significant increasing trends in COD and TOC; statistically significant decreasing trends in ammonia, dissolved arsenic, and dissolved manganese.
- MW-3: statistically significant decreasing trends in ammonia, dissolved calcium, chloride, hardness, dissolved iron, dissolved manganese, and specific conductivity.
- MW-5: statistically significant decreasing trends in dissolved arsenic, dissolved calcium, chloride, hardness, specific conductivity, and sulfate.

In summary, the only parameters showing significantly increasing trends in downgradient wells since golf course construction were COD and TOC in MW-2. The higher concentrations of COD and TOC since 2019 were accompanied by lower measured concentrations of some other landfill indicator parameters including specific conductivity, chloride, dissolved calcium, and hardness, and the purged water was noted to have an orange color and contain some black particulate material. This well is located approximately 1,500 ft from the former Landfill in a rough area of the golf course adjacent to a green and is relatively shallow compared to the other wells (screened between 38 and 45 ft below ground surface). The observed water quality changes in this well are likely related to the damage observed in this well. The COD and TOC results for this event were outliers compared to previous data and may be related to the disturbance caused by the attempts to remove the Hydrostar pump column and its abandonment in the well.

GROUNDWATER LEVEL MONITORING RESULTS

Groundwater levels were measured at the monitoring wells prior to sampling. Depth to water could not be measured at MW-1 due to wellhead constraints. Depth to water at MW-2 could not be measured due to the bend in the pipe and failed pump column. The depth to water at MW-3 was greater than 150 feet and could not be measured by the sounder. The measurements are presented in Table 3 with calculated water elevations.

DISCUSSION AND CONCLUSIONS

Analysis of the March 2022 groundwater data from the Newcastle Demolition Landfill indicates the following:

- The differences in groundwater chemistry between monitoring wells continue to suggest that the observed water chemistry is influenced by local geochemical conditions and, therefore, do not demonstrate landfill impacts. Concentrations exceeding secondary GWQSs or MCLs (specific conductivity, TDS, 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 but were below the MCL.
- The historical increases in concentrations of some parameters observed during the golf course construction period between 1996 and approximately 2002 in wells MW-2 and MW-3 (including ammonia, dissolved iron, and dissolved manganese) were likely related to changed geochemical conditions associated with clearing and grading of the previously heavily forested area and construction of the golf course. More recent data have indicated lower concentrations of these parameters.

- There were no statistically significantly increasing concentration trends observed in downgradient wells since golf course construction except for COD and TOC in MW-2. The higher concentrations of TOC and COD observed in well MW-2 since 2019 were also accompanied by visual changes and lower concentrations of other indicator parameters and are likely related to factors other than the Landfill. The MW-2 well chemistry has been compromised by the break in the well casing allowing shallow subsurface water including irrigation to enter the well. Additionally, the Hydrostar pump and PVC discharge assembly are abandoned in the well. Therefore, monitoring at this well should be discontinued. Given that 2023 is the last year of post-closure, no replacement of well MW-2 is planned.
- The current groundwater monitoring data are consistent with previous conclusions that the Landfill is stable and is not causing impacts to human health or the environment. This conclusion is supported by the results of historical monitoring data for an expanded list of constituents of potential concern including volatile and semi-volatile organic compounds.

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.
Jerome Cruz, Public Health – Seattle & King County
Tim O'Connor LG, LHG, Solid Waste Management Program, Washington State Department of Ecology, NWRO
Tamara Welty, LG, LHG, Periodic Reviewer & Site Manager, Toxics Cleanup Program, Washington State Department of Ecology, NWRO

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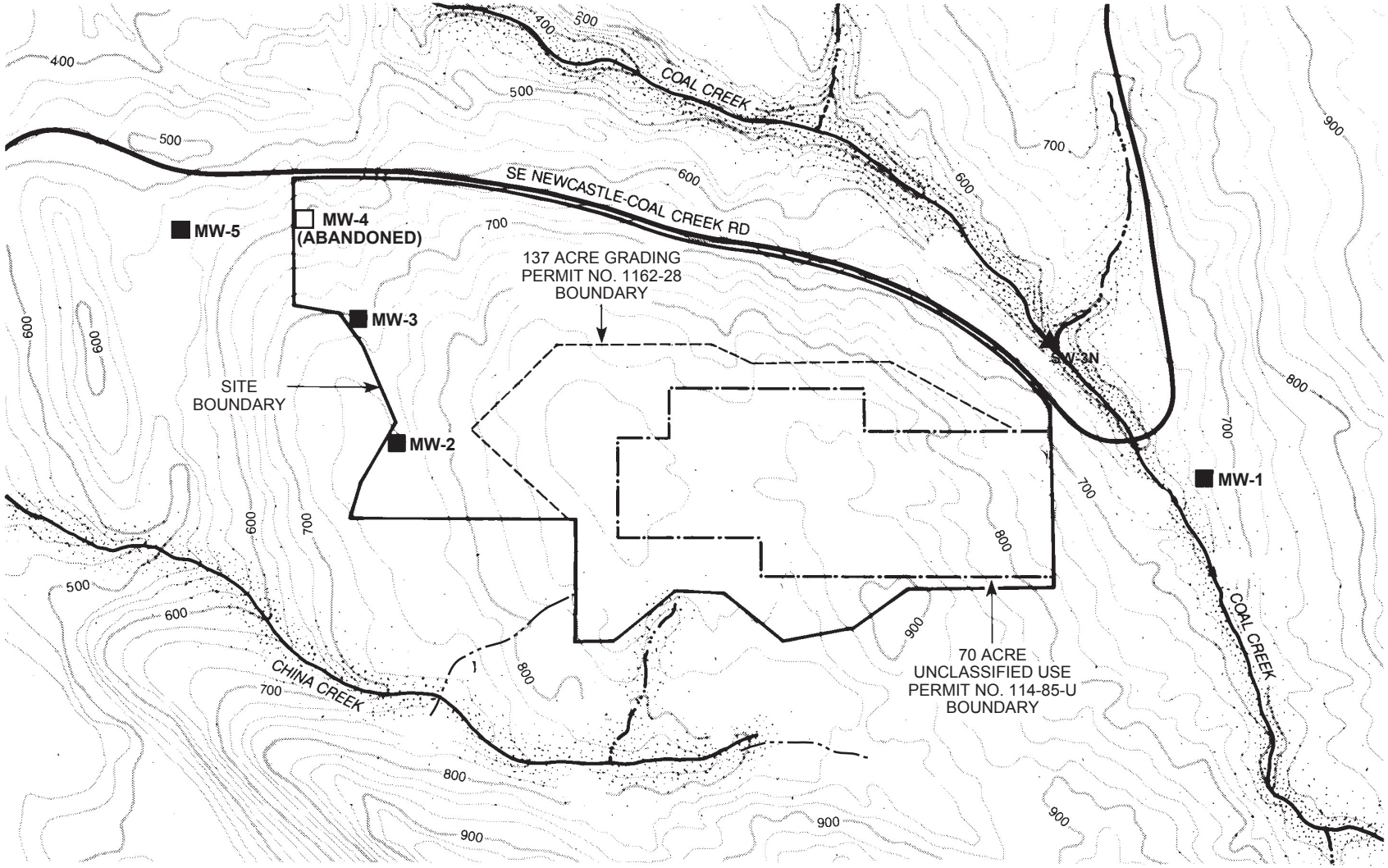
Figures



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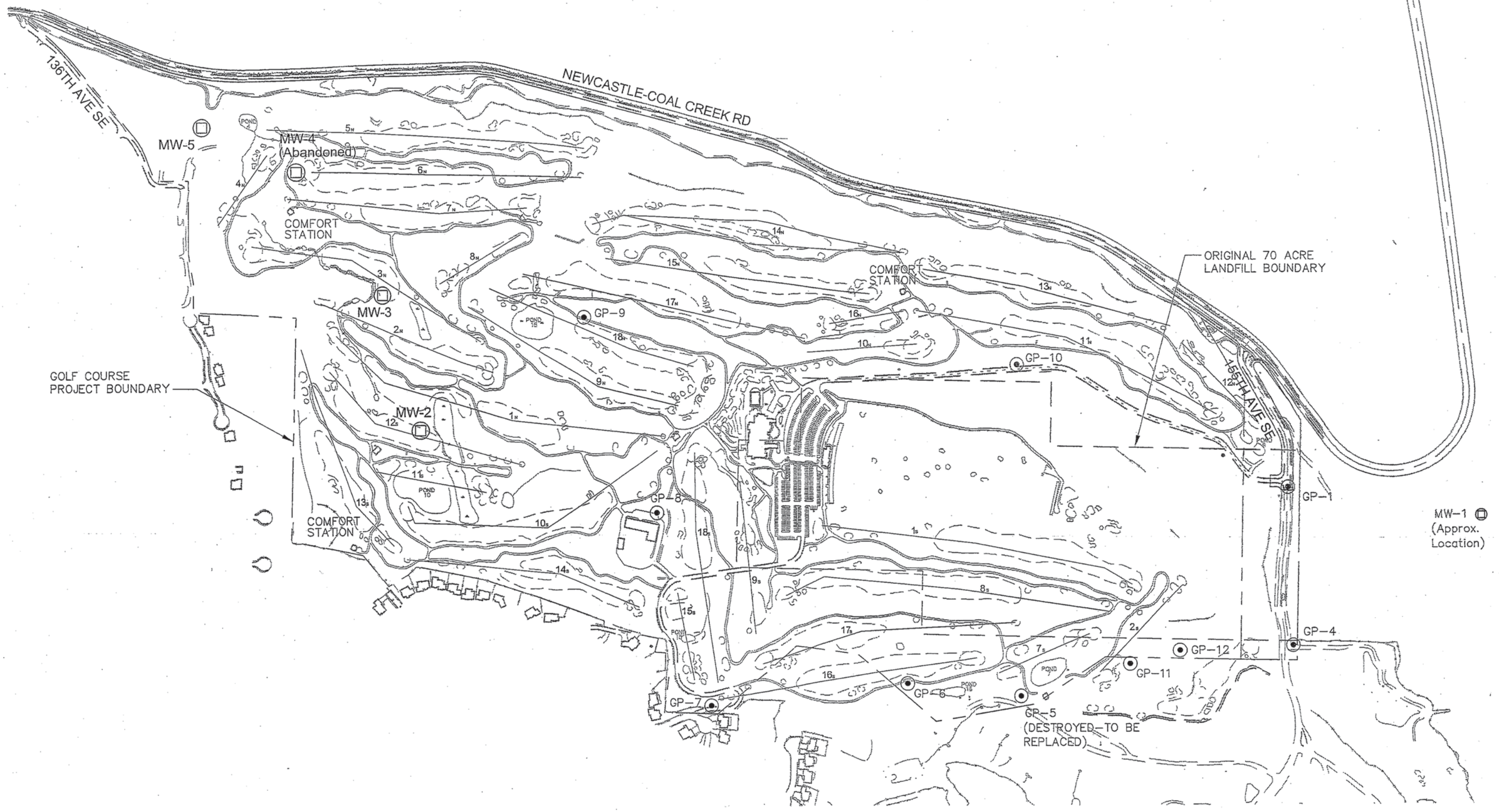
SCALE IN FEET

MW-1 Groundwater Monitoring Well

Figure 1
Groundwater Monitoring Locations in Site Vicinity
Newcastle Demolition Landfill

Parametrix, Inc.



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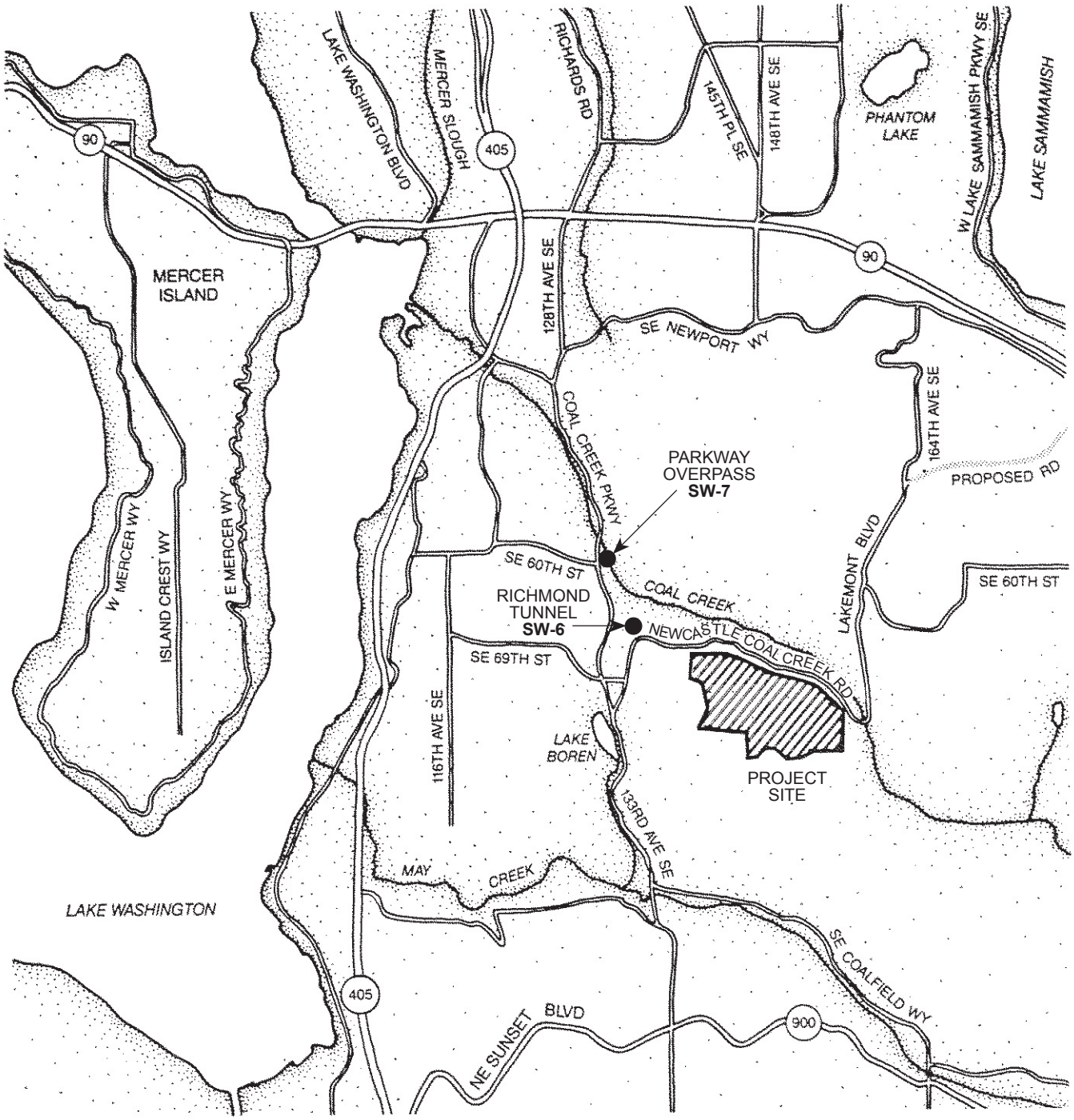
LEGEND

- 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 3/16/2022**	**MW-2 3/17/2022**	**MW-3 3/17/2022**	**MW-6 (MW-3 Dup) 3/17/2022**	**MW-5 3/16/2022**	**SW-6 3/16/2022**	**SW-7 3/16/2022**
Field Data										
Temperature	°C			9.8	11.0	14.6	- -	18.4	12.1	9.9
pH	standard	6.5-8.5 **		6.95	**6.00**	7.36	- -	**6.35**	7.12	7.94
Specific Conductivity	uS/cm		700 **	**1074**	140.3	692	- -	573.7	**902**	251.7
DO	mg/L			8.97	11.43	2.38	- -	0.37	11.45	11.49
Redox	mV			69.3	82.9	20.6	- -	36.5	27.2	19.2
Conventionals										
Total Dissolved Solids	mg/L	500 **	500 **	**797**	101	423	423	350	**568**	148
Chloride	mg/L	250 **	250 **	2.27	0.225	5.97	5.95	2.06	4.73	8.98
Ammonia	mg-N/L			0.139	0.159	0.288	0.284	0.065	0.180	0.040 U
Nitrate	mg-N/L	10 *	10 *	0.0200 U	0.172	0.161	0.160	0.0600 U	0.0500	0.615
Nitrate + Nitrite	mg-N/L			0.010 U	0.187	0.161	0.160	0.050 U	0.050	0.625
Nitrite	mg-N/L		1 *	0.010 U	0.015	0.010 U	0.010 U	0.010 U	0.010 U	0.010
Sulfate	mg/L	250 **	250 **	**305**	0.615	27.7	28.0	65.0	143	30.9
Chemical Oxygen Demand	mg/L			10.0 U	550	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Total Organic Carbon	mg/L			0.945	154	4.53	3.66	1.72	1.65	2.68
Dissolved Hardness	mg/L			649	67.6	65.5	65.6	302	369	80.6
Dissolved Metals										
Arsenic	mg/L	0.00005 ***	0.01 *	**0.00525**	**0.000525**	**0.00318**	**0.00323**	**0.00481**	**0.00476**	**0.000644**
Calcium	mg/L			171	18.5	14.1	14.1	70.1	72.1	19.3
Iron	mg/L	0.3 **	0.3 **	**0.763**	**1.01**	**0.341**	**0.301**	**6.18**	**2.82**	0.110
Magnesium	mg/L			54.1	5.19	7.38	7.39	30.8	45.8	7.84
Manganese	mg/L	0.05 **	0.05 **	**0.118**	**0.0762**	0.0278	0.0298	**0.613**	**0.245**	0.0281
Zinc	mg/L	5 **	5 **	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U

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

Table 2. Results of Mann-Kendall Tests for Trend, Newcastle Demolition Landfill, 2000 to 2022

Well ID	Analyte	n	S	Variance	Z	Trend
MW-1	Ammonia-N	28	**-45**	2559.0	-0.87	No Trend
	Arsenic, Dissolved	**20**	**-71**	**933.0**	**-2.29**	**Negative**
	Calcium, Dissolved	**28**	**179**	**2549.7**	**3.53**	**Positive**
	Chloride	**28**	**-143**	**2539.0**	**-2.82**	**Negative**
	COD	**28**	**148**	**1880.7**	**3.39**	**Positive**
	Hardness	**28**	**177**	**2524.3**	**3.50**	**Positive**
	Iron, Dissolved	**28**	**-165**	**2549.7**	**-3.25**	**Negative**
	Manganese, Dissolved	28	-62	2556.0	-1.21	No Trend
	Specific Conductivity	**28**	**134**	**2562.0**	**2.63**	**Positive**
	Sulfate	28	35	2559.0	0.67	No Trend
	TOC	**28**	**-124**	**1972.7**	**-2.77**	**Negative**
MW-2	**Ammonia-N**	**28**	**-102**	**2562.0**	**-2.00**	**Negative**
	Arsenic, Dissolved	**20**	**-62**	**902.7**	**-2.03**	**Negative**
	Calcium, Dissolved	28	27	2561.0	0.51	No Trend
	Chloride	28	59	2559.0	1.15	No Trend
	COD	**28**	**132**	**2554.7**	**2.59**	**Positive**
	Hardness	28	37	2546.3	0.71	No Trend
	Iron, Dissolved	28	65	2561.0	1.26	No Trend
	Manganese, Dissolved	**28**	**-112**	**2557.3**	**-2.19**	**Negative**
	Specific Conductivity	26	21	2058.3	0.44	No Trend
	Sulfate[1]	28	-97	2559.0	-1.90	Negative
	TOC	**28**	**183**	**2558.3**	**3.60**	**Positive**
MW-3	**Ammonia-N**	**26**	**-188**	**2057.3**	**-4.12**	**Negative**
	Arsenic, Dissolved	20	-26	945.3	-0.81	No Trend
	Calcium, Dissolved	**26**	**-300**	**2057.3**	**-6.59**	**Negative**
	Chloride	**26**	**-199**	**2049.7**	**-4.37**	**Negative**
	COD	26	-41	2045.0	-0.88	No Trend
	Hardness	**26**	**-287**	**2054.3**	**-6.31**	**Negative**
	Iron, Dissolved	**26**	**-249**	**2056.3**	**-5.47**	**Negative**
	Manganese, Dissolved	**26**	**-177**	**2056.3**	**-3.88**	**Negative**
	Specific Conductivity	**26**	**-161**	**2058.3**	**-3.53**	**Negative**
	Sulfate	26	2	2057.3	0.02	No Trend
	TOC	26	-22	2055.3	-0.46	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 2. Results of Mann-Kendall Tests for Trend, Newcastle Demolition Landfill, 2000 to 2022 (continued)

Well ID	Analyte	n	S	Variance	Z	Trend
MW-5	Ammonia-N	24	-46	1621.3	-1.12	No Trend
	Arsenic, Dissolved	**18**	**-97**	**697.0**	**-3.64**	**Negative**
	Calcium, Dissolved	**24**	**-192**	**1625.3**	**-4.74**	**Negative**
	Chloride	**24**	**-150**	**1623.3**	**-3.70**	**Negative**
	COD	24	18	1516.7	0.44	No Trend
	Hardness	**24**	**-194**	**1613.3**	**-4.81**	**Negative**
	Iron, Dissolved	24	42	1623.3	1.02	No Trend
	Manganese, Dissolved	24	36	1623.3	0.87	No Trend
	Specific Conductivity	**24**	**-117**	**1624.3**	**-2.88**	**Negative**
	Sulfate	**24**	**-201**	**1624.3**	**-4.96**	**Negative**
	TOC	24	-56	1623.3	-1.37	No Trend

n = Sample **Arsenic, Dissolved**

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 absol Arsenic, Dissolved
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 2022

Well	Date	Reference Elevation[1]	Depth to Groundwater[2]	Groundwater Elevation[1]
MW-1	3/16/2022	649	NM	NM
MW-2	3/17/2022	753	NM	NM
MW-3	3/17/2022	716	>150	<566
MW-5	3/16/2022	542	60.43	482

Notes:

[1] Reference Elevation and Groundwater Elevation approximate

[2] Depth to groundwater in ft measured from well seal

NM = Not Measured

Appendix A

Laboratory Report and Chain-of-Custody Forms

Analytical Resources, LLC
Analytical Chemists and Consultants

12 April 2022

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

RE: Newcastle LF GW Monitoring (553-1625-014)

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)
22C0274	N/A

Shelly Fishel

Digitally signed by Shelly Fishel
Date: 2022.04.12 18:09:50 -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, LLC

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 its entirety.

Shelly Fishel, Project Manager

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 22C0274	Turn-around Requested: 2 weeks
ARI Client Company: Parametrix	Phone: (206) 394.3667
Client Contact: Lisa Gilbert	
Client Project Name: Newcastle Landfill	
Client Project #: 553-1625-014	Samplers: M Brady

Date: 3/16/2022
Page: 1 of 1
No. of Coolers:
Cooler Temps: 9.7

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	Ammonia, COD, TOC	D Fe,Mn,Zn, Hardness, As	TDS					Notes/Comments
					Analysis Requested								
MW-1	3/16	1355	water	4	✔	✔	✔	✔					Dissolved metals samples field-filtered
MW-2			water	4	✔	✔	✔	✔					
MW-3			water	4	✔	✔	✔	✔					
MW-5	3/16	1125	water	4	✔	✔	✔	✔					
MW-6			water	4	✔	✔	✔	✔					
SW-6	3/16	1430	water	4	✔	✔	✔	✔					
SW-7	3/16	1455	water	4	✔	✔	✔	✔					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Mike Brady	Printed Name: Dimitri Lomidze	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 3/16/22 1545	Date & Time: 3/16/22 1545	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 LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	22C0274-01	Water	16-Mar-2022 13:55	16-Mar-2022 15:45
MW-5	22C0274-02	Water	16-Mar-2022 11:25	16-Mar-2022 15:45
SW-6	22C0274-03	Water	16-Mar-2022 14:30	16-Mar-2022 15:45
SW-7	22C0274-04	Water	16-Mar-2022 14:55	16-Mar-2022 15:45

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Work Order Case Narrative

Client: Parametrix, Inc.
Project: Newcastle LF GW Monitoring
Project Number: 553-1625-014
Work Order: 22C0274

Sample receipt

Sample(s) as listed on the preceding page were received 16-Mar-2022 15:45 under ARI work order 22C0274. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Dissolved Metals - EPA Method 200.8 and 6010D

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 blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory 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 blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Total Organic Carbon (TOC)

The sample(s) were submitted to Fremont Analytical for Total Organic Carbon analysis. The Fremont report is included here in its entirety.

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

WORK ORDER

22C0274

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Parametrix, Inc. **Project Manager: Shelly Fishel**

Project: Newcastle LF GW Monitoring **Project Number: 553-1625-002**

Analysis groups included in this work order

Hardness, Calculated (6010D)

Met 6010D - Mg Met 6010D - Ca

Nitrate-N Calc EPA 353.2

Nitrite-N, EPA 353.2 Nitrate + Nitrite-N, EPA 353.2

Preservation Confirmation

Container ID	Container Type	pH
22C0274-01 A	HDPE NM, 1000 mL	
22C0274-01 B	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
22C0274-01 C	HDPE NM, 500 mL	
22C0274-01 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 pass
22C0274-02 A	HDPE NM, 1000 mL	
22C0274-02 B	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
22C0274-02 C	HDPE NM, 500 mL	
22C0274-02 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 pass
22C0274-03 A	HDPE NM, 1000 mL	
22C0274-03 B	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
22C0274-03 C	HDPE NM, 500 mL	
22C0274-03 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 pass
22C0274-04 A	HDPE NM, 1000 mL	
22C0274-04 B	HDPE NM, 500 mL, 1:1 HNO3	<2 pass
22C0274-04 C	HDPE NM, 500 mL	
22C0274-04 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2 pass

Preservation Confirmed By [signature] Date 3/16/22

Reviewed By Date

Analytical Resources, LLC
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: 22C0274 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the 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 1545 9.7

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 2565

Cooler Accepted by: DC Date: 3/16/22 Time: 1545

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
How were bottles sealed in plastic bags?	Individually	Grouped	Not
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		

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: LB Date: 3/16/22 Time: 16:26 Labels checked by: _____

***** 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:

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

ARI Work Order: 22C0274

Cooler#: _____ **Temperature(°C):** 9.7

Sample ID	Bottle Count	Bottle Type
Samples Received Above		6°C

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Cooler#: _____ **Temperature(°C):** _____

Sample ID	Bottle Count	Bottle Type

Completed by: DC Date: 3/16/22 Time: 1545

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Analytical Resources, LLC
Shelly Fishel
4611 South 134th Place, Ste 100
Tukwila, WA 98168

RE: 22C0274
Work Order Number: 2203464

March 25, 2022

Attention Shelly Fishel:

Fremont Analytical, Inc. received 4 sample(s) on 3/18/2022 for the analyses presented in the following report.

Total Organic Carbon by SM 5310C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:
Sub Data

Fremont Analytical

Date: *03/25/2022*

CLIENT: Analytical Resources, LLC
Project: 22C0274
Work Order: 2203464

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2203464-001	22C0274-01	03/16/2022 1:55 PM	03/18/2022 2:06 PM
2203464-002	22C0274-02	03/16/2022 11:25 AM	03/18/2022 2:06 PM
2203464-003	22C0274-03	03/16/2022 2:30 PM	03/18/2022 2:06 PM
2203464-004	22C0274-04	03/16/2022 2:55 PM	03/18/2022 2:06 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2203464**
Date: **3/25/2022**

CLIENT: Analytical Resources, LLC
Project: 22C0274

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2203464**
Date Reported: **3/25/2022**

CLIENT: Analytical Resources, LLC
Project: 22C0274

Lab ID: 2203464-001 **Collection Date:** 3/16/2022 1:55:00 PM
Client Sample ID: **22C0274-01** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C				Batch ID: R74293		Analyst: SLL
Total Organic Carbon	0.945	0.500		mg/L	1	3/23/2022 10:03:00 PM

Lab ID: 2203464-002 **Collection Date:** 3/16/2022 11:25:00 AM
Client Sample ID: **22C0274-02** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C				Batch ID: R74293		Analyst: SLL
Total Organic Carbon	1.72	0.500		mg/L	1	3/23/2022 10:24:00 PM

Lab ID: 2203464-003 **Collection Date:** 3/16/2022 2:30:00 PM
Client Sample ID: **22C0274-03** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C				Batch ID: R74293		Analyst: SLL
Total Organic Carbon	1.65	0.500		mg/L	1	3/23/2022 10:45:00 PM

Lab ID: 2203464-004 **Collection Date:** 3/16/2022 2:55:00 PM
Client Sample ID: **22C0274-04** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C				Batch ID: R74293		Analyst: SLL
Total Organic Carbon	2.68	0.500		mg/L	1	3/23/2022 11:52:00 PM

Work Order: 2203464
CLIENT: Analytical Resources, LLC
Project: 22C0274

QC SUMMARY REPORT

Total Organic Carbon by SM 5310C

Sample ID: **LCS-74293**	SampType: **LCS**			Units: **mg/L**		Prep Date: **3/23/2022**		RunNo: **74293**			
Client ID: **LCSW**	Batch ID: **R74293**					Analysis Date: **3/23/2022**		SeqNo: **1523789**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	5.25	0.500	5.000	0	105	91.5	110				

Sample ID: **MB-74293**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **3/23/2022**		RunNo: **74293**			
Client ID: **MBLKW**	Batch ID: **R74293**					Analysis Date: **3/23/2022**		SeqNo: **1523790**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.500									

Sample ID: **2203463-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **3/23/2022**		RunNo: **74293**			
Client ID: **BATCH**	Batch ID: **R74293**					Analysis Date: **3/23/2022**		SeqNo: **1523792**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	151	2.00						153.5	1.40	20	D

Sample ID: **2203463-001AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **3/23/2022**		RunNo: **74293**			
Client ID: **BATCH**	Batch ID: **R74293**					Analysis Date: **3/23/2022**		SeqNo: **1523793**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	171	2.00	20.00	153.5	87.4	71.5	116				D

Sample ID: **2203547-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **3/24/2022**		RunNo: **74293**			
Client ID: **BATCH**	Batch ID: **R74293**					Analysis Date: **3/24/2022**		SeqNo: **1523808**			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	14.6	0.500						14.51	0.529	20	

Fremont Analytical

Date: *3/25/2022*

Work Order: 2203464
CLIENT: Analytical Resources, LLC
Project: 22C0274

QC SUMMARY REPORT

Total Organic Carbon by SM 5310C

Sample ID: **2203547-001AMS** SampType: **MS** Units: **mg/L** Prep Date: **3/24/2022** RunNo: **74293**
Client ID: **BATCH** Batch ID: **R74293** Analysis Date: **3/24/2022** SeqNo: **1523809**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	19.6	0.500	5.000	14.51	102	71.5	116				

Sample ID: **2203547-001AMSD** SampType: **MSD** Units: **mg/L** Prep Date: **3/24/2022** RunNo: **74293**
Client ID: **BATCH** Batch ID: **R74293** Analysis Date: **3/24/2022** SeqNo: **1523810**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	19.6	0.500	5.000	14.51	102	71.5	116	19.63	0.0612	30	

Sample Log-In Check List

Client Name:	**ARI**	Work Order Number:	**2203464**
Logged by:	**Clare Griggs**	Date Received:	**3/18/2022 2:06:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Courier		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original

Analytical Resources, LLC
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order:22C0274

220346A

SENDING LABORATORY:

Analytical Resources, LLC
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6202
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone :(206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA AND INVOICE TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 22C0274-01 **Sampled: 03/16/22 13:55 Matrix: Water**				**Diss Metals Field filtered**
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/13/22 13:55		
Containers Supplied: **22C0274-01 E** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22C0274-02 **Sampled: 03/16/22 11:25 Matrix: Water**				**Diss Metals Field filtered**
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/13/22 11:25		
Containers Supplied:				
Sample ID: 22C0274-03 **Sampled: 03/16/22 14:30 Matrix: Water**				**Diss Metals Field filtered**
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/13/22 14:30		
Containers Supplied: **22C0274-03 E** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22C0274-04 **Sampled: 03/16/22 14:55 Matrix: Water**				**Diss Metals Field filtered**
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/13/22 14:55		
Containers Supplied: **22C0274-04 E** Glass NM, Amber, 250 mL, 9N				

Std 5-Day TAT
pdf : EDD SLF 03/18/2022

Released By	Date	Received By	Date
Jacob Haltz	03/18/22 1241	J PM	
Released By	Date	Received By	Date
		Justine Pogue	3/18/22 14:06

Printed: 3/16/2022 5:00:54PM

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/16/2022 13:55
Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 23:23

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0274-01 B 02
Preparation Batch: BKC0707 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	2	0.400	5.25	ug/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/16/2022 13:55
Instrument: ICP2 Analyst: SKD — Analyzed: 03/28/2022 15:39

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0274-01 B 01
Preparation Batch: BKC0677 — Sample Size: 25 mL
Prepared: 03/25/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	171	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.763	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	54.1	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.118	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/16/2022 13:55
Instrument: BAL2 Analyst: DOE — Analyzed: 03/17/2022 09:47

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01
Preparation Batch: BKC0416 — Sample Size: 100 mL
Prepared: 03/17/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	797	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 13:55
Instrument: IC930 Analyst: BF — Analyzed: 03/17/2022 15:32

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	2.27	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/16/2022 13:55
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 11:39

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.139	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/16/2022 13:55
Instrument: [CALC] Analyst: AGM — Analyzed: 03/17/2022 14:32

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-01
Preparation Batch: [CALC]
Prepared: 03/17/2022 — Final Volume: 1

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

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/17/2022 12:35

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01 C
Preparation Batch: BKC0418 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

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

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01 C
Preparation Batch: BKC0424 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/16/2022 13:55

Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:38

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01 D

Preparation Batch: BKC0757 — Sample Size: 2 mL

Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/16/2022 13:55

Instrument: [CALC] Analyst: SKD — Analyzed: 03/28/2022 15:39

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-01

Preparation Batch: [CALC]

Prepared: 03/25/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	649	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/16/2022 13:55
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01
Preparation Batch: B032322
Prepared: 03/16/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	0.945	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-1

22C0274-01RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 13:55
Instrument: IC930 Analyst: BF — Analyzed: 03/30/2022 17:30

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-01RE2 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	100	10.0	305	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/16/2022 11:25
Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 23:09

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0274-02 B 02
Preparation Batch: BKC0707 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	4.81	ug/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/16/2022 11:25
Instrument: ICP2 Analyst: SKD — Analyzed: 03/28/2022 16:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0274-02 B 01
Preparation Batch: BKC0677 — Sample Size: 25 mL
Prepared: 03/25/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	70.1	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	6.18	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	30.8	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.613	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/16/2022 11:25
Instrument: BAL2 Analyst: DOE — Analyzed: 03/17/2022 09:47

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02
Preparation Batch: BKC0416 — Sample Size: 200 mL
Prepared: 03/17/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	350	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 11:25
Instrument: IC930 Analyst: BF — Analyzed: 03/17/2022 16:52

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	2.06	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/16/2022 11:25
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 11:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.065	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/16/2022 11:25
Instrument: [CALC] Analyst: AGM — Analyzed: 03/17/2022 14:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-02
Preparation Batch: [CALC]
Prepared: 03/17/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	5	0.0600	ND	mg/L	U

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/17/2022 12:40

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02 C
Preparation Batch: BKC0418 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/16/2022 11:25

Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:38

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02 D

Preparation Batch: BKC0757 — Sample Size: 2 mL

Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/16/2022 11:25

Instrument: [CALC] Analyst: SKD — Analyzed: 03/28/2022 16:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-02

Preparation Batch: [CALC]

Prepared: 03/25/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	302	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/16/2022 11:25
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02
Preparation Batch: B032322
Prepared: 03/16/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	1.72	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02RE1 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/16/2022 11:25
Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/17/2022 14:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02RE1 C
Preparation Batch: BKC0424 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		5	0.050	ND	mg/L	Y1, U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

MW-5

22C0274-02RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 11:25
Instrument: IC930 Analyst: BF — Analyzed: 03/30/2022 18:10

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-02RE2 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	65.0	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/16/2022 14:30

Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/31/2022 21:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0274-03 B 02

Preparation Batch: BKC0707 — Sample Size: 25 mL

Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	2	0.400	4.76	ug/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/16/2022 14:30

Instrument: ICP2 Analyst: SKD — Analyzed: 03/28/2022 16:03

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0274-03 B 01

Preparation Batch: BKC0677 — Sample Size: 25 mL

Prepared: 03/25/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	72.1	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	2.82	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	45.8	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.245	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/16/2022 14:30
Instrument: BAL2 Analyst: DOE — Analyzed: 03/17/2022 09:47

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03
Preparation Batch: BKC0416 — Sample Size: 100 mL
Prepared: 03/17/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	568	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 14:30
Instrument: IC930 Analyst: BF — Analyzed: 03/17/2022 17:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	4.73	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/16/2022 14:30
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 11:45

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.180	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/16/2022 14:30
Instrument: [CALC] Analyst: AGM — Analyzed: 03/17/2022 14:38

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-03
Preparation Batch: [CALC]
Prepared: 03/17/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.0500	mg/L	

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/17/2022 12:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03 C
Preparation Batch: BKC0418 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

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

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03 C
Preparation Batch: BKC0424 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.050	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/16/2022 14:30

Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:40

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03 D

Preparation Batch: BKC0757 — Sample Size: 2 mL

Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/16/2022 14:30

Instrument: [CALC] Analyst: SKD — Analyzed: 03/28/2022 16:03

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-03

Preparation Batch: [CALC]

Prepared: 03/25/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	369	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/16/2022 14:30
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03
Preparation Batch: B032322
Prepared: 03/16/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	1.65	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-6

22C0274-03RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 14:30

Instrument: IC930 Analyst: BF — Analyzed: 03/30/2022 18:30

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-03RE2 C

Preparation Batch: BKC0427 — Sample Size: 10 mL

Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	50	5.00	143	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/16/2022 14:55

Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 23:18

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0274-04 B 02

Preparation Batch: BKC0707 — Sample Size: 25 mL

Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.644	ug/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/16/2022 14:55
Instrument: ICP2 Analyst: SKD — Analyzed: 03/28/2022 16:06

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0274-04 B 01
Preparation Batch: BKC0677 — Sample Size: 25 mL
Prepared: 03/25/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	19.3	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.110	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	7.84	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.0281	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/16/2022 14:55
Instrument: BAL2 Analyst: DOE — Analyzed: 03/17/2022 09:47

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04
Preparation Batch: BKC0416 — Sample Size: 200 mL
Prepared: 03/17/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	148	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 14:55
Instrument: IC930 Analyst: BF — Analyzed: 03/17/2022 18:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	8.98	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/16/2022 14:55

Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 11:46

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04 D

Preparation Batch: BKC0494 — Sample Size: 10 mL

Prepared: 03/21/2022 — Final Volume: 10 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/16/2022 14:55
Instrument: [CALC] Analyst: AGM — Analyzed: 03/17/2022 14:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-04
Preparation Batch: [CALC]
Prepared: 03/17/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.615	mg/L	

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/17/2022 12:42

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04 C
Preparation Batch: BKC0418 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

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

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04 C
Preparation Batch: BKC0424 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.625	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/16/2022 14:55
Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04 D
Preparation Batch: BKC0757 — Sample Size: 2 mL
Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/16/2022 14:55

Instrument: [CALC] Analyst: SKD — Analyzed: 03/28/2022 16:06

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0274-04

Preparation Batch: [CALC]

Prepared: 03/25/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	80.6	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/16/2022 14:55
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04
Preparation Batch: B032322
Prepared: 03/16/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	0.5	2.68	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

SW-7

22C0274-04RE2 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/16/2022 14:55
Instrument: IC930 Analyst: BF — Analyzed: 03/30/2022 18:50

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0274-04RE2 C
Preparation Batch: BKC0427 — Sample Size: 10 mL
Prepared: 03/17/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	5	0.500	30.9	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BKC0677 - WMN (No Prep)

Instrument: ICP2 Analyst: SKD

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0677-BLK1)				Prepared: 25-Mar-2022 Analyzed: 28-Mar-2022 15:19						
Calcium, Dissolved	ND	0.0500	mg/L							U
Iron, Dissolved	ND	0.0500	mg/L							U
Magnesium, Dissolved	ND	0.0500	mg/L							U
Manganese, Dissolved	ND	0.0040	mg/L							U
Zinc, Dissolved	ND	0.0200	mg/L							U
LCS (BKC0677-BS1)				Prepared: 25-Mar-2022 Analyzed: 28-Mar-2022 15:46						
Calcium, Dissolved	9.66	0.0505	mg/L	10.0		96.6	80-120			
Iron, Dissolved	1.93	0.0505	mg/L	2.00		96.3	80-120			
Magnesium, Dissolved	10.7	0.0505	mg/L	10.0		107	80-120			
Manganese, Dissolved	0.496	0.0040	mg/L	0.500		99.2	80-120			
Zinc, Dissolved	0.487	0.0202	mg/L	0.500		97.5	80-120			
Duplicate (BKC0677-DUP1)	**Source: 22C0274-01**			Prepared: 25-Mar-2022 Analyzed: 28-Mar-2022 15:36						
Calcium, Dissolved	157	0.0500	mg/L		171			8.18	20	
Iron, Dissolved	0.687	0.0500	mg/L		0.763			10.60	20	
Magnesium, Dissolved	48.5	0.0500	mg/L		54.1			11.00	20	
Manganese, Dissolved	0.105	0.0040	mg/L		0.118			12.00	20	
Zinc, Dissolved	ND	0.0200	mg/L		ND					U
Matrix Spike (BKC0677-MS1)	**Source: 22C0274-01**			Prepared: 25-Mar-2022 Analyzed: 28-Mar-2022 15:42						
Calcium, Dissolved	181	0.0505	mg/L	10.0	171	106	75-125			
Iron, Dissolved	2.73	0.0505	mg/L	2.00	0.763	98.5	75-125			
Magnesium, Dissolved	61.5	0.0505	mg/L	10.0	54.1	73.8	75-125			HC
Manganese, Dissolved	0.626	0.0040	mg/L	0.500	0.118	102	75-125			
Zinc, Dissolved	0.501	0.0202	mg/L	0.500	ND	100	75-125			

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BKC0707 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0707-BLK1)				Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 17:21							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BKC0707-BS1)				Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 17:26							
Arsenic, Dissolved	75a	26.0	0.200	ug/L	25.0		104	80-120			
Duplicate (BKC0707-DUP1)		**Source: 22C0274-01**		Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 23:28							
Arsenic, Dissolved	75a	5.21	0.400	ug/L		5.25			0.69	20	D
Matrix Spike (BKC0707-MS1)		**Source: 22C0274-01**		Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 23:33							
Arsenic, Dissolved	75a	30.4	0.400	ug/L	25.0	5.25	101	75-125			D

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

Matrix Spike Dup (BKC0707-MSD1)		**Source: 22C0274-01**		Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 23:39							
Arsenic, Dissolved	75a	30.3	0.400	ug/L	25.0	5.25	100	75-125	0.35	20	D

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0416 - No Prep Wet Chem

Instrument: BAL2 Analyst: DOE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0416-BLK1)				Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 09:47						
Dissolved Solids	ND	5	mg/L							U
LCS (BKC0416-BS1)				Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 09:47						
Dissolved Solids	522	10	mg/L	500		104	90-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0418 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0418-BLK1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 12:32							
Nitrite-N	ND	0.010	mg/L							U
LCS (BKC0418-BS1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 12:34							
Nitrite-N	0.498	0.010	mg/L	0.500		99.6	90-110			
Duplicate (BKC0418-DUP1)		**Source: 22C0274-01**	Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 12:36							
Nitrite-N	ND	0.010	mg/L		ND					U
Matrix Spike (BKC0418-MS1)		**Source: 22C0274-01**	Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 12:37							
Nitrite-N	0.511	0.010	mg/L	0.500	ND	102	75-125			

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

Matrix Spike Dup (BKC0418-MSD1)		**Source: 22C0274-01**	Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 12:38							
Nitrite-N	0.521	0.010	mg/L	0.500	ND	104	75-125	1.94	200	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0424 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0424-BLK1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:29							
Nitrate + Nitrite as N	ND	0.010	mg/L							U
LCS (BKC0424-BS1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:30							
Nitrate + Nitrite as N	0.512	0.010	mg/L	0.500		102	90-110			
Duplicate (BKC0424-DUP1)	**Source: 22C0274-01**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:33							
Nitrate + Nitrite as N	ND	0.010	mg/L		ND					U
Matrix Spike (BKC0424-MS1)	**Source: 22C0274-01**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:34							
Nitrate + Nitrite as N	0.510	0.010	mg/L	0.500	ND	102	75-125			

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

Matrix Spike Dup (BKC0424-MSD1)	**Source: 22C0274-01**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:35							
Nitrate + Nitrite as N	0.510	0.010	mg/L	0.500	ND	102	75-125	0.00		

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0427 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0427-BLK1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 14:52							
Chloride	ND	0.100	mg/L							U
Sulfate	ND	0.100	mg/L							U
LCS (BKC0427-BS1)			Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 15:12							
Chloride	4.93	0.100	mg/L	5.00		98.7	90-110			
Sulfate	5.14	0.100	mg/L	5.00		103	90-110			
Duplicate (BKC0427-DUP1)	**Source: 22C0274-01**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 15:52							
Chloride	2.28	0.100	mg/L		2.27			0.13	20	
Duplicate (BKC0427-DUP3)	**Source: 22C0274-01RE2**		Prepared: 17-Mar-2022 Analyzed: 30-Mar-2022 17:50							
Sulfate	302	10.0	mg/L		305			0.98	20	D
Matrix Spike (BKC0427-MS1)	**Source: 22C0274-01RE1**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 16:12							
Chloride	4.27	0.100	mg/L	2.01	2.27	99.8	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike (BKC0427-MS3)	**Source: 22C0274-01RE2**		Prepared: 17-Mar-2022 Analyzed: 24-Mar-2022 08:49							
Sulfate	878	10.0	mg/L	503	305	114	75-125			D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BKC0427-MSD1)	**Source: 22C0274-01RE1**		Prepared: 17-Mar-2022 Analyzed: 17-Mar-2022 16:32							
Chloride	4.25	0.100	mg/L	2.01	2.27	98.6	75-125	0.56	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BKC0427-MSD3)	**Source: 22C0274-01RE2**		Prepared: 17-Mar-2022 Analyzed: 24-Mar-2022 09:09							
Sulfate	874	10.0	mg/L	503	305	113	75-125	0.48	20	D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0494 - No Prep Wet Chem

Instrument: LACHAT1 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0494-BLK1)				Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:37						
Ammonia-N	ND	0.040	mg/L							U
LCS (BKC0494-BS1)				Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:38						
Ammonia-N	0.486	0.040	mg/L	0.500		97.2	90-110			
Duplicate (BKC0494-DUP1)		**Source: 22C0274-01**		Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:40						
Ammonia-N	0.139	0.040	mg/L		0.139			0.00		
Matrix Spike (BKC0494-MS1)		**Source: 22C0274-01**		Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:42						
Ammonia-N	0.631	0.040	mg/L	0.500	0.139	98.4	75-125			

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

Matrix Spike Dup (BKC0494-MSD1)		**Source: 22C0274-01**		Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:43						
Ammonia-N	0.633	0.040	mg/L	0.500	0.139	98.8	75-125	0.32	200	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0757 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: CKI

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0757-BLK1)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:36						
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK2)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:41						
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK3)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:45						
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK4)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:46						
COD	ND	10.0	mg/L							U
LCS (BKC0757-BS1)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:37						
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS2)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:41						
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS3)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:45						
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS4)				Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:46						
COD	93.6	10.0	mg/L	100		93.6	90-110			
Duplicate (BKC0757-DUP1)		**Source: 22C0274-02**		Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:38						
COD	ND	10.0	mg/L		ND					U
Matrix Spike (BKC0757-MS1)		**Source: 22C0274-02**		Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:39						
COD	95.0	20.0	mg/L	100	ND	95.1	90-110			

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

Matrix Spike Dup (BKC0757-MSD1)		**Source: 22C0274-02**		Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:40						
COD	96.4	20.0	mg/L	100	ND	96.4	90-110	1.45	10	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Analysis by: Fremont Analytical

Wet Chemistry - Quality Control

Batch B032322 - No Prep Wet Chem

Instrument: FANA Analyst:

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
BLK (B032322-BLK1)				Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	ND	0.5	mg/L				0-0			
BS (B032322-BS1)				Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	5.25	0.5	mg/L			105	91.5-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

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 6010D 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

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:45

Notes and Definitions

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.

Analytical Resources, LLC
Analytical Chemists and Consultants

12 April 2022

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

RE: Newcastle LF GW Monitoring (553-1625-014)

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)
22C0296	N/A

Shelly Fishel

Digitally signed by Shelly Fishel
Date: 2022.04.12 18:17:16 -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, LLC

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 its entirety.

Shelly Fishel, Project Manager

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 22C0296	Turn-around Requested: 2 wks	Page: 1 of 1	
ARI Client Company:	Phone: 206 394 3667	Date: 3/17/22	Ice Present?
Client Contact: Lisa Gilbert		No. of Coolers:	Cooler Temps:
Client Project Name: Newcastle Landfill			
Client Project #: 553-1625-014	Samplers: M Brady		

Analytical Resources, LLC
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	Ammonia TOC COD	Diss Fe, Mn Hardness 2540B	TDS					Notes/Comments
MW-2	3/17	1200	H_2O	4	X	X	X	X					
MW-3	3/17	1055	H_2O	4	X	X	X	X					
MW-6	3/17	800	H_2O	4	X	X	X	X					

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Mike Brady	Printed Name: Isabelle Pleasy	Printed Name:	Printed Name:
	Company: Parametrix	Company: ARI	Company:	Company:
	Date & Time: 3/17 1308	Date & Time: 3/17/22 13:08	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: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-2	22C0296-01	Water	17-Mar-2022 12:00	17-Mar-2022 13:08
MW-3	22C0296-02	Water	17-Mar-2022 10:55	17-Mar-2022 13:08
MW-6	22C0296-03	Water	17-Mar-2022 08:00	17-Mar-2022 13:08

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Work Order Case Narrative

Client: Parametrix, Inc.
Project: Newcastle LF GW Monitoring
Project Number: 553-1625-014
Work Order: 22C0296

Sample receipt

Sample(s) as listed on the preceding page were received 17-Mar-2022 13:08 under ARI work order 22C0296. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Dissolved Metals - EPA Method 200.8 and 6010D

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 blank spike (BS/LCS) percent recoveries were within control limits.

The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory 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 blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits.

Total Organic Carbon (TOC)

The sample(s) were submitted to Fremont Analytical for Total Organic Carbon analysis. The Fremont report is included here in its entirety.

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

WORK ORDER

22C0296

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Parametrix, Inc. **Project Manager:** Shelly Fishel

Project: Newcastle LF GW Monitoring **Project Number:** 553-1625-014

Preservation Confirmation

Container ID	Container Type	pH	
22C0296-01 A	HDPE NM, 1000 mL		
22C0296-01 B	HDPE NM, 500 mL	>2	Fail
22C0296-01 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-01 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-01 E	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
22C0296-02 A	HDPE NM, 1000 mL		
22C0296-02 B	HDPE NM, 500 mL	>2	Fail
22C0296-02 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-02 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-02 E	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass
22C0296-03 A	HDPE NM, 1000 mL		
22C0296-03 B	HDPE NM, 500 mL	>2	Fail
22C0296-03 C	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-03 D	Glass NM, Amber, 250 mL, 9N H2SO4	<2	Pass
22C0296-03 E	HDPE NM, 500 mL, 1:1 HNO3 (FF)	<2	Pass

SJS
Preservation Confirmed By

03/17/22
Date

Reviewed By

Date

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Parametrix
Project Name: New castle landfill
COC No(s): _____ NA
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Assigned ARI Job No: 22C0296
Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the 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) 0.5

Time 13:08

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D0025605

Cooler Accepted by: CB Date: 3/17/22 Time: 13:08

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
How were bottles sealed in plastic bags?	Individually	Grouped	Not
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		

Were the sample(s) split by ARI? NA YES Date/Time: 3/17/22 1542 Equipment: paw Split by: JS

Samples Logged by: JS Date: 3/17/22 Time: 1542 Labels checked by: JS

***** 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:

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Analytical Resources, LLC
Shelly Fishel
4611 South 134th Place, Ste 100
Tukwila, WA 98168

RE: 22C0296
Work Order Number: 2203463

March 25, 2022

Attention Shelly Fishel:

Fremont Analytical, Inc. received 3 sample(s) on 3/18/2022 for the analyses presented in the following report.

Total Organic Carbon by SM 5310C

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:
Sub Data

Fremont Analytical

Date: *03/25/2022*

CLIENT: Analytical Resources, LLC
Project: 22C0296
Work Order: 2203463

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2203463-001	22C0296-01	03/17/2022 12:00 PM	03/18/2022 2:06 PM
2203463-002	22C0296-02	03/17/2022 10:55 AM	03/18/2022 2:06 PM
2203463-003	22C0296-03	03/17/2022 8:00 AM	03/18/2022 2:06 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2203463**
Date: **3/25/2022**

CLIENT: Analytical Resources, LLC
Project: 22C0296

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2203463**
Date Reported: **3/25/2022**

CLIENT: Analytical Resources, LLC
Project: 22C0296

Lab ID: 2203463-001 **Collection Date:** 3/17/2022 12:00:00 PM
Client Sample ID: **22C0296-01** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C					Batch ID: R74293	Analyst: SLL
Total Organic Carbon	154	2.00	D	mg/L	4	3/23/2022 8:03:00 PM

Lab ID: 2203463-002 **Collection Date:** 3/17/2022 10:55:00 AM
Client Sample ID: **22C0296-02** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C					Batch ID: R74293	Analyst: SLL
Total Organic Carbon	4.53	2.00	D	mg/L	4	3/23/2022 9:13:00 PM

Lab ID: 2203463-003 **Collection Date:** 3/17/2022 8:00:00 AM
Client Sample ID: **22C0296-03** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by SM 5310C					Batch ID: R74293	Analyst: SLL
Total Organic Carbon	3.66	2.00	D	mg/L	4	3/23/2022 9:45:00 PM

Fremont Analytical

Date: *3/25/2022*

Work Order: 2203463
CLIENT: Analytical Resources, LLC
Project: 22C0296

QC SUMMARY REPORT

Total Organic Carbon by SM 5310C

Sample ID: **LCS-74293**	SampType: **LCS**	Units: **mg/L**	Prep Date: **3/23/2022**	RunNo: **74293**
Client ID: **LCSW**	Batch ID: **R74293**		Analysis Date: **3/23/2022**	SeqNo: **1523789**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	5.25	0.500	5.000	0	105	91.5	110				

Sample ID: **MB-74293**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **3/23/2022**	RunNo: **74293**
Client ID: **MBLKW**	Batch ID: **R74293**		Analysis Date: **3/23/2022**	SeqNo: **1523790**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.500									

Sample ID: **2203463-001ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **3/23/2022**	RunNo: **74293**
Client ID: **22C0296-01**	Batch ID: **R74293**		Analysis Date: **3/23/2022**	SeqNo: **1523792**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	151	2.00						153.5	1.40	20	D

Sample ID: **2203463-001AMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **3/23/2022**	RunNo: **74293**
Client ID: **22C0296-01**	Batch ID: **R74293**		Analysis Date: **3/23/2022**	SeqNo: **1523793**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	171	2.00	20.00	153.5	87.4	71.5	116				D

Sample ID: **2203547-001ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **3/24/2022**	RunNo: **74293**
Client ID: **BATCH**	Batch ID: **R74293**		Analysis Date: **3/24/2022**	SeqNo: **1523808**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	14.6	0.500						14.51	0.529	20	

Original

Fremont Analytical

Date: *3/25/2022*

Work Order: 2203463
CLIENT: Analytical Resources, LLC
Project: 22C0296

QC SUMMARY REPORT

Total Organic Carbon by SM 5310C

Sample ID: **2203547-001AMS** SampType: **MS** Units: **mg/L** Prep Date: **3/24/2022** RunNo: **74293**
Client ID: **BATCH** Batch ID: **R74293** Analysis Date: **3/24/2022** SeqNo: **1523809**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	19.6	0.500	5.000	14.51	102	71.5	116				

Sample ID: **2203547-001AMSD** SampType: **MSD** Units: **mg/L** Prep Date: **3/24/2022** RunNo: **74293**
Client ID: **BATCH** Batch ID: **R74293** Analysis Date: **3/24/2022** SeqNo: **1523810**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	19.6	0.500	5.000	14.51	102	71.5	116	19.63	0.0612	30	

Sample Log-In Check List

Client Name:	**ARI**	Work Order Number:	**2203463**
Logged by:	**Clare Griggs**	Date Received:	**3/18/2022 2:06:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No ☐	Not Present	☐
2.	How was the sample delivered?	Courier				

Log In

3.	Coolers are present?	Yes	☑	No ☐	NA	☐
4.	Shipping container/cooler in good condition?	Yes	☑	No ☐		
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No ☐	Not Present	☑
6.	Was an attempt made to cool the samples?	Yes	☑	No ☐	NA	☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☑	No ☐	NA	☐
8.	Sample(s) in proper container(s)?	Yes	☑	No ☐		
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No ☐		
10.	Are samples properly preserved?	Yes	☑	No ☐		
11.	Was preservative added to bottles?	Yes	☐	No ☑	NA	☐
12.	Is there headspace in the VOA vials?	Yes	☐	No ☐	NA	☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No ☐		
14.	Does paperwork match bottle labels?	Yes	☑	No ☐		
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No ☐		
16.	Is it clear what analyses were requested?	Yes	☑	No ☐		
17.	Were all holding times able to be met?	Yes	☑	No ☐		

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No ☐	NA	☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original

Analytical Resources, LLC
Analytical Chemists and Consultants

2203463

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order:22C0296

SENDING LABORATORY:

Analytical Resources, LLC
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6202
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone :(206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA AND INVOICE TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 22C0296-01 **Sampled: 03/17/22 12:00 Matrix: Water**				~~Field filtered~~ (1)
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/14/22 12:00		
Containers Supplied: **22C0296-01 C** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22C0296-02 **Sampled: 03/17/22 10:55 Matrix: Water**				~~Field filtered~~ (1)
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/14/22 10:55		
Containers Supplied: **22C0296-02 C** Glass NM, Amber, 250 mL, 9N				
Sample ID: 22C0296-03 **Sampled: 03/17/22 08:00 Matrix: Water**				~~Field filtered~~ (1)
Carbon, Organic Total, SM 5310 B-00	03/31/22	04/14/22 08:00		
Containers Supplied: **22C0296-03 C** Glass NM, Amber, 250 mL, 9N				

(1) SLF 3/17/2022

Standard 5-day TAT
Pdf : EDD
SLF 03/17/2022

Jacob Walte 03/18/22 1241
Released By Date Received By Date

Released By Date Justine Pogue 3/18/22 14:06
Received By Date

Printed: 03/17/2022 15:51:00

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/17/2022 12:00
Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 22:54

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0296-01 E 02
Preparation Batch: BKC0707 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	0.525	ug/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/17/2022 12:00
Instrument: ICP2 Analyst: MVP — Analyzed: 03/30/2022 20:19

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0296-01 E 02
Preparation Batch: BKC0717 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	18.5	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	1.01	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	5.19	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.0762	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/17/2022 12:00
Instrument: IC930 Analyst: BF — Analyzed: 03/18/2022 18:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01 B
Preparation Batch: BKC0452 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.225	mg/L	

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.615	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/17/2022 12:00
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 12:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.159	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/17/2022 12:00
Instrument: [CALC] Analyst: AGM — Analyzed: 03/23/2022 12:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0296-01
Preparation Batch: [CALC]
Prepared: 03/23/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.172	mg/L	

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/18/2022 14:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01 B
Preparation Batch: BKC0453 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.010	0.015	mg/L	

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01 D
Preparation Batch: BKC0554 — Sample Size: 10 mL
Prepared: 03/23/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.187	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/17/2022 12:00
Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01 D
Preparation Batch: BKC0757 — Sample Size: 0.4 mL
Prepared: 03/29/2022 — Final Volume: 2 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
COD		1	50.0	550	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/17/2022 12:00

Instrument: [CALC] Analyst: MVP — Analyzed: 03/30/2022 20:19

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0296-01

Preparation Batch: [CALC]

Prepared: 03/28/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	67.6	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/17/2022 12:00
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01
Preparation Batch: B032322
Prepared: 03/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	2.00	154	mg/L	Da

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-2

22C0296-01RE1 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/17/2022 12:00
Instrument: BAL2 Analyst: DOE — Analyzed: 03/24/2022 08:42

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-01RE1
Preparation Batch: BKC0586 — Sample Size: 200 mL
Prepared: 03/24/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	5	101	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/17/2022 10:55
Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 22:59

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0296-02 E 02
Preparation Batch: BKC0707 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	3.18	ug/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/17/2022 10:55
Instrument: ICP2 Analyst: MVP — Analyzed: 03/30/2022 18:56

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0296-02 E 02
Preparation Batch: BKC0717 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	14.1	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.341	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	7.38	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.0278	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/17/2022 10:55
Instrument: BAL2 Analyst: DOE — Analyzed: 03/18/2022 13:17

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02
Preparation Batch: BKC0463 — Sample Size: 100 mL
Prepared: 03/18/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	423	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/17/2022 10:55
Instrument: IC930 Analyst: BF — Analyzed: 03/18/2022 20:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02 B
Preparation Batch: BKC0452 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	5.97	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/17/2022 10:55
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 12:04

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.288	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/17/2022 10:55
Instrument: [CALC] Analyst: AGM — Analyzed: 03/23/2022 12:35

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0296-02
Preparation Batch: [CALC]
Prepared: 03/23/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.161	mg/L	

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/18/2022 14:45

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02 B
Preparation Batch: BKC0453 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

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

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02 D
Preparation Batch: BKC0554 — Sample Size: 10 mL
Prepared: 03/23/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.161	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/17/2022 10:55

Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:42

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02 D

Preparation Batch: BKC0757 — Sample Size: 2 mL

Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/17/2022 10:55

Instrument: [CALC] Analyst: MVP — Analyzed: 03/30/2022 18:56

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0296-02

Preparation Batch: [CALC]

Prepared: 03/28/2022 Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	65.5	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/17/2022 10:55
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02
Preparation Batch: B032322
Prepared: 03/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	2.00	4.53	mg/L	Da

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-3

22C0296-02RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/17/2022 10:55
Instrument: IC930 Analyst: BF — Analyzed: 03/19/2022 01:42

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-02RE1 B
Preparation Batch: BKC0452 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	6	0.600	27.7	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 200.8 UCT-KED — Sampled: 03/17/2022 08:00
Instrument: ICPMS1 Analyst: MCB — Analyzed: 03/28/2022 23:04

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix — Extract ID: 22C0296-03 E 02
Preparation Batch: BKC0707 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.200	3.23	ug/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6010D — Sampled: 03/17/2022 08:00
Instrument: ICP2 Analyst: MVP — Analyzed: 03/30/2022 18:59

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: WMN (No Prep) — Extract ID: 22C0296-03 E 02
Preparation Batch: BKC0717 — Sample Size: 25 mL
Prepared: 03/28/2022 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Calcium, Dissolved	7440-70-2	1	0.0500	14.1	mg/L	
Iron, Dissolved	7439-89-6	1	0.0500	0.301	mg/L	
Magnesium, Dissolved	7439-95-4	1	0.0500	7.39	mg/L	
Manganese, Dissolved	7439-96-5	1	0.0040	0.0298	mg/L	
Zinc, Dissolved	7440-66-6	1	0.0200	ND	mg/L	U

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: EPA 160.1 — Sampled: 03/17/2022 08:00
Instrument: BAL2 Analyst: DOE — Analyzed: 03/18/2022 13:17

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03
Preparation Batch: BKC0463 — Sample Size: 100 mL
Prepared: 03/18/2022 — Final Volume: 200 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Dissolved Solids		1	10	423	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/17/2022 08:00
Instrument: IC930 Analyst: BF — Analyzed: 03/18/2022 20:22

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03 B
Preparation Batch: BKC0452 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	5.95	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: EPA 350.1 M — Sampled: 03/17/2022 08:00
Instrument: LACHAT1 Analyst: AGM — Analyzed: 03/22/2022 12:05

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03 D
Preparation Batch: BKC0494 — Sample Size: 10 mL
Prepared: 03/21/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Ammonia-N	7664-41-7	1	0.040	0.284	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: EPA 353.2 — Sampled: 03/17/2022 08:00
Instrument: [CALC] Analyst: AGM — Analyzed: 03/23/2022 12:36

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC] — Extract ID: 22C0296-03
Preparation Batch: [CALC]
Prepared: 03/23/2022 — Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.0200	0.160	mg/L	

Instrument: LACHAT2 Analyst: AGM — Analyzed: 03/18/2022 14:52

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03 B
Preparation Batch: BKC0453 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

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

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03 D
Preparation Batch: BKC0554 — Sample Size: 10 mL
Prepared: 03/23/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Nitrate + Nitrite as N		1	0.010	0.160	mg/L	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: EPA 410.4 — Sampled: 03/17/2022 08:00
Instrument: UV1800-1 Analyst: CKI — Analyzed: 03/30/2022 15:42

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03 D
Preparation Batch: BKC0757 — Sample Size: 2 mL
Prepared: 03/29/2022 — Final Volume: 2 mL

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Calculation

Method: SM 2340 B-97 — Sampled: 03/17/2022 08:00

Instrument: [CALC] Analyst: MVP — Analyzed: 03/30/2022 18:59

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]
Prepared: 03/28/2022 Final Volume: 1

Extract ID: 22C0296-03

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness, Dissolved		1	0.331	65.6	mg/L CaCO3	

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03 (Water)

Wet Chemistry

Method: SM 5310 B-00 — Sampled: 03/17/2022 08:00
Instrument: FANA Analyst: — Analyzed: 03/23/2022 00:00

Analysis by: Fremont Analytical

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03
Preparation Batch: B032322
Prepared: 03/17/2022 Final Volume:

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Total Organic Carbon		1	2.00	3.66	mg/L	Da

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

MW-6

22C0296-03RE1 (Water)

Wet Chemistry

Method: EPA 300.0 — Sampled: 03/17/2022 08:00
Instrument: IC930 Analyst: BF — Analyzed: 03/19/2022 02:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 22C0296-03RE1 B
Preparation Batch: BKC0452 — Sample Size: 10 mL
Prepared: 03/18/2022 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	6	0.600	28.0	mg/L	D

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BKC0707 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0707-BLK1)				Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 17:21							
Arsenic, Dissolved	75a	ND	0.200	ug/L							U
LCS (BKC0707-BS1)				Prepared: 28-Mar-2022 Analyzed: 28-Mar-2022 17:26							
Arsenic, Dissolved	75a	26.0	0.200	ug/L	25.0		104	80-120			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BKC0717 - WMN (No Prep)

Instrument: ICP2 Analyst: MVP

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0717-BLK1)				Prepared: 28-Mar-2022 Analyzed: 30-Mar-2022 18:48						
Calcium, Dissolved	ND	0.0500	mg/L							U
Magnesium, Dissolved	ND	0.0500	mg/L							U
Manganese, Dissolved	ND	0.0040	mg/L							U
Zinc, Dissolved	ND	0.0200	mg/L							U
Blank (BKC0717-BLK2)				Prepared: 28-Mar-2022 Analyzed: 04-Apr-2022 15:08						
Iron, Dissolved	ND	0.0500	mg/L							U
LCS (BKC0717-BS1)				Prepared: 28-Mar-2022 Analyzed: 30-Mar-2022 19:16						
Calcium, Dissolved	9.53	0.0505	mg/L	10.0		95.3	80-120			
Magnesium, Dissolved	10.5	0.0505	mg/L	10.0		105	80-120			
Manganese, Dissolved	0.500	0.0040	mg/L	0.500		100	80-120			
Zinc, Dissolved	0.505	0.0202	mg/L	0.500		101	80-120			
LCS (BKC0717-BS2)				Prepared: 28-Mar-2022 Analyzed: 04-Apr-2022 15:37						
Iron, Dissolved	2.09	0.0505	mg/L	2.00		104	80-120			
Duplicate (BKC0717-DUP1)		**Source: 22C0296-01**		Prepared: 28-Mar-2022 Analyzed: 30-Mar-2022 20:16						
Calcium, Dissolved	18.5	0.0505	mg/L		18.5			0.01	20	
Magnesium, Dissolved	5.01	0.0505	mg/L		5.19			3.68	20	
Manganese, Dissolved	0.0730	0.0040	mg/L		0.0762			4.26	20	
Zinc, Dissolved	ND	0.0202	mg/L		ND					U
Duplicate (BKC0717-DUP2)		**Source: 22C0296-01**		Prepared: 28-Mar-2022 Analyzed: 04-Apr-2022 15:13						
Iron, Dissolved	0.989	0.0505	mg/L		1.01			2.07	20	
Matrix Spike (BKC0717-MS1)		**Source: 22C0296-01**		Prepared: 28-Mar-2022 Analyzed: 30-Mar-2022 20:22						
Calcium, Dissolved	28.5	0.0505	mg/L	10.0	18.5	99.8	75-125			
Magnesium, Dissolved	16.2	0.0505	mg/L	10.0	5.19	110	75-125			
Manganese, Dissolved	0.600	0.0040	mg/L	0.500	0.0762	105	75-125			
Zinc, Dissolved	0.529	0.0202	mg/L	0.500	ND	106	75-125			

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

Matrix Spike (BKC0717-MS2)		**Source: 22C0296-01**		Prepared: 28-Mar-2022 Analyzed: 04-Apr-2022 15:19						
Iron, Dissolved	3.12	0.0505	mg/L	2.00	1.01	106	75-125			

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0452 - No Prep Wet Chem

Instrument: IC930 Analyst: BF

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0452-BLK1)				Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 17:02						
Chloride	ND	0.100	mg/L							U
Sulfate	ND	0.100	mg/L							U
LCS (BKC0452-BS1)				Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 17:22						
Chloride	4.91	0.100	mg/L	5.00		98.2	90-110			
Sulfate	4.82	0.100	mg/L	5.00		96.5	90-110			
Duplicate (BKC0452-DUP1)	**Source: 22C0296-01**			Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 18:22						
Chloride	0.273	0.100	mg/L		0.225			19.30	20	
Sulfate	0.643	0.100	mg/L		0.615			4.45	20	
Matrix Spike (BKC0452-MS1)	**Source: 22C0296-01**			Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 18:42						
Chloride	2.07	0.100	mg/L	2.01	0.225	92.0	75-125			
Sulfate	2.37	0.100	mg/L	2.01	0.615	87.2	75-125			

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

Matrix Spike Dup (BKC0452-MSD1)	**Source: 22C0296-01**			Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 19:02						
Chloride	1.90	0.100	mg/L	2.01	0.225	83.7	75-125	8.40	20	
Sulfate	2.26	0.100	mg/L	2.01	0.615	81.6	75-125	4.88	20	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0453 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0453-BLK1)			Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 14:42							
Nitrite-N	ND	0.010	mg/L							U
LCS (BKC0453-BS1)			Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 14:43							
Nitrite-N	0.489	0.010	mg/L	0.500		97.8	90-110			
Duplicate (BKC0453-DUP1)		**Source: 22C0296-02**	Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 14:46							
Nitrite-N	ND	0.010	mg/L		ND					U
Matrix Spike (BKC0453-MS1)		**Source: 22C0296-02**	Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 14:47							
Nitrite-N	0.517	0.010	mg/L	0.500	ND	103	75-125			

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

Matrix Spike Dup (BKC0453-MSD1)		**Source: 22C0296-02**	Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 14:48							
Nitrite-N	0.519	0.010	mg/L	0.500	ND	104	75-125	0.39	200	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0463 - No Prep Wet Chem

Instrument: BAL2 Analyst: DOE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0463-BLK1)				Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 13:17						
Dissolved Solids	ND	5	mg/L							U
LCS (BKC0463-BS1)				Prepared: 18-Mar-2022 Analyzed: 18-Mar-2022 13:17						
Dissolved Solids	514	10	mg/L	500		103	90-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0494 - No Prep Wet Chem

Instrument: LACHAT1 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0494-BLK1)			Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:37							
Ammonia-N	ND	0.040	mg/L							U
LCS (BKC0494-BS1)			Prepared: 21-Mar-2022 Analyzed: 22-Mar-2022 11:38							
Ammonia-N	0.486	0.040	mg/L	0.500		97.2	90-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0554 - No Prep Wet Chem

Instrument: LACHAT2 Analyst: AGM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0554-BLK1)			Prepared: 23-Mar-2022 Analyzed: 23-Mar-2022 12:31							
Nitrate + Nitrite as N	ND	0.010	mg/L							U
LCS (BKC0554-BS1)			Prepared: 23-Mar-2022 Analyzed: 23-Mar-2022 12:32							
Nitrate + Nitrite as N	0.508	0.010	mg/L	0.500		102	90-110			
Duplicate (BKC0554-DUP1)	**Source: 22C0296-03**		Prepared: 23-Mar-2022 Analyzed: 23-Mar-2022 12:37							
Nitrate + Nitrite as N	0.161	0.010	mg/L		0.160			0.62	20	
Matrix Spike (BKC0554-MS1)	**Source: 22C0296-03**		Prepared: 23-Mar-2022 Analyzed: 23-Mar-2022 12:38							
Nitrate + Nitrite as N	0.655	0.010	mg/L	0.500	0.160	99.0	75-125			

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

Matrix Spike Dup (BKC0554-MSD1)	**Source: 22C0296-03**		Prepared: 23-Mar-2022 Analyzed: 23-Mar-2022 12:40							
Nitrate + Nitrite as N	0.654	0.010	mg/L	0.500	0.160	98.8	75-125	0.15	20	

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0586 - No Prep Wet Chem

Instrument: BAL2 Analyst: DOE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0586-BLK1)				Prepared: 24-Mar-2022 Analyzed: 24-Mar-2022 08:42						
Dissolved Solids	ND	5	mg/L							U
LCS (BKC0586-BS1)				Prepared: 24-Mar-2022 Analyzed: 24-Mar-2022 08:42						
Dissolved Solids	481	10	mg/L	500		96.1	90-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BKC0757 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: CKI

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BKC0757-BLK1)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:36							
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK2)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:41							
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK3)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:45							
COD	ND	10.0	mg/L							U
Blank (BKC0757-BLK4)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:46							
COD	ND	10.0	mg/L							U
LCS (BKC0757-BS1)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:37							
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS2)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:41							
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS3)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:45							
COD	95.9	10.0	mg/L	100		95.9	90-110			
LCS (BKC0757-BS4)			Prepared: 29-Mar-2022 Analyzed: 30-Mar-2022 15:46							
COD	93.6	10.0	mg/L	100		93.6	90-110			

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Analysis by: Fremont Analytical

Wet Chemistry - Quality Control

Batch B032322 - No Prep Wet Chem

Instrument: FANA Analyst:

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
BLK (B032322-BLK1)				Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	ND	0.5	mg/L				0-0			
BS (B032322-BS1)				Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	5.25	0.5	mg/L			105	91.5-110			
DUP (B032322-DUP1)	**Source: 22C0296-01**			Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	151	0.5	mg/L		154		0-0	1.40	20	Da
MS (B032322-MS1)	**Source: 22C0296-01**			Prepared:	Analyzed: 23-Mar-2022 00:00					
Total Organic Carbon	171	0.5	mg/L		154	87.4	71.5-116			Da

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

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

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 6010D 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

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022

Parametrix, Inc.	Project: Newcastle LF GW Monitoring	
719 2nd Avenue, Suite 200	Project Number: 553-1625-014	**Reported:**
Seattle WA, 98104	Project Manager: Lisa Gilbert	12-Apr-2022 17:48

Notes and Definitions

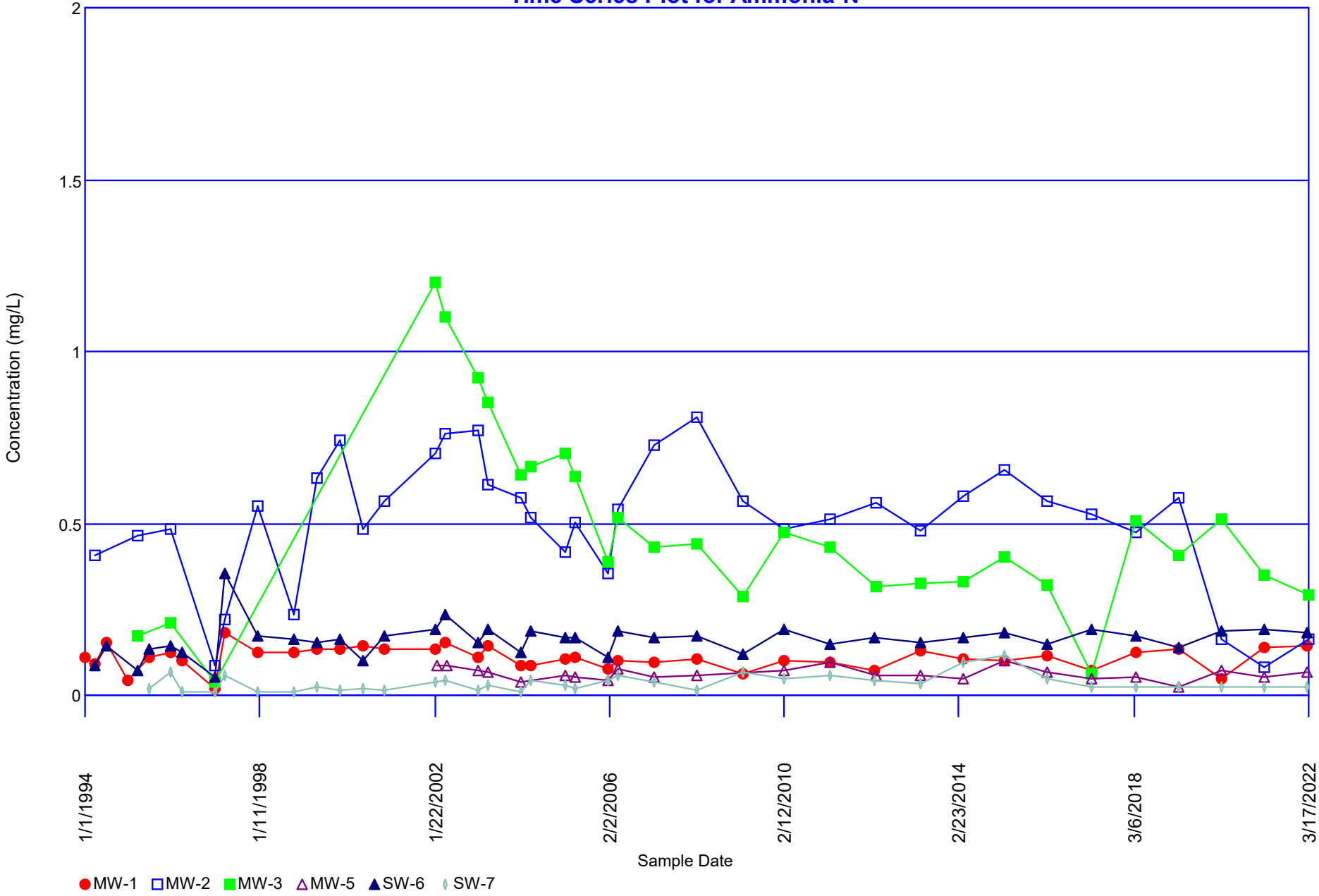
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
Da	Dilution was required
J	Estimated concentration value detected below the reporting limit.
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
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

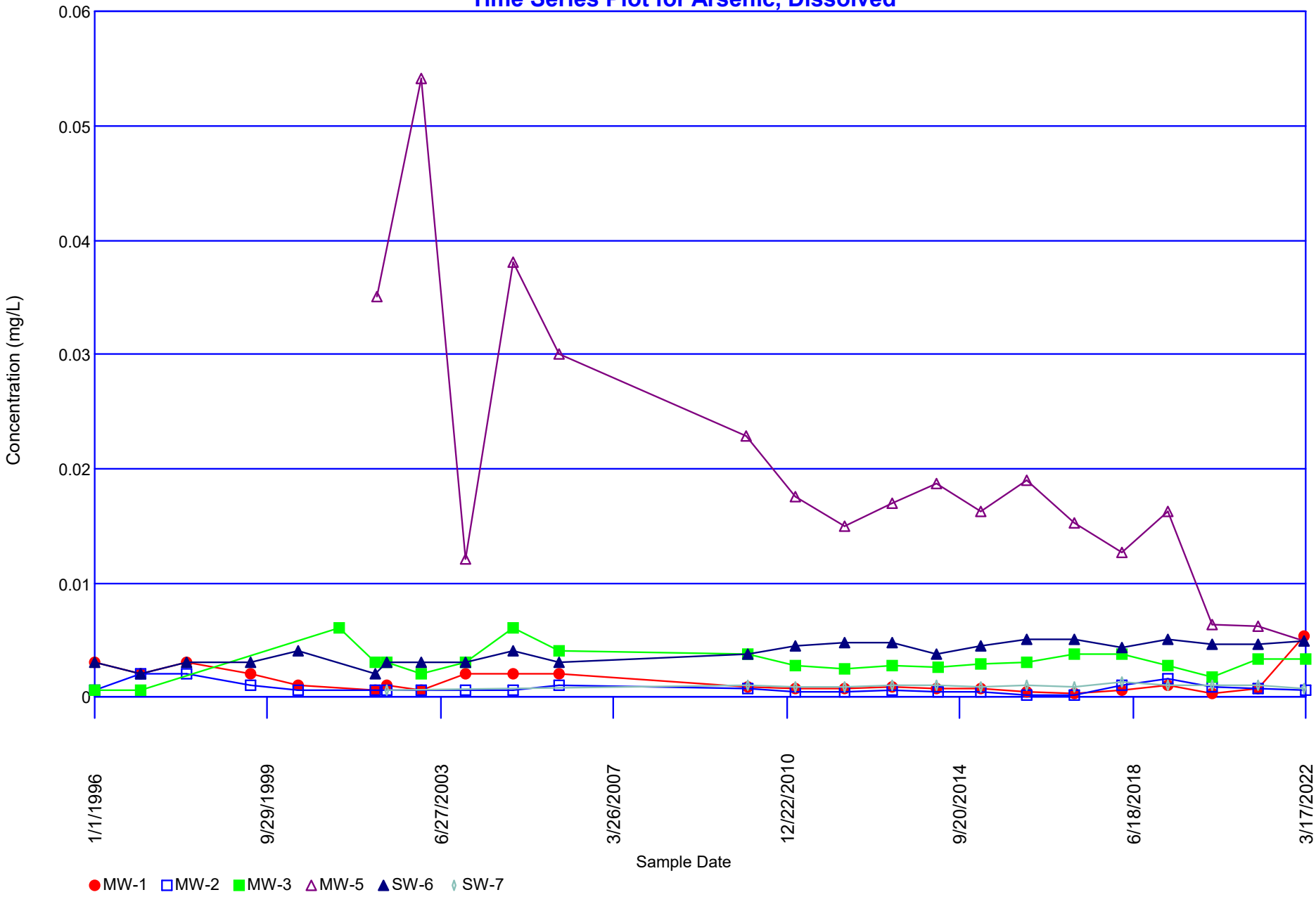


Ammonia-N

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Arsenic, Dissolved

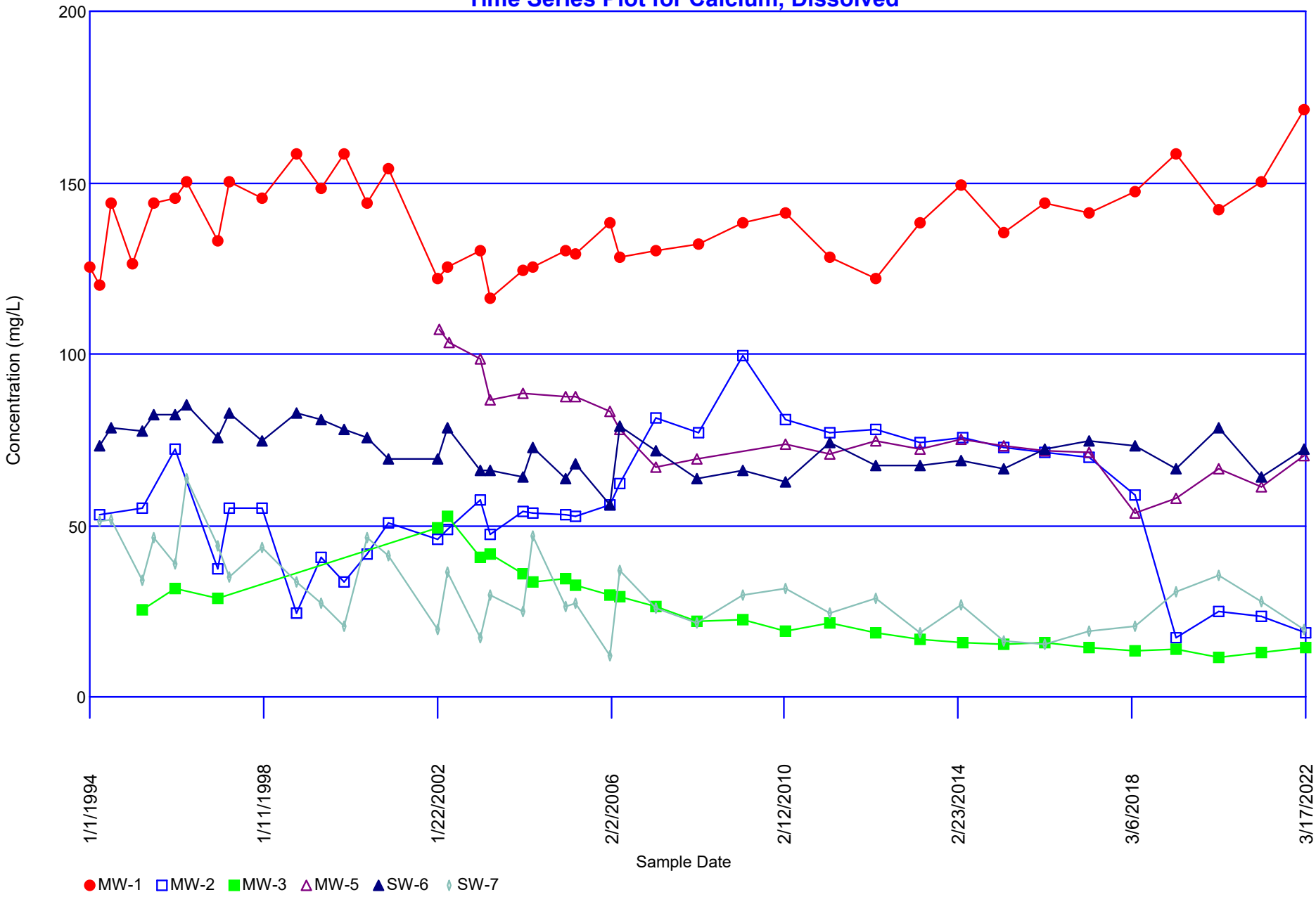


Arsenic, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Calcium, Dissolved

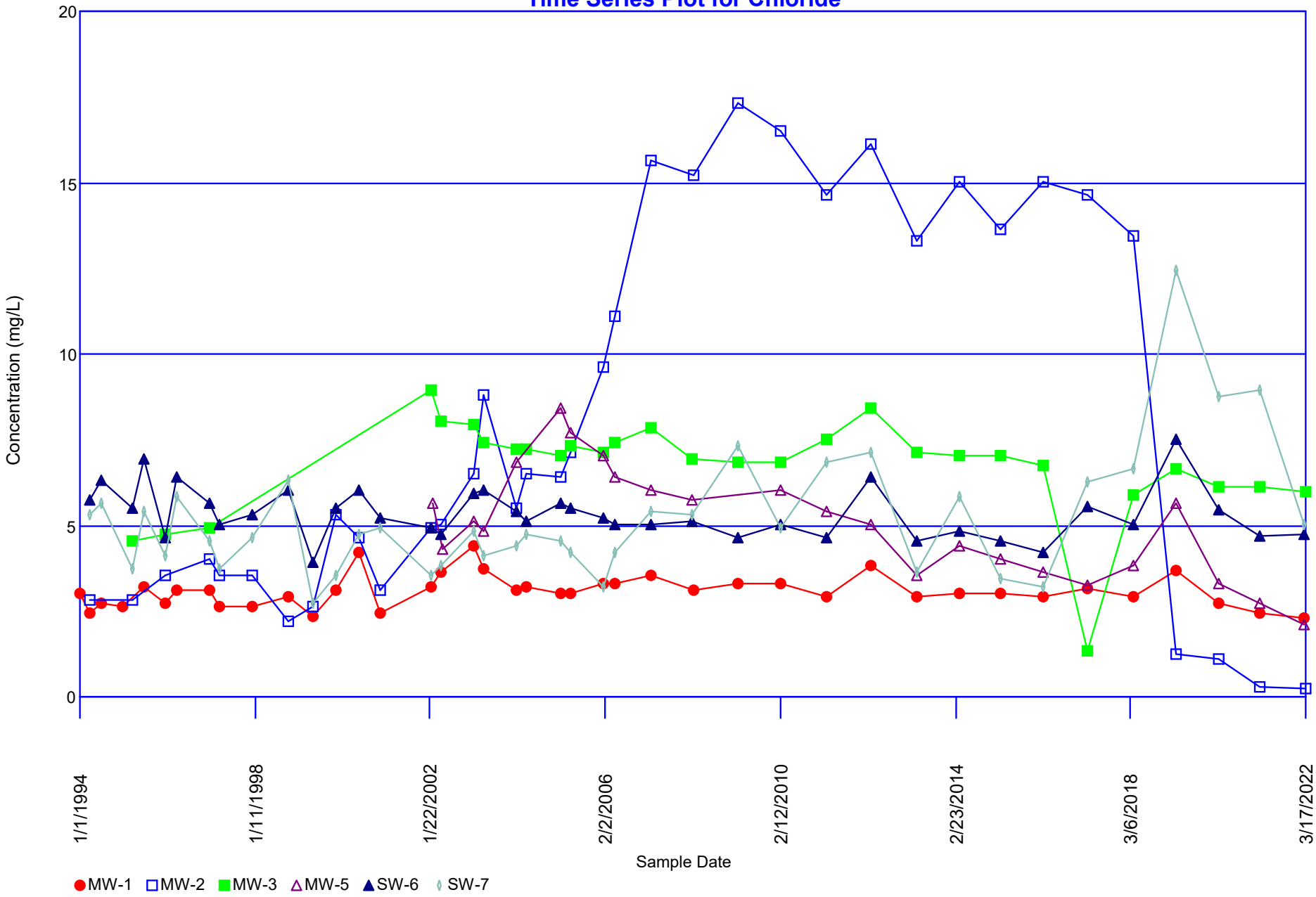


Calcium, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Chloride

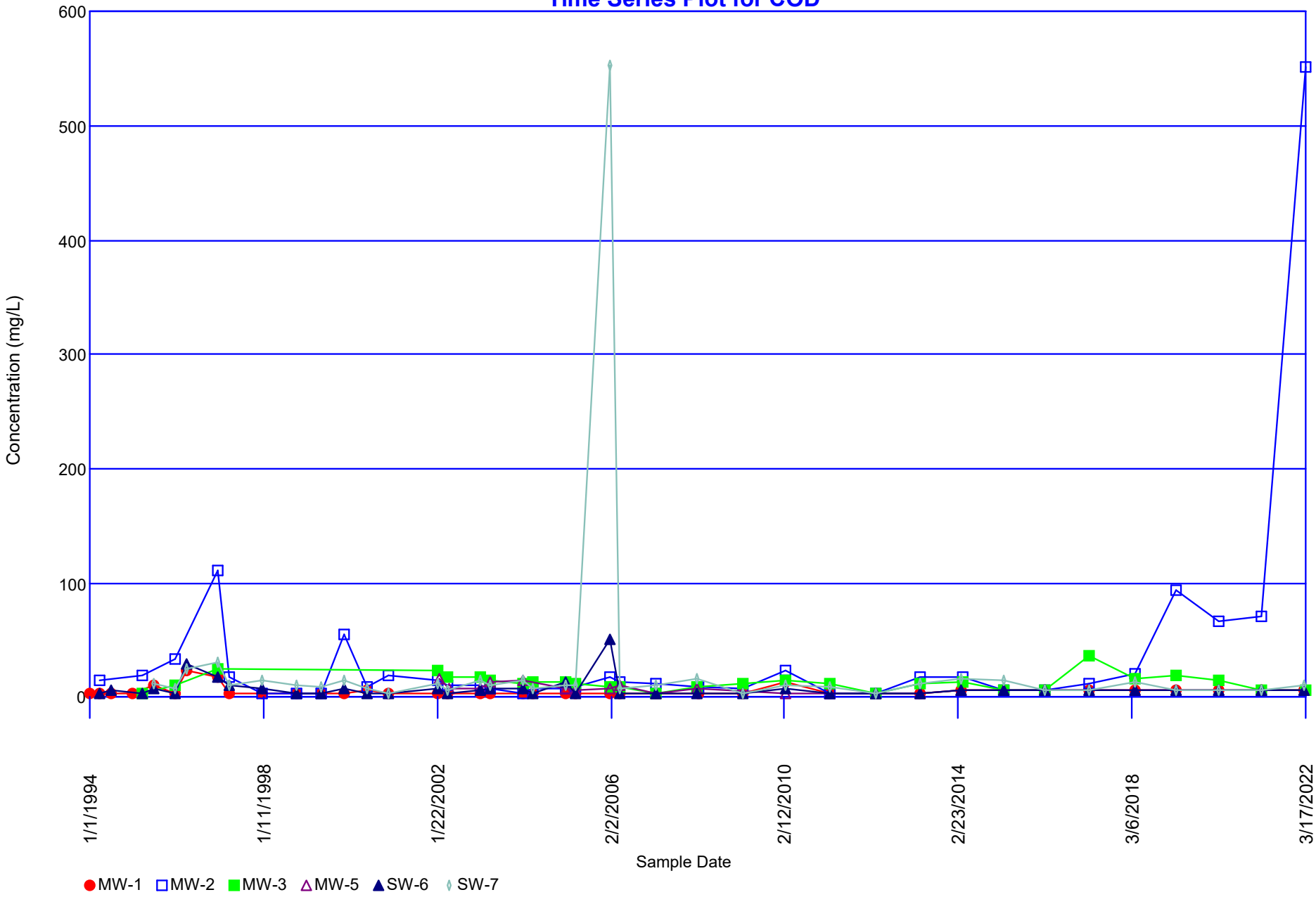


Chloride

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for COD

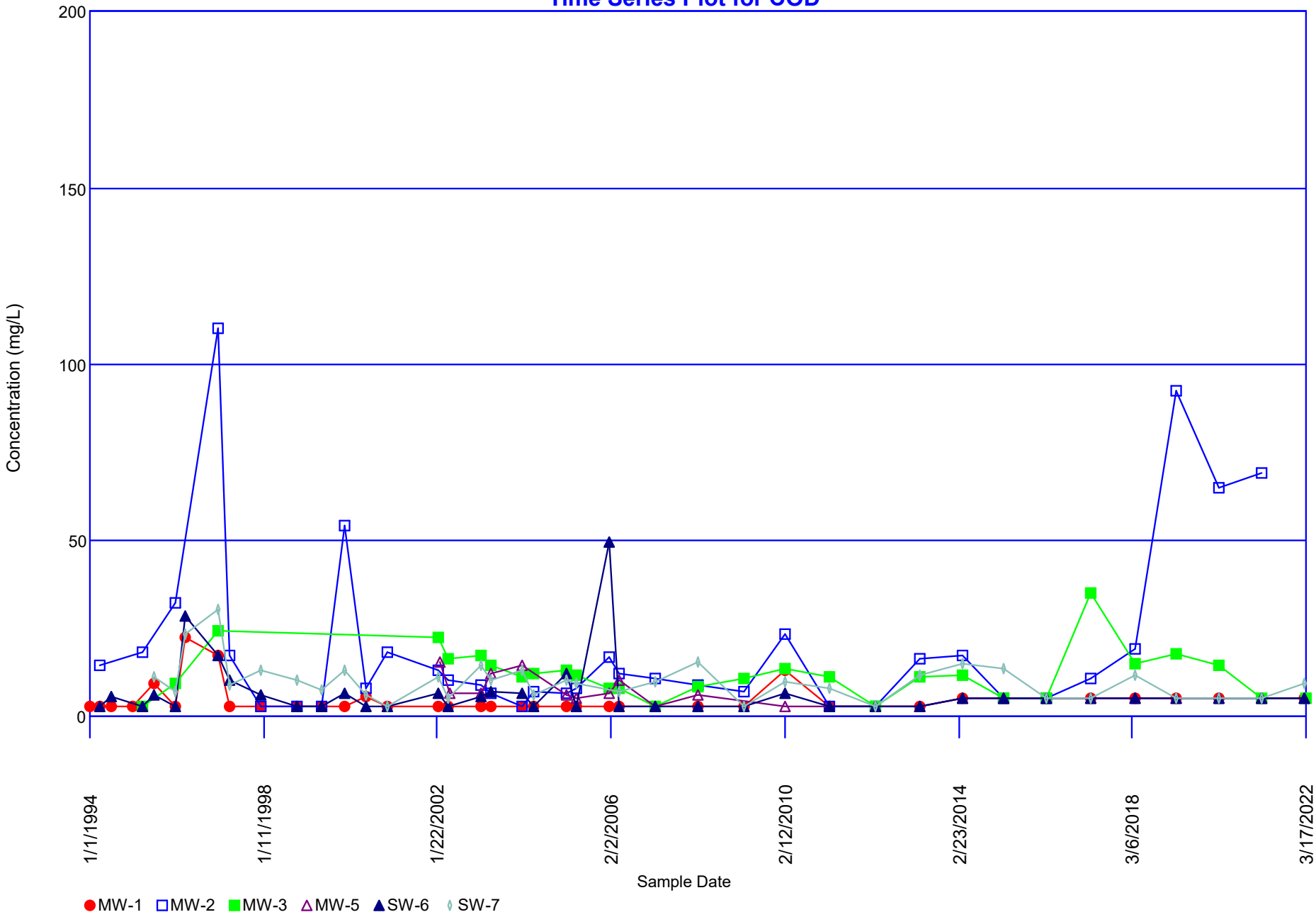


COD

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for COD

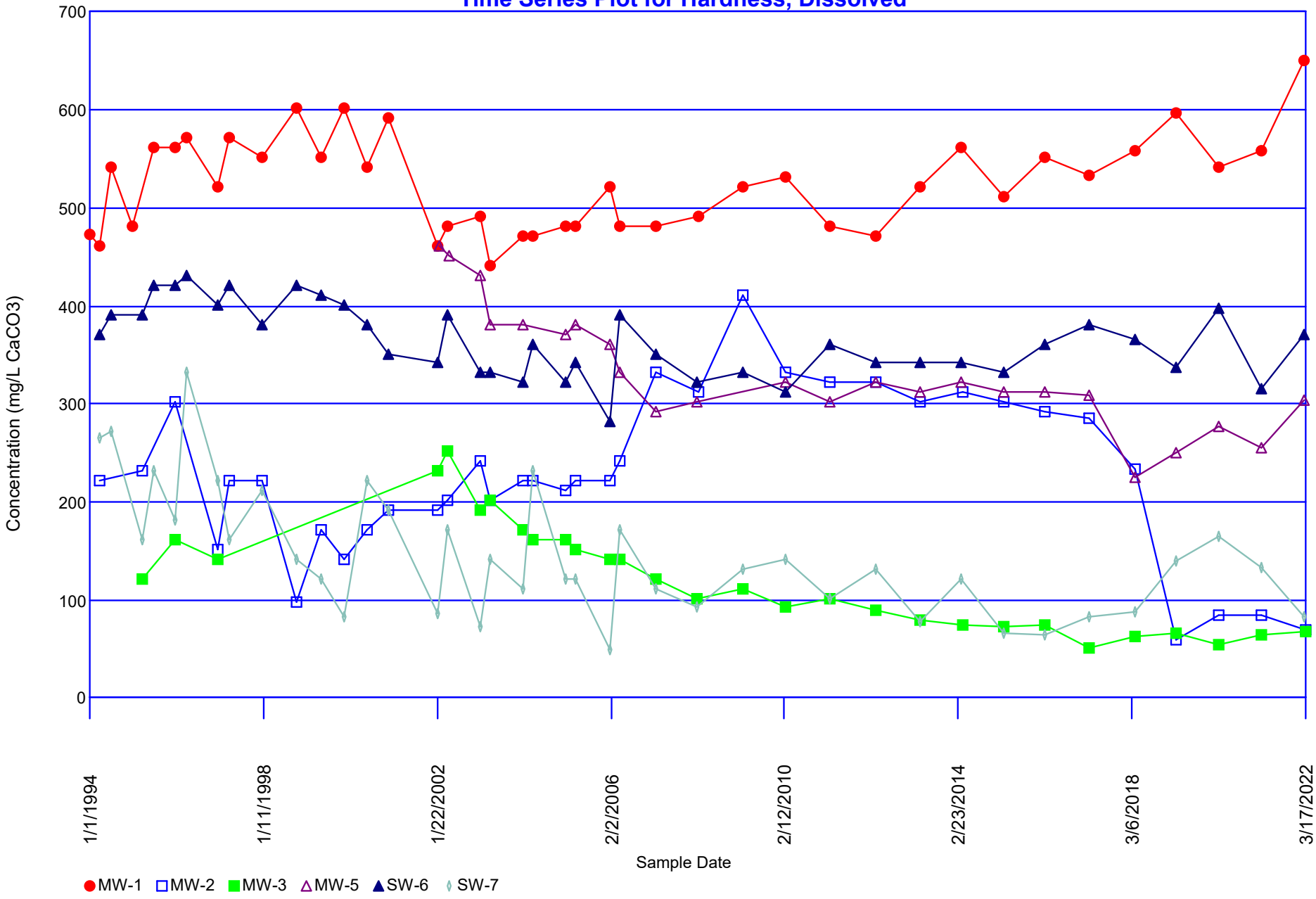


COD

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Hardness, Dissolved

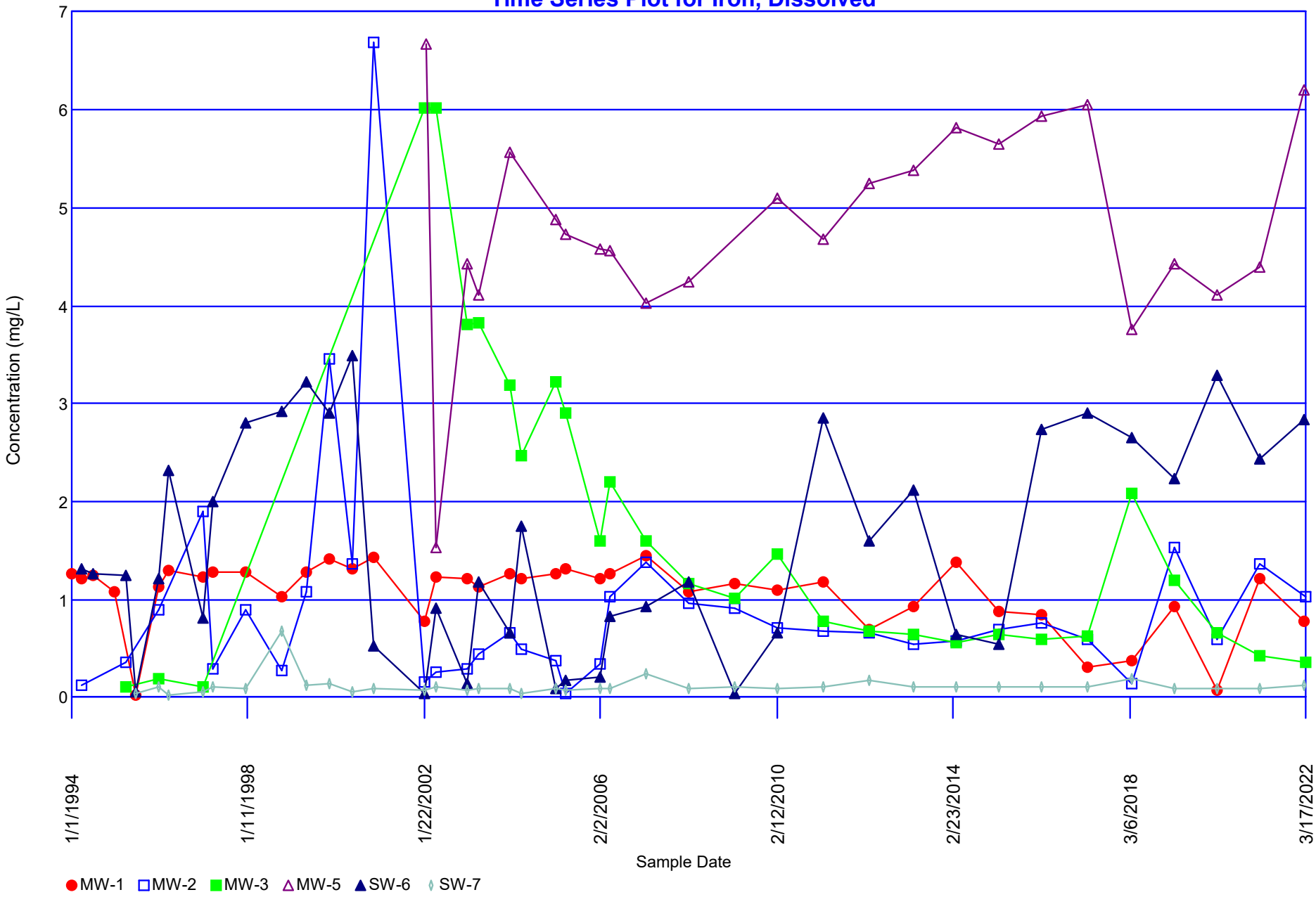


Hardness, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Iron, Dissolved

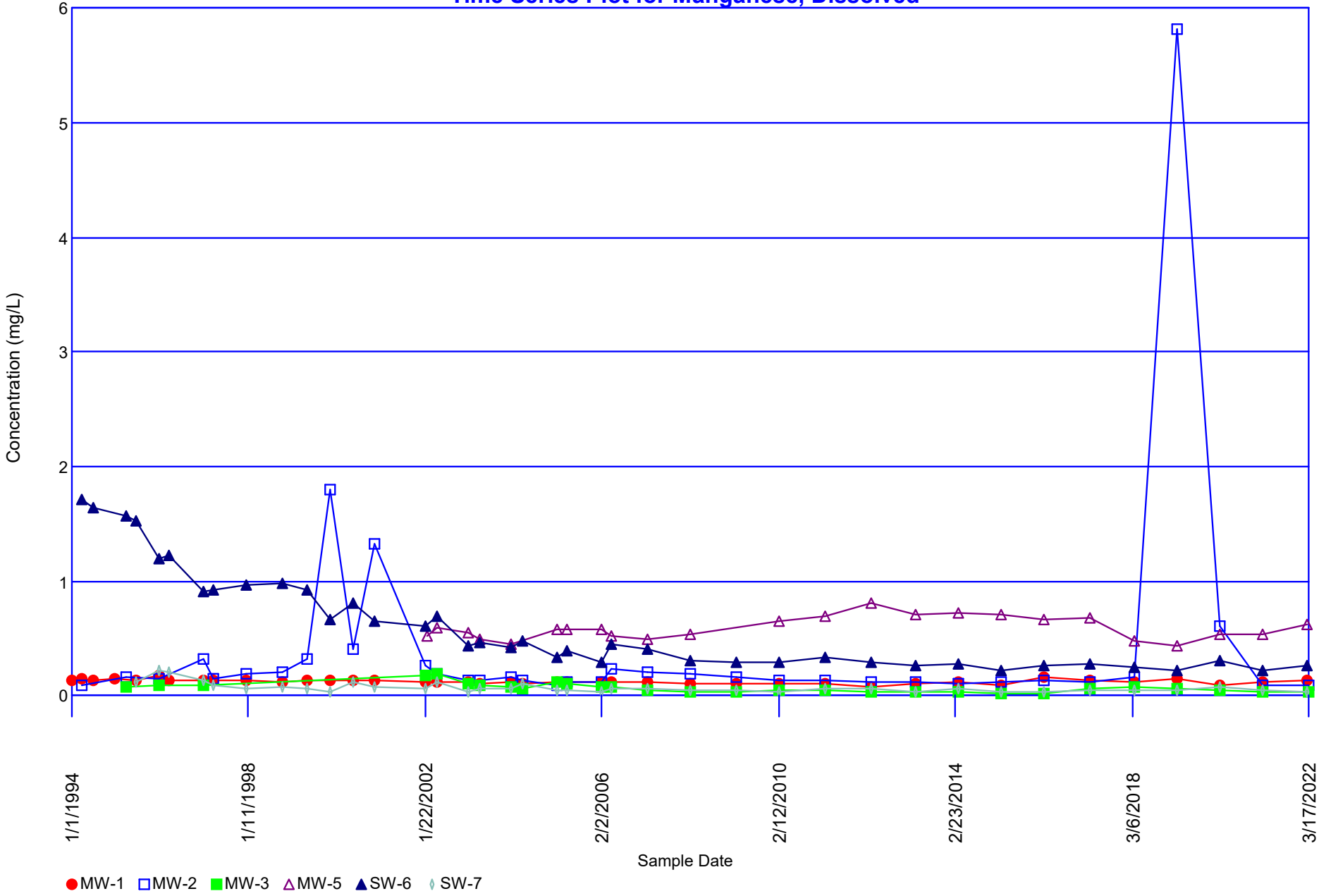


Iron, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Manganese, Dissolved

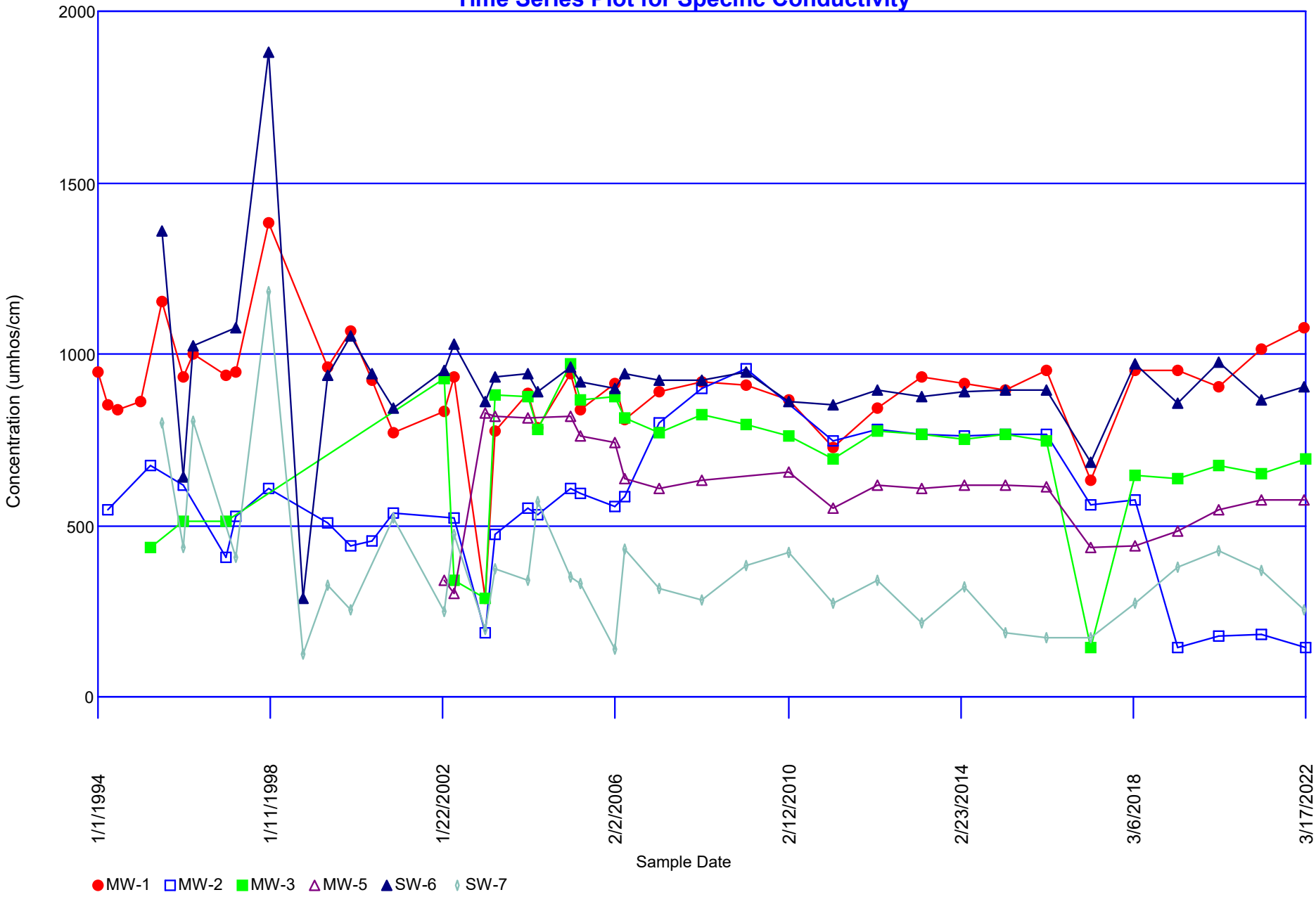


Manganese, Dissolved

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Specific Conductivity

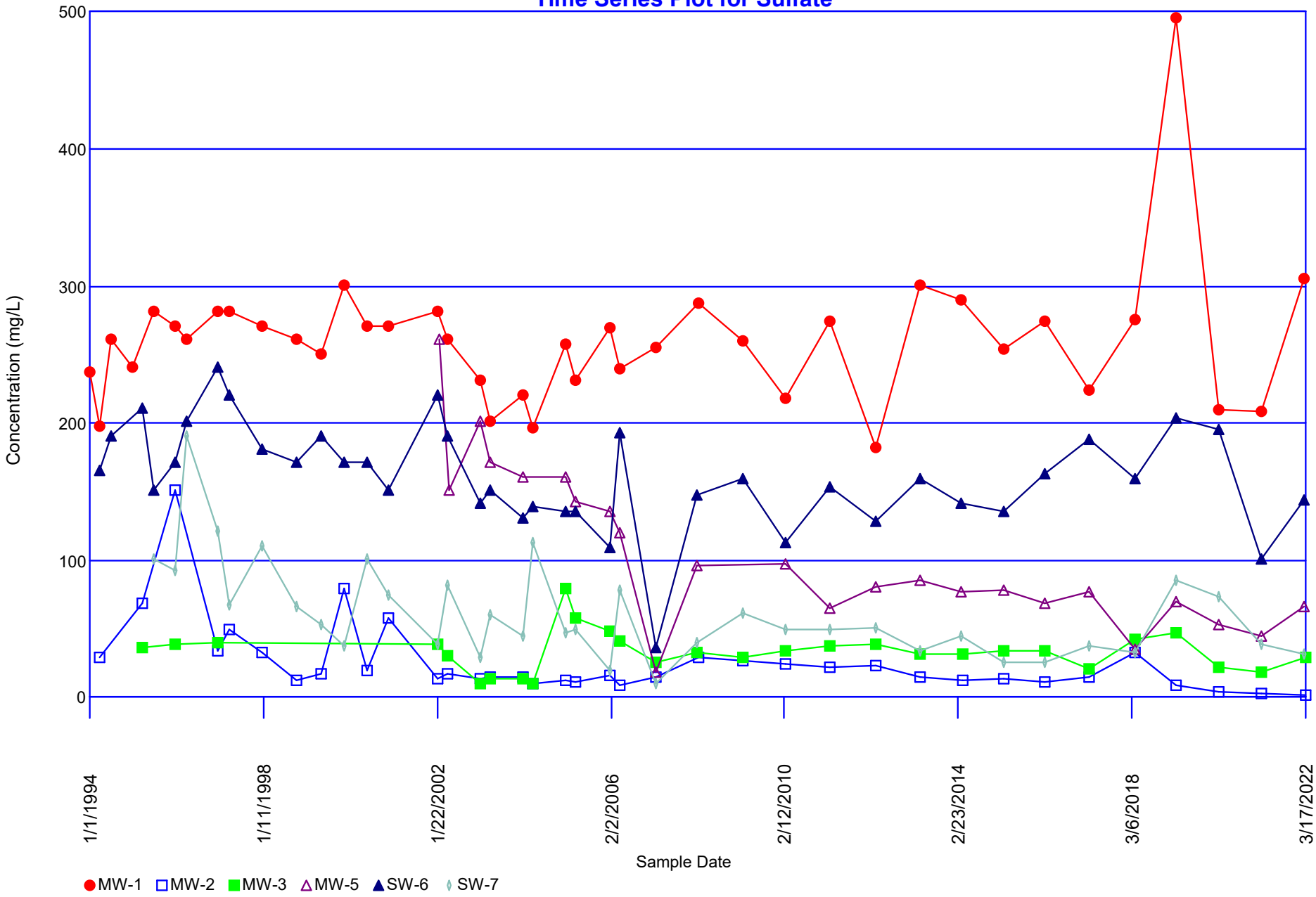


Specific Conductivity

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for Sulfate

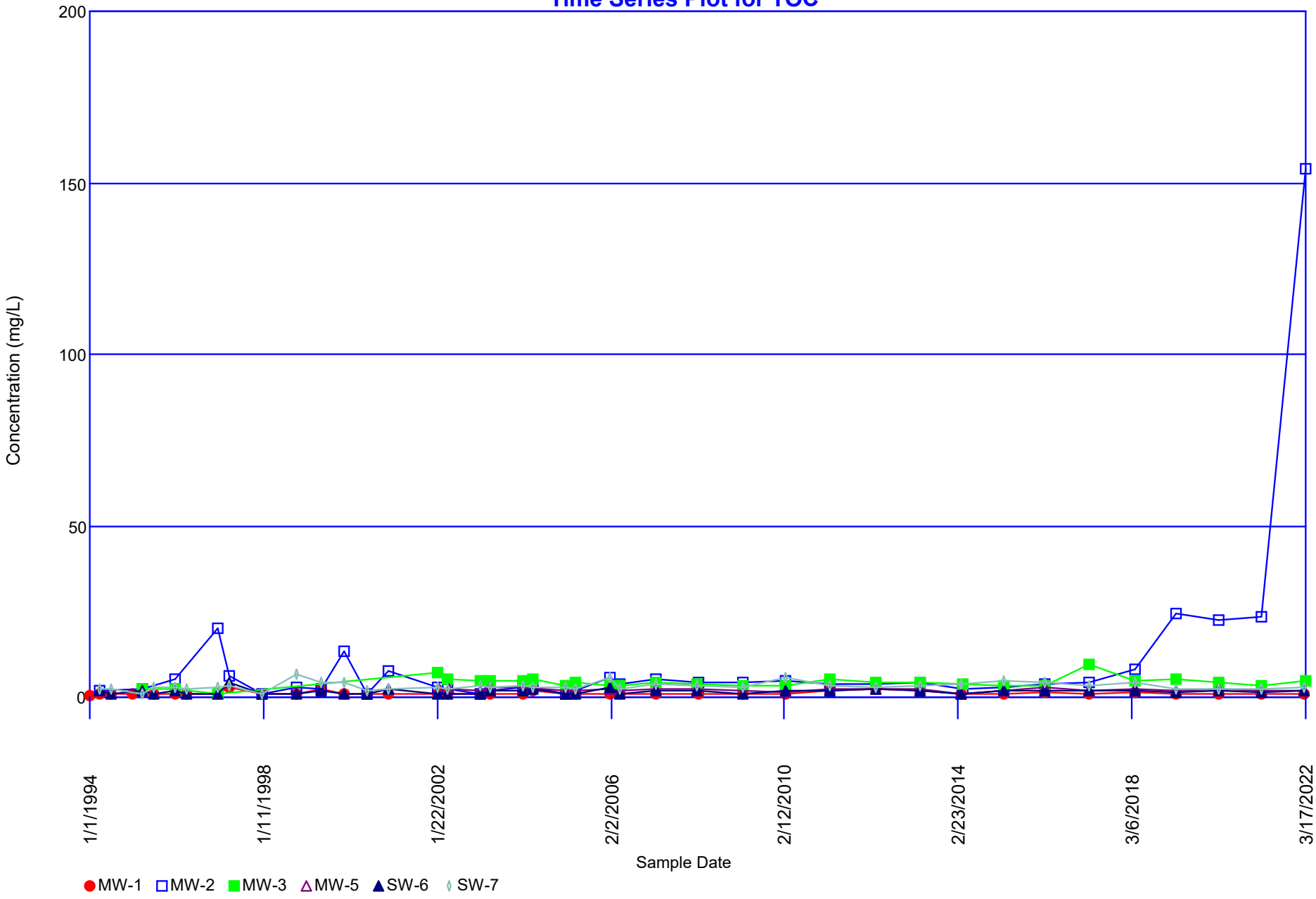


Sulfate

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for TOC

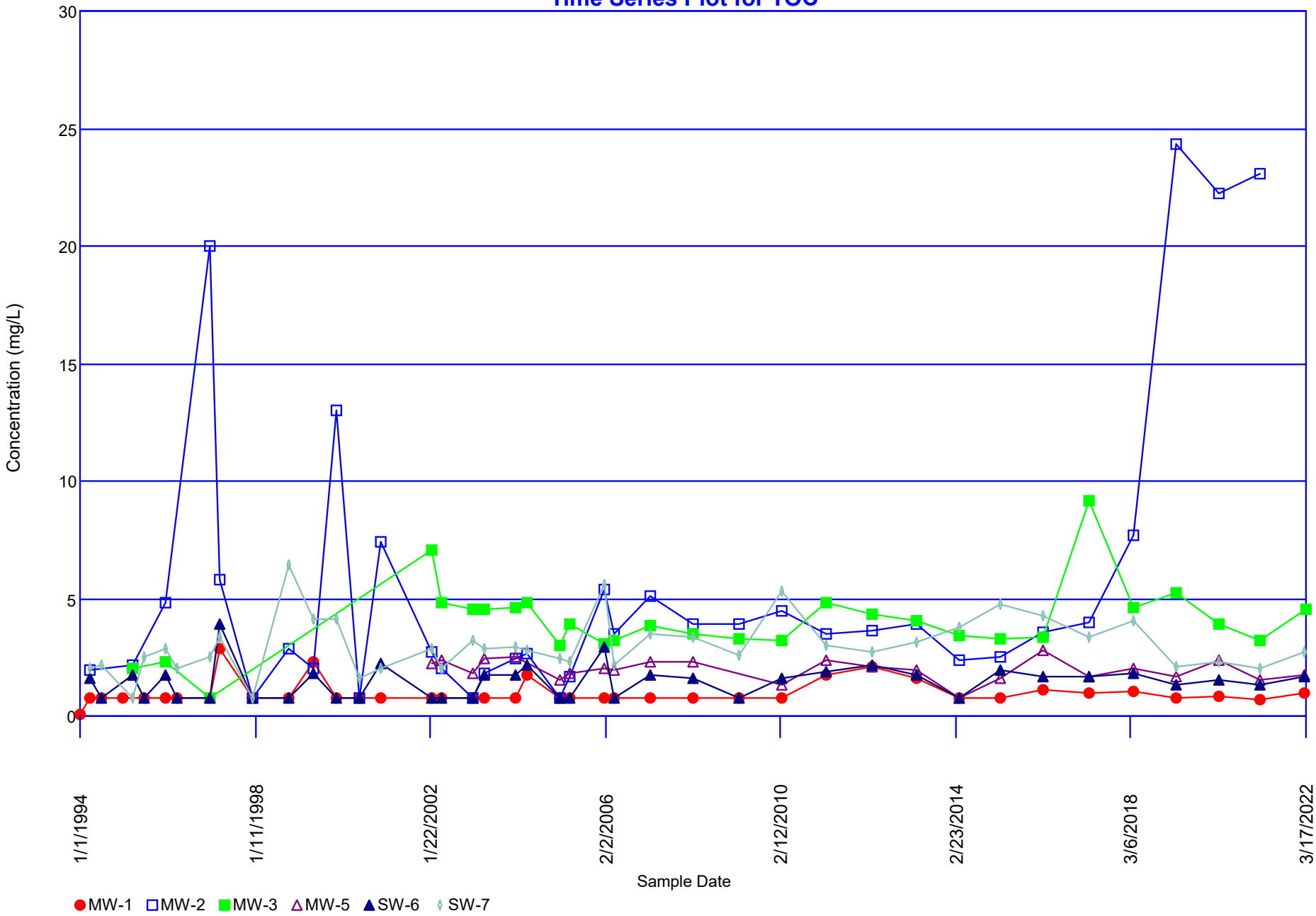


TOC

Non-Detects Replaced with 1/2 DL

Newcastle Landfill

Time Series Plot for TOC

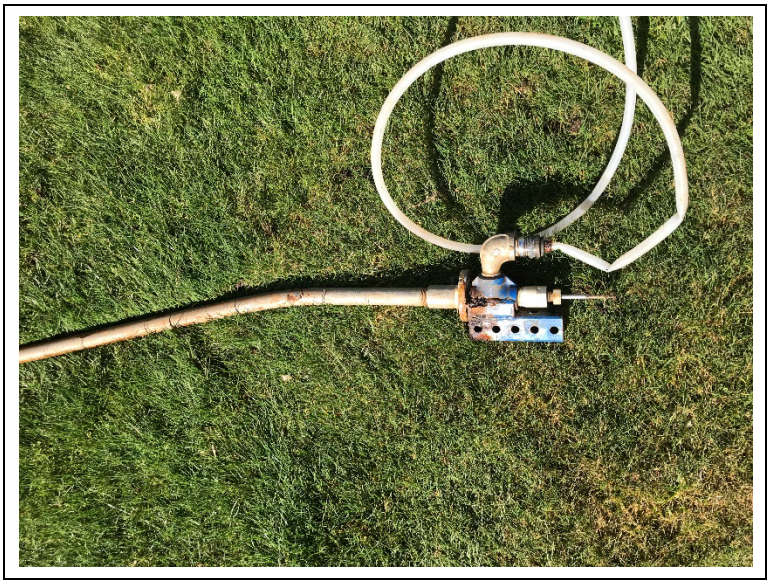


TOC

Non-Detects Replaced with 1/2 DL

Appendix C

Photographs



The landing plate and upper portion of the well MW-2 Hydrostar pump discharge pipe showing the degree of bend.

Photograph showing the break in the MW-2 PVC well casing (left center) at the area of the bend in the Hydrostar pump discharge pipe.

The Hydrostar pump discharge pipe from the unsaturated portion of well MW-2 with wet iron staining and silt that had migrated down from the well break above.