King County
Solid Waste Division
Department of Natural Resources and Parks
King Street Center
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Seattle, WA 98104-3855
206-477-4466
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April 1, 2022

TO: Jerome Cruz, Environmental Scientist III, Environmental Health Division, Public Health – Seattle and King County

VIA: Jamey Barker, P.E., Engineer IV DS JB

FM: Marisa Baptiste, Engineer III DS MB

RE: King County Vashon Island Closed Landfill 2021 Annual Groundwater Data Evaluation Report

The purpose of this letter is to transmit the *King County Vashon Island Closed Landfill 2021 Annual Groundwater Data Evaluation Report*. The potentiometric maps and groundwater velocity calculations that have been included in the report were prepared by a licensed hydrogeologist and have been previously submitted with quarterly reports. This report also includes an executive summary, site specific summary, exceedances table, trend test table, time-concentration plots of parameters of interest, and descriptive statistics summary table.

The 2021 Annual Report has been updated to include environmental data collected through December 2021.

If you have questions or need additional information, please contact me at 206-477-0458, or via email at marisa.baptiste@kingcounty.gov.

Enclosures

cc: Yolanda Pon, Solid Waste Program Supervisor, Environmental Health Division, Public Health Seattle & King County
Tim O'Connor, LG., LHG., Hydrogeologist III, Washington State Department of Ecology
Alan Noell, PhD., P.E., Solid Waste Engineer, Washington State Department of Ecology
Glynda Steiner, P.E., CCM, Deputy Division Director, Solid Waste Division (SWD), Department of Natural Resources & Parks (DNRP)
Theresa Thurlow, P.E., Engineer Manager, SWD, DNRP
Jamey Barker, P.E., Engineer IV, SWD, DNRP
Jennifer Keune, Interim Supervisor Environmental/Permit Compliance, SWD, DNRP

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April 1, 2022

Tim O'Connor, Hydrogeologist III
Washington State Department of Ecology
Northwest Regional Office
15700 Dayton Ave N
Shoreline, WA 98133

RE: King County Vashon Island Closed Landfill 2021 Annual Groundwater Data Evaluation Report

Dear Mr. O'Connor:

The purpose of this letter is to transmit the *King County Vashon Island Closed Landfill 2021 Annual Groundwater Data Evaluation Report*. The potentiometric maps and groundwater velocity calculations that have been included in the report were prepared by a licensed hydrogeologist and have been previously submitted with quarterly reports. This report also includes an executive summary, site specific summary, exceedances table, trend test table, time-concentration plots of parameters of interest, and descriptive statistics summary table.

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Sincerely,

DocuSigned by:
Marisa Baptiste
52CD32739BC9450...

Marisa Baptiste
Engineer III

Enclosures

cc: Jerome Cruz, Environmental Scientist III, Environmental Health Division, Public Health – Seattle & King County
Alan Noell, PhD., P.E., Solid Waste Program, Washington State Department of Ecology
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KING COUNTY
VASHON ISLAND CLOSED LANDFILL

2021 ANNUAL GROUNDWATER DATA EVALUATION REPORT

King County
Department of
Natural Resources and Parks
Solid Waste Division

Serving Community | Protecting Environment | Operating Excellence

www.kingcounty.gov/solidwaste

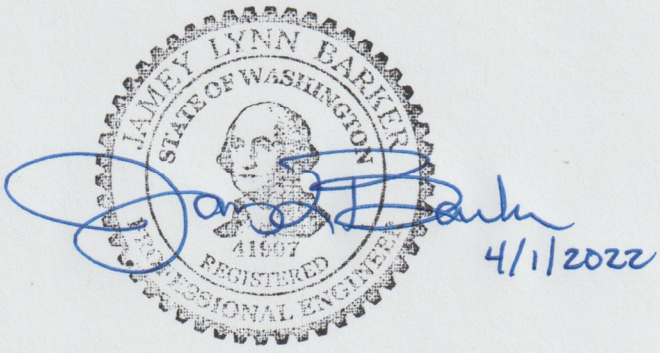
April 2022

CERTIFICATION

KING COUNTY VASHON ISLAND CLOSED LANDFILL
2021 ANNUAL GROUNDWATER DATA EVALUATION REPORT CERTIFICATION

I certify in accordance with the requirements of WAC 173-351-400(c) (3), that the contents of this document were prepared under my direction or supervision under a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Where applicable, some specific and related hydrogeologic portions have been duly certified by the responsible groundwater scientist. Based on my inquiry of the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

Name: Jamey Barker, P.E.	**Title:** Supervising Engineer, Facility Engineering and Science Section	**Date:** April 1, 2022
Mailing Address: Solid Waste Division King County Department of Natural Resources & Parks 201 South Jackson Street, Suite 701 Seattle, WA 98104-3855		**Telephone Number:** 206-477-4625
Signature:		



WASHINGTON STATE DEPARTMENT OF ECOLOGY

CHECKLIST FOR GROUNDWATER REPORTING
Municipal Solid Waste Landfills
WAC 173-351-415

Include a signed, completed copy of this checklist with each quarterly and annual report.

Quarterly groundwater reports shall be submitted to the jurisdictional health department and Ecology within 60 days of receipt of analytical data. Annual groundwater reports shall be submitted to the jurisdictional health department and Ecology by April 1 of each year.

1st ____ 2nd ____ 3rd ____ 4th ✓ YEAR: 2021	Reference (section, subsection)	Included in this report	Location – section or appendix
***Quarterly Groundwater Reports**: 173-351-415(2) plus the referenced sections*			
Statistical calculations and summaries			
Statistical tests	420, (2)	☒	Tables 3-2, 3-3, 3-5; Appendix B
Notification of statistical increase (if applicable)	430, (4)	☒	Sect 4.3.3, 4.4.3, 4.4.4, 4.5.3, 4.6.3 & 4.6.4
Notification of concentrations above Chapter 173-200 WAC criteria (if any)	430, (4)	☒	Appendix B
Static water level readings	415, (2)	☒	Appendix H
Potentiometric surface elevation maps depicting flow direction	415, (2)	☒	Appendix G
Flow rate – calculated	415, (2)	☒	Appendix G
Cation-anion balances	430, (5a)	☒	Appendix I
Explanation of greater than 5% (or 10%) difference (if needed)	430, (5a)	☒	Sect 4.3.2, 4.4.2, 4.5.2, & 4.6.2
Trilinear diagrams	430, (5b)	☒	Appendix I
Leachate analyses (if sampled and tested)	415, (2)	☒	Appendix K
Data entered into EIM database (date entered by: 05/17/2022)	415, (3)	☒	
***Annual Groundwater Reports**: 173-351-415(1)* **YEAR:** 2021			
Summary of statistical results and trends Descriptive statistics	415, (1) 420, (1)	☒	Tables 3-1, 3-2, 3-3, 3-5, and 3-6
Summary of groundwater flow rate and direction for the year	415, (1)	☒	Appendix G
Copy of all potentiometric maps for the year	415, (1)	☒	Appendix G
Summary geochemical evaluation	415, (1)	☒	Section 4
For Quarterly and Annual Reports			
Stamped by a licensed professional	RCW 18.220	☒	

DocuSigned by:
Marisa Baptiste
52CD32739B09450

Signature of Report Author	Date	Landfill
Marisa Baptiste	April 1, 2022	King County Vashon Island Closed Landfill

If you need this publication in an alternate format, please call the Waste 2 Resources Program at (360) 407-6900. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

KING COUNTY
VASHON ISLAND CLOSED LANDFILL

2021 ANNUAL GROUNDWATER DATA EVALUATION REPORT

King County Department of Natural Resources & Parks
Solid Waste Division, Facility Engineering & Science Section

April 2022

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EXECUTIVE SUMMARY

This report presents the results of statistical analyses on the groundwater monitoring data collected at the Vashon Island Closed Landfill (VLF) from January 1986 through December 2021 per Washington Administrative Code (WAC) 173-351 and King County Solid Waste Code, Chapter 10.04. The fourth quarter 2021 data is presented in the following appendices: Appendix B: Exceedance Reports, Appendix G: Groundwater Velocity Calculations and Potentiometric Maps, Appendix H: Groundwater Monitoring Data, Appendix I: Ion Balance Summary & Trilinear Diagrams, Appendix J: Surface Water Monitoring Data, Appendix K: Leachate Monitoring Data, and Appendix L: Landfill Gas Monitoring Data.

The Financial Assurance information in this document (included in Appendix N) presents the authorized 2021-2022 budget for the VLF. The financial information is presented in a format, which responds to the regulatory request for financial assurance and will be updated based on a remedial investigation and feasibility study ongoing for the landfill.

Landfilling was discontinued in August of 1999 with the final cover placement occurring in fall 2001. The landfill closure area is approximately 34 acres. The basic components of the cover system, from the top down, include vegetative layer, upper drainage layer, impervious layer consisting of high-density polyethylene (HDPE), and lower gravel drainage layer.

The groundwater monitoring wells on VLF penetrate two water-bearing zones, Unit C, including Channels Cc1, Cc2, and Cc3, and Unit D (Figure 2).

Channel Cc1 has two monitoring wells, MW-10, and MW-13, which are not considered to be impacted by landfilling activities. Monitoring wells MW-3 and MW-4 have reduced water volumes and do not always yield enough water to be sampled.

Monitoring wells in the groundwater perched in Channel Cc2 display impacts from landfill activities, these monitoring wells include MW-2, MW-21, MW-33, and MW-35. Stronger reducing conditions are identified in monitoring wells MW-21, MW-33, and MW-35 than in monitoring well MW-2, consistent with historical conditions. Since the landfill was closed and capped, wells in the Channel Cc2 have shown an overall reduction in volatile organic compounds (VOCs). Patterns observed for VOCs in monitoring wells MW-2, MW-21, MW-33, and MW-35 indicate landfill gas is the source of these groundwater impacts, which differs from other water quality parameters. In 2014, Channel Cc2 entered voluntary cleanup under the Washington State Model Toxics Control Act (MTCA).

There are two groundwater monitoring wells (MW-8 and MW-36) in Channel Cc3 the groundwater at both wells is of good quality with little evidence of landfilling impacts.

Conditions in Unit D Aquifer show as being stable and they do not indicate impacts attributable to landfill activities.

The landfill gas control system continues to be monitored. Two new direct drive blowers were installed in March of 2022 and active landfill gas collection has resumed after two years of being offline. There have been no methane detections at the compliance monitoring points since 2008.

Springs discharge on the hillslope to the west of Westside Highway SW. The water from these springs has been collected since 1991 at three weirs, SW-W1, SW-W2, and SW-W3. The only VOC detected with any frequency in the weirs is vinyl chloride. A surface water sampling location, SW-E was added to the sampling network in November of 2012 and sample results show that water quality is similar to SW-W1 with no VOC detections.

King County Solid Waste Division (KCSWD) monitors quarterly for groundwater, surface water, and leachate at VLF; monthly for landfill gas; and semiannually for offsite wells. KCSWD is currently reviewing the need for improvements to the engineering control systems for the landfill.

1. PURPOSE

The purpose of this report is to present the annual conditions at Vashon Island Closed Landfill (VLF) in compliance of the regulatory requirements of the Washington Administrative Code (WAC) 173-351, *Criteria for Municipal Solid Waste Landfills*.

2. INTRODUCTION

This is the 2021 Annual Groundwater Data Evaluation Report that presents the results of statistical analyses on the groundwater monitoring data collected at the VLF from January 1986 through December 2021. This annual report describes the hydrogeologic conditions at the landfill, presents the evaluated groundwater quality data collected from upgradient and downgradient monitoring wells, and the water quality data from seeps on the hillside to the west of the landfill. The data in this report are presented in compliance with Washington State Department of Ecology (Ecology) *Criteria for Municipal Solid Waste Landfills* (WAC 173-351-415), and the King County Code, *King County Solid Waste Regulations* (Title 10, Rules and Regulations No. 8).

In accordance with the annual reporting requirement of WAC 173-351, this annual report includes a discussion of maintenance activities at the site in 2021 (Table 2-1), surface water data (Appendix J), landfill gas data (Appendix L), and leachate data (Appendix K). This report also includes a summary of previous site investigations and ongoing efforts; a description of the location; a history of the landfill; evaluation methods; data quality; and results and discussion of groundwater flow and chemistry at the landfill. Planned future activities at the site are presented in Section 7. This report reflects the updated hydrogeological conceptual model (Aspect, 2020).

2.1. SITE LOCATION and REGIONAL SETTING

The VLF is located on a 54.3-acre King County owned parcel in the west central portion of Vashon Island (Figure 1). The landfill property is divided by Westside Highway SW. Most of the property exists in sparsely vegetated to unwooded, gently rolling terrain at elevations of 300 to 400 ft. The 39-acre area east of the highway is primarily unwooded open space and consists of 10.3 acres of municipal solid waste and 28.7 acres of landfill facilities. The 15.3-acre area west of the highway is steep, undeveloped, forested land sloping towards Colvos Passage, commonly referred to as the West Hillslope. The VLF property is bounded by Westside Highway Southwest and rural residential land to the northwest, by Southwest 184th Street to the north, by forested land and rural residential land to the east, and by rural residential land to the south (Figure 1). Vashon Island has a mild climate, tempered by the surrounding Puget Sound. Summers are cool and dry, while winters are moist and mild.

2.2. SITE HISTORY

Solid waste disposal began at the landfill property in the early 1900s. Operation of the landfill was assumed by the Solid Waste Division in the late 1950s, when daily cover, record keeping, and other updated solid waste management practices were initiated. The landfill was closed in two phases: a partial closure in 1988, in accordance with WAC 173-304, and a final closure in 2001, in accordance with WAC 173-351.

The 1988, Phase 1 closure occurred in the northwest portion of the landfill (approximately 2.3 acres). The closure included installation of a cover, a liner below the lateral expansion area, surface water management, leachate collection, and landfill gas collection systems. The selected design consisted of installing an impermeable composite liner (consisting of high density polyethylene (HDPE) geomembrane, low-permeability soil, geotextile, and foundation material/natural soil liner) over the existing refuse area; a passive gas collection system under this liner; a leachate collection and conveyance system; an aerated pretreatment lagoon; stormwater control facilities (ditches, culverts, and siltation and detention ponds); and a venting and treatment system of landfill gas. A liner for the future refuse area was installed. These improvements were completed in 1989.

Phase 2 closure began in August of 1999 with the discontinuation of material placement in the landfill and the installation of a temporary plastic cover over the refuse. Stormwater facility improvements were constructed during the summer and fall of 1999, including a detention pond in the southeast corner and an underground drain system around the perimeter of the landfill. The leachate collection and conveyance system were expanded before cap placement during the Phase 2 closure, and the leachate lagoon was constructed. Between 1996 and 2001, additional horizontal trench collectors between refuse lifts were connected into the existing active landfill gas collection system. The final cover placement occurred in the fall of 2001. The basic components of the cover system, from the top down, include a vegetative layer, upper drainage layer, impervious layer consisting of HDPE, and a lower gravel drainage layer. The combined Phase 1 and Phase 2 landfill closure area is approximately 10.3 acres.

2.3. 2021 INVESTIGATIONS and SITE IMPROVEMENTS

For a list of previous investigations at Vashon Island Closed Landfill see Table 2-2. In 2021, the Feasibility Study was started, as part of the independent cleanup for Channel Cc2 being conducted under the Model Toxics Control Act (WAC 173-340). The Feasibility Study Outline, after review by the Washington State Department of Ecology and Public Health-Seattle & King County, was finalized on June 30, 2021.

For the 2021 site improvements see Table 2-1 and for well completion details see Table 2-3.

3. EVALUATION METHODS

The landfill environmental evaluation was conducted in accordance with WAC 173-351 and the *Environmental Monitoring Sampling and Analysis Plan and Quality Assurance Project Plan for Vashon Island Closed Landfill* (SAP).

3.1. GROUNDWATE ELEVATIONS and FLOW DIRECTION

Groundwater levels in individual wells have been plotted as a function of time (Figures 7-11). Changes in water levels before and after the 1989 closure are noted. Groundwater flow directions were estimated based on water elevations in monitoring wells screened in similar water-bearing zones. Upgradient and downgradient wells are determined by flow direction.

In order to utilize the most current information, an elevation datum transition from National Geodetic Vertical Datum of 1929 (NGVD29) to North American Vertical Datum of 1988 (NAVD88) was implemented. Water level elevations from 2016 to July 2019 were adjusted by an approximate increase of three feet from previous reports. In May of 2019, groundwater monitoring wells were resurveyed in the NAVD88 datum and starting in July of 2019 water level elevations were calculated from the updated reference elevations. All screen intervals are in reference to NAVD88, unless otherwise indicated.

Groundwater static water levels are reviewed each quarter. Any inconsistencies with historical data are reviewed carefully and evaluated for accuracy. Since water levels are taken prior to sampling, this provides a second data point for quality control. The quarterly static water levels are forwarded to a licensed hydrogeologist consultant, for preparation of potentiometric maps and groundwater velocity calculations. Potentiometric maps and groundwater velocity calculations are included Appendix G.

3.2. TRILINEAR DIAGRAMS and ION BALANCE

Geochemical data is presented on trilinear diagrams. Major cations and anions are plotted on individual triangles as percentages of total milliequivalents per liter (meq/L). These diagrams illustrate differences in major ion chemistry between groundwater samples and can be used to categorize water composition into identifiable groundwater types or hydrochemical facies. These hydrochemical facies reflect distinct compositions of cation and anion concentrations. The value of the diagram lies in describing relationships that exist among individual samples. Trilinear Diagrams prepared for the monitoring wells are included with ionic balance calculations in Appendix I.

Ion balances also provide information about the internal consistency of sample results. If the ion ratio is greater than ten percent, this is an indication of analytical error. When this disparity occurs,

the individual results are reviewed, and any findings are included in this report. For the ion balance calculations non-detects values are evaluated as half the method detection limit.

3.3. GROUNDWATER and SURFACE WATER EXCEEDANCES

Groundwater quality monitoring results are compared to the *National Primary and Secondary Drinking Water Regulations* (40 CFR Parts 141 and 143; MCL) and *Water Quality Standards for Groundwaters of the State of Washington* (WAC 173-200; SGWC) found in Appendix A. Surface water quality monitoring results are compared to *Water Quality Standards for Surface Waters of the State of Washington* (WAC 173-201A) and *Water Quality Standards* (40 CFR Parts 131). Standards are compared to actual analytical values, not mean or median values. Exceedances are tabulated and reported in Appendix B and comply with the requirement in WAC 173-351-415(2)c to report concentrations above the MCL. In addition, not all parameters that are analyzed have standards.

In addition to providing information about the water quality relative to established standards, exceedances also provide a cursory evaluation of changes relative to historical data. When an established standard is exceeded for the first time or is a statistically significant increase compared to historical results, the data is reviewed more carefully.

3.4. VOLATILE ORGANIC COMPOUND DETECTIONS

All groundwater VOC detections are reported in Appendix B. Groundwater VOC detections are used a groundwater quality evaluation method, since the majority of organic compounds are synthetic and occurrences in groundwater may be an indication of an impact from landfilling activities.

3.5. PREDICTION LIMIT EXCEEDANCES

The 2021 prediction limits are summarized in Appendix A. The prediction limit is a statistical interval calculated, during the first quarter, annually on past background samples to estimate future values. The data from monitoring wells screened within Unit D Aquifer are compared to the calculated intrawell prediction limits, and data from wells screened within Channel Cc2 are compared to interwell prediction limits calculated using data from upgradient monitoring well MW-20. Before calculating the Prediction Limit, the data set is tested for normality by application of the Shapiro-Wilk Test for Normality. If the data fail the test for normality, transformed data are tested. When normal or transformed normal data sets are determined, a parametric prediction limit is calculated, and future results compared to this value. The prediction limits generated for the annual report are based on a 5% false positive rate (type I error) and depend on the background distribution. If the normality test fails or if the dataset has fewer than 50% detections, then the prediction limit is calculated based on the maximum value from that dataset for the specific analyte. If the dataset is completely made up of non-detect data, then the current method detection limit is

used as the prediction limit. For prediction limit calculations non-detects values are evaluated as half the method detection limit.

3.6. STATISTICAL AND TREND ANALYSES

3.6.1. Descriptive Statistics

Descriptive statistical summary tables are compiled for groundwater (Table 3-1) and surface water (Table 3-4). The data from each monitoring well or surface water stations are divided into two groups for evaluation. The first group consists of all data in the period of record exclusive of the eight most recent analyses. The second group consists of the eight most recent analyses. Monitoring wells that have not produced sufficient water for eight samples in the last two years are compiled as a long-term trend only. Descriptive statistics describe general measures of a sample population, the extremes (maximum, minimum,) central tendencies (mean, median), and variability (standard deviation). These descriptive statistics are compared to historical values to identify any significant changes. For the descriptive statistics calculations non-detects values are evaluated as half the method detection limit.

For the purpose of discussion, the more recent period is considered to have more importance, both because of the timeliness of the data and improvements in the quality of the data. Although both means and medians are reported in the summary tables, medians are used in the text because they tend to be a more reliable measure of central tendency in the case of nonnormal distributions, particularly when there are outliers, as is the case here. Natural waters are commonly characterized by non-normal distributions.

3.6.2. Trend Analysis

The trend test tables are compiled for groundwater as a summary table (Table 3-2) and a detailed table (Table 3-3). Trend testing was accomplished by using the Mann-Kendall test for trend. The Mann-Kendall trend test involves listing the observations in temporal order and computing all differences that may be formed between measurements and earlier measurements. The test statistic is the difference between the number of strictly positive differences and the number of strictly negative differences. The tabulated results presented in a table in the annual report are: number of analyses, number of detections, direction of trend, probability, and significance of trend at a 95% confidence level. For the trend analysis non-detects values are evaluated as half the method detection limit.

The trend test evaluates data for long-term trends, including historical data up to the last eight samples, and for short-term trends using the last eight samples. For wells with historical data beyond 50 samples, the most recent 50 samples are used in the long-term trend test. Monitoring wells that have not produced sufficient water for eight samples in the last two years are compiled for a long-term trend test only. For the purpose of discussion, the more recent period is considered to have more importance, both because of the timeliness of the data and improvements in the quality of the data.

3.7. DATA QUALITY

Five analytical labs have performed laboratory services for water samples collected at the VLF including Laucks from 1986 to March 1990, AmTest from March 1990 to April 1992, and Analytical Resources (ARI) from April 1992 to May 1995, Laucks again from May 1995 to April 2008, Pace from April 2008 to March 2009, and the King County Environmental Laboratory from April 2009 to current. All five laboratories have Washington State Department of Ecology accreditation through the Washington State Manchester Environmental Laboratory for the methods used at the time that the samples were analyzed.

Contamination of blanks has important ramifications for data quality. However, some compounds have high blank contamination rates for compounds, such as acetone and methylene chloride. Although improvements have been made in reducing the rate of blank contamination in the lab, blank samples that have a longer residence time in the laboratory still show elevated rates. Since the common laboratory contaminants do not provide the only evidence of landfill impacts, other volatile organic compounds are used for this evaluation. Other compounds, such as, sulfate, zinc, and iron have also been detected in blanks. These detections will be noted for the individual samples in which they have occurred. Some data, particularly concerning solvents, must be qualified based on blank contamination events and measures of precision and accuracy. All sample results qualified with a "B" have blank contamination associated with the analysis. (See Appendix B)

KCSWD conducts quality control and quality assurance (QA/QC) quarterly on analytical data. If the QA/QC process or any of the data evaluation methods above show any inconsistencies or outliers the lab is contacted and asked to verify results. Administrative errors, such as a sample switch, are corrected promptly. In some cases, the sample will be reanalyzed, and a new result provided. If no error can be identified by the lab, the monitoring location will be resampled. Results that are demonstrated to be incorrect are flagged as rejected in the database and data that is flagged rejected in the database is not used for data analysis.

There are instances where the limit of detection, because of technological limitations, is above the *National Primary and Secondary Drinking Water Regulations* and *Water Quality Standards for Groundwaters of the State of Washington* for groundwater or above the *Water Quality Standards for Surface Waters of the State of Washington* (WAC 173-201A) and *Water Quality Standards* (40 CFR Parts 131) for surface water. Because these concentrations are not quantifiable, they can be reported only qualitatively, as less than a reporting limit and are qualified accordingly. Another issue involving limits arises when the limits of detection or analytical sensitivity changes over time. This issue is especially noticeable for parameters such as chloride, where more recent samples show more fluctuations or definition on the graphs due to more significant figures (greater sensitivity) being reported. Other factors that may contribute to these changes may be due to dilution, or due to technical or contractual specifications such as technical advancements in instrumentation in the contractual laboratory industry. These changes must be kept in mind while reviewing data evaluation and conclusions; laboratory qualifiers can be found in Appendix A.

A notable change in 2017 involved the methodology for the analytical testing covered by SW-846 (Test Methods for Evaluating Solid Waste). The previous Method Detection Limit (MDL)

methodology was updated in 2017 to use the Lower Limit of Quantitation (LLOQ). The LLOQ is the lowest point on a calibration curve that can be used for quantification. It is a method that repeatedly tests and calibrates against known standards such as reagent water, method blanks, etc. Ultimately, the LLOQ's ability to detect an analyte at a specific concentration is dependent upon factors such as instrument sensitivity and can, at times, be greater than the baseline curve concentration.

4. RESULTS and DISCUSSION

4.1. GROUNDWATER

The updated hydrogeological conceptual model presents the latest interpretation of the hydrogeology, and that interpretation has been used in the preparation of potentiometric surface maps and calculations of groundwater velocities (Aspect, 2020). Monitoring well locations are shown on Figure 2. These monitoring wells penetrate four water-bearing zones (Channels Cc1, Cc2, and Cc3, and Unit D Aquifer).

Results for the groundwater quality beneath the VLF were derived from Channels Cc1, Cc2, Cc3, and the Unit D Aquifer. During the recent sampling period, eight samples were taken from each well, with the exceptions of monitoring wells MW-3 and MW-4. Certain wells have limited data because they are seasonally dry, have low production, or are slow to recover and did not yield adequate data for comprehensive analyses. Only long-term trend tests are available for these wells.

It is also important to note that several compounds, in particular acetone, zinc, and methylene chloride, have been frequently detected in blanks and field samples at similar concentrations. The likely source of these compounds is laboratory contamination. Additionally, from mid-August through December the King County Environmental Laboratory's roof was being replaced. The roofing material is tar paper, applied using a torch method. The tar paper and other products used in this project contain acetone and toluene, which occasionally enter the lab and have been detected in the reverse osmosis (RO) water used to prepare method blanks (MBs) and VTRPs.

Iron, manganese, and arsenic occur naturally in groundwater of this region. The Washington State Department of Ecology conducted a background study on arsenic in groundwater and found for the Puget Sound basin the natural background is 0.008 mg/L (Ecology, 2016). Therefore, exceedances of the *Water Quality Standards for Groundwaters of the State of Washington* for these contaminants are believed to be representative of background groundwater quality unaffected by the VLF.

The pH field data for the period between late 1993 and early 1996 may not be reliable because of inconsistent field instrumentation.

4.2. GROUNDWATER in UNIT B

Previously, monitoring well MW-24 was considered to be screened in Channel Cc1, but information provided in the updated hydrogeological conceptual model placed this well in Unit B. Monitoring well MW-24 does not produce enough groundwater, in order to sample, so only water level measurements are taken (Figure 7).

4.2.1. Groundwater Elevations and Flow Direction

Groundwater elevation data for Channel Cc1 can found in Figure 7 and Appendix H. Due to monitoring well MW-24 being the only well screened in Unit B, there is not enough water level elevation data to calculate velocity and produce potentiometric maps for Unit B. Static water level data for monitoring well MW-24 is consistent with previous years.

4.3. GROUNDWATER in CHANNEL Cc1

There are four monitoring wells, MW-3, MW-4, MW-10, and MW-13, screened in Channel Cc1 deposits, previously described as monitoring groundwater perched above the lacustrine silt. Water levels and water quality in Channel Cc1 is consistent with previous years unless stated otherwise below.

4.3.1. Groundwater Elevations and Flow Direction

Groundwater elevation data for Channel Cc1 can found in Figure 8 and Appendix H. Historically, groundwater levels in the monitoring wells in Channel Cc1 have shown a variation from less than one foot to almost five feet with no marked seasonality. Due to minimal recharge rates in monitoring wells MW-3 and MW-4, there is not enough water level elevation data to calculate velocity and produce potentiometric maps for Channel Cc1. Field permeability tests performed by Harper-Owes (1986) indicated that the average permeability of sand in Channel Cc1 was approximately 4.3 ft/day.

4.3.2. Trilinear Diagrams and Ion Balance

The Channel Cc1 trilinear diagrams and ion balances are located in Appendix I for 2021. The trilinear diagrams for monitoring wells MW-3, MW-10, and MW-13 show the samples are within the same calcium-magnesium-bicarbonate hydrochemical facie as previous years. The cation/anion ratio for the monitoring wells MW-3, MW-10, and MW-13 are within ten percent (Appendix I), which is sufficient for characterization. The trilinear diagrams and ion balances for monitoring well MW-4 show a shift in the quality of the sample, likely the result of steadily decreasing water levels in the well and sump like conditions that result from the silt contact, resulting in the samples not being representative of groundwater conditions.

4.3.3. Groundwater Exceedances

Exceedances of the *Water Quality Standards for Groundwaters of the State of Washington* (SGWC) and *National Primary and Secondary Drinking Water Regulations* (MCL) are summarized in tables in Appendix B. Total arsenic exceeded the primary SGWC for all samples collected in Channel Cc1 during 2021 (Appendix B). There were no new or statistically significant

increases in groundwater criteria exceedances for Channel Cc1 in 2021. Groundwater exceedances are consistent with previous years and are the result of background arsenic conditions.

4.3.1. Volatile Organic Compounds Detections

Groundwater VOC detections are summarized in tables in Appendix B. There were detections of acetone (qualified as 'JT', meaning results are only reported as qualitative, i.e., 'present but unquantified), cis-1,2-dichloroethene, and trichlorofluoromethane (qualified as 'JT') in monitoring well MW-4 and one detection of trichlorofluoromethane in monitoring well MW-3.

4.3.2. Statistical and Trends Analyses

Statistical and trend analysis results for Channel Cc1 are summarized in Tables 3-1, 3-2, and 3-3.

Monitoring well MW-10 has a statistically significant short-term increasing trend for dissolved arsenic. This increasing trend is not believed to indicate landfill impacts, as arsenic is naturally occurring in the region and on Vashon Island there are arsenic deposits from the Asarco Smelter. All other short-term trends for monitoring wells MW-10 and MW-13 are either decreasing or stable.

Monitoring wells MW-3 and MW-4 do not have sufficient data in the past two years to run short-term statistical and trend analyses. Long-term trend analyses show that most analytes have declining or stables trends over the past 50 sampling event, except for nitrate and total calcium for monitoring well MW-4.

4.3.3. Summary

Raw analytical groundwater data and time-concentration plots for monitoring wells in Channel Cc1 can be found in Appendices H and C, respectively.

The 2021 groundwater quality for monitoring wells MW-10 and MW-13 is consistent with previous years, good with no indication of landfill impacts.

The long-term trends for monitoring wells MW-3 and MW-4 indicate that water quality is improving. Monitoring well MW-4 is screened across a silt contact and the well can act as a sump. Due to the poor sample quality in monitoring well MW-4 indicated by the second quarter of 2021 ion balance and the changes in the trilinear diagram, monitoring well MW-4 will only be sampled if the depth to water is above 105.27 ft. (above the silt contact).

4.4. GROUNDWATER in CHANNEL Cc2

Monitoring wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35 monitor the groundwater perched within Channel Cc2. Monitoring wells MW-2, MW-20, MW-21, MW-33, and MW-35 are completed in continuous thin sand that correlates with the elevation and location of two of the seeps (seeps 2 and 3 or SW-S2 and SW-S3) on the west side of the landfill (King County, 2011). Monitoring well MW-5D was monitored quarterly beginning in 1986 and decommissioned in April 2015. Monitoring well MW-35 was installed in March of 2015, to replace monitoring well MW-5D and monitoring well MW-33 was installed in March of 2015, to better define groundwater quality in Channel Cc2.

Groundwater in Channel Cc2 has been impacted by landfill gas (Aspect et. al., 2020). Remediation of Channel Cc2 is being addressed through an independent cleanup under the *Model Toxics Control Act* (WAC 173-340). The *Vashon Island Closed Landfill Remedial Investigation Report* (Aspect, 2020; Remedial Investigation) was finalized in November 2020. The Remedial Investigation will be used to prepare a Feasibility Study (FS) and to develop the Cleanup Action Plan. Water levels and water quality in Channel Cc2 is consistent with previous years unless stated otherwise below.

4.4.1. Groundwater Elevations and Flow Direction

Groundwater elevation data for Channel Cc3 can found in Figure 9 and Appendix H. Quarterly velocity calculations and potentiometric maps are attached in Appendix G.

In 2021, water level fluctuations in monitoring wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35 were less than one foot (Figure 9). This low or lack of response to the annual cycle of wet and dry seasons can be explained by the landfill location, which is in an area where significant recharge to the aquifer does not occur (Carr, 1983). Relatively low-permeability surficial deposits (till) and partial landfill closures in 1989 and 1999 contribute to the lack of significant recharge.

4.4.2. Trilinear Diagrams and Ion Balance

The Channel Cc2 trilinear diagrams and ion balances are located in Appendix I for 2021. The trilinear diagram shows all the samples to be within the same calcium-magnesium-bicarbonate hydro-chemical facie, as they have been in past samples for these wells. Monitoring wells MW-2, MW-21, MW-33, and MW-35 continue to be characterized by more dominant bicarbonate-carbonate characteristics. The cation/anion ratio for the wells in this channel was within ten percent (Appendix I) for all 2021. The reported results are sufficient for characterization.

4.4.3. Groundwater Exceedances

Exceedances of the SGWC and MCL are summarized in tables in Appendix B. There was an error that resulted in exceedances for bis(2-Ethylhexyl) phthalate for sample results from monitoring wells MW-33 and MW-35 not being included in the first quarter report. There were no new or

statistically significant increases in groundwater criteria exceedances for Channel Cc2 in 2021. Groundwater exceedances are consistent with previous years and are the result of landfill gas impacts.

4.4.4. Prediction Limits Exceedances

Exceedances of the interwell prediction limits are summarized in tables in Appendix B. The prediction limits in for monitoring wells in Channel Cc2 are compared to upgradient monitoring well MW-20. There was an error that resulted in the interwell prediction limit for vinyl chloride being 0.0867 ug/L for the first three quarters of 2021, when it should have been 0.02 ug/L. This error has been corrected and the prediction limits are correctly reported in Appendix B for all quarters of 2021.

There were no new prediction limit exceedances for Channel Cc2 in 2021 and there were no prediction limit exceedances for total chromium, total lead, and total vanadium, which were exceeded in 2020. Prediction limit exceedances are consistent with previous years and are the result of landfill gas impacts.

4.4.5. Volatile Organic Compound Detections

Groundwater VOC detections are summarized in tables in Appendix B. Detections of VOCs in 2021 were consistent with previous years for samples collected from Channel Cc2 and are the result of landfill gas impacts.

4.4.6. Statistical and Trends Analyses

Statistical and trend analysis results for Channel Cc2 are summarized in Tables 3-1, 3-2, and 3-3.

There was a statistically significant short-term increasing trend for nitrate in monitoring well MW-2. This increasing trend is not believed to represent a new landfill impact. Monitoring well MW-2 is characterized as having more oxidizing conditions, which result in higher concentrations of nitrate. Also, nitrate concentrations in monitoring well MW-2 (see Table 3-1) are well below the primary SGWC of 10 mg/L.

There was a statistically significant short-term increasing trend for sulfate in monitoring well MW-9. This increasing trend is not believed to represent changing conditions in monitoring well MW-9. The short-term median value is less than the long-term median value (see Table 3-1) and both are significantly less than the secondary SGWC of 250 mg/L. Additionally, this increasing trend does not coincide with any increases in chloride concentrations, which would be more indicative of leachate impacts.

There was a statistically significant short-term increasing trend for dissolved calcium in monitoring well MW-21. Calcium is an indicator of landfill gas impacts, which monitoring well MW-21 is

impacted by. Increasing calcium could be indicative of changing landfill gas impacts in monitoring well MW-21.

There are no statistically significant short-term increasing trends for VOCs in Channel Cc2. There is a statistically significant short-term decreasing trend for dichlorodifluoromethane in monitoring wells MW-2, MW-20, MW-21, and MW-33.

All other Channel Cc2 short-term trend analysis results showed to be either stable or decreasing.

4.4.7. Appendix III Sampling

In 2021, KCSWD added five appendix III analytes (2,4,5-TP Silvex, 2-methyl-1-propanol, bis(2-chloroethyl) ether, bis(2-ethylhexyl) phthalate, and diethyl phthalate) to the quarterly monitoring program for Channel Cc2 (not including monitoring well MW-9). These five analytes were previously detected during appendix III sampling. Exceedances of the SGWC and MCL for these analytes are summarized in tables in Appendix B. Statistical (Table 3-5) and trend analyses (Table 3-6) were conducted on the 2021 results. These new analytes will be added to the prediction limit exceedance check in 2023. Full appendix III sampling will be conducted again in 2024.

4.4.8. Summary

Raw analytical groundwater data and time-concentration plots for monitoring wells in Channel Cc2 can be found in Appendices H and D, respectively.

The 2021 groundwater quality for monitoring wells MW-9 and MW-20 is consistent with previous years and appear to be of good quality with little evidence of landfilling impacts.

In general, conditions in monitoring well MW-2 appear to be more oxidizing than other wells in Channel Cc2. This environment is characterized by lower levels of iron and ammonia, absence of manganese, and higher levels of nitrate. Oxidizing conditions decrease the mobility of arsenic, due to adsorption to ferric hydroxides.

The redox conditions in monitoring wells MW-21, MW-33, and MW-35 are more reducing, determined by lower levels of nitrate, and higher levels of iron, manganese, and ammonia. Reducing condition increase the mobility of arsenic, which result in higher concentrations of arsenic in these monitoring wells.

Groundwater conditions in Channel Cc2 are consistent with previous years. Impact from landfill activities is evident in monitoring wells MW-2, MW-21, MW-33, and MW-35. Historically, there was evidence of impacts from leachate; however, declines in concentration of general water quality indicators (specific conductance, dissolved solids, chlorides, metals, etc.) suggest that leachate impacts have been controlled with closure. Current groundwater impacts in Channel Cc2 are the result of landfill gas (Aspect et. al., 2020). In 2014, Channel Cc2 was entered into voluntary

cleanup under MTCA. These evaluations will aid in determining if any additional improvements are needed

4.5. GROUNDWATER in CHANNEL Cc3

Monitoring wells MW-8 and MW-36 monitor the groundwater in Channel Cc3. Monitoring well MW-14 was decommissioned in April of 2015 and monitoring well MW-27, which was previously thought to be screened in both Channel Cc3 and Unit D Aquifer, was decommissioned in July of 2016. The updated hydrogeological model shows monitoring well MW-27 had been fully screened in Unit C (Figure 10). Monitoring well MW-36, which replaced monitoring well MW-14, was commissioned in April of 2015.

4.5.1. Groundwater Elevations and Flow Direction

Groundwater elevation data for Channel Cc3 can found in Figure 10 and Appendix H.

Monitoring wells MW-8 and MW-36 are screened within the coarser sand deposit of Channel Cc3. Monitoring well MW-8 was previously considered to not be hydraulically equivalent to groundwater in either Cc2 nor Cc3 and to be screened along a flow path from Cc2 to Cc3. The updated hydrogeological conceptual model (Aspect et. al., 2020), shows that monitoring wells MW-8, MW-36, and decommissioned wells MW-14 and MW-27 are fully screened within Cc3 and that there is limited hydraulic interconnection between Channels Cc2 and Cc3.

Annual water-level fluctuations in the monitoring wells MW-8 and MW-36 are usually within an annual range of about one foot. There is not enough water level data in Channel Cc3, with only two wells, to produce potentiometric maps and water velocities.

4.5.2. Trilinear Diagrams and Ion Balance

The Channel Cc3 trilinear diagrams and ion balances are located in Appendix I for 2021. The trilinear diagram shows all the samples to be within the same calcium-magnesium-bicarbonate hydro-chemical facie, as they have been in past samples for these wells. The cation/anion ratio for the wells in this channel was within ten percent (Appendix I) for all of 2021. The reported results are sufficient for characterization.

4.5.3. Groundwater Exceedances

Exceedances of the SGWC and MCL are summarized in tables in Appendix B. Total arsenic exceeded the primary SGWC for all samples collected in Channel Cc3 during 2021 (Appendix B). There were no new or statistically significant increases in groundwater criteria exceedances for Channel Cc3 in 2021. Groundwater exceedances are consistent with previous years and are the result of background arsenic conditions.

4.5.4. Volatile Organic Compounds Detections

There were no VOCs detected this year in Channel Cc3 samples.

4.5.5. Statistical and Trends Analyses

Statistical and trend analysis results for Channel Cc3 are summarized in Tables 3-1, 3-2, and 3-3.

There was a statistically significant short-term increasing trend for nitrate in monitoring well MW-8. This increasing trend is not believed to represent a new landfill impact. The nitrate short-term median value is less than the long-term median value (see Table 3-1) and both are significantly less than the primary SGWC of 10 mg/L.

There was a statistically significant short-term increasing trend for sulfate in monitoring well MW-36. This increasing trend is not believed to represent changing conditions in monitoring well MW-36. The sulfate short-term median value (see Table 3-1) is significantly less than the secondary SGWC of 250 mg/L. Additionally, this increasing trend does not coincide with any increases in chloride concentrations, which would be more indicative of leachate impacts.

There was a statistically significant short-term increasing trend for dissolved calcium in monitoring well MW-36. This increasing trend is not believed to represent changing conditions in monitoring well MW-36. Calcium is naturally occurring in groundwater and can also be an indicator of landfill gas impacts, along with magnesium and alkalinity, which do not have increasing short-term trends for monitoring well MW-36.

All other Channel Cc3 short-term trend analysis results showed to be either stable or decreasing.

4.5.6. Summary

Raw analytical groundwater data and time-concentration plots for monitoring wells in Channel Cc3 can be found in Appendices H and E, respectively.

The 2021 groundwater quality within monitoring wells in Channel Cc3 is consistent with previous years and appear to be of good quality with little evidence of landfilling impacts.

4.6. GROUNDWATER in the UNIT D AQUIFER

Monitoring wells MW-7, MW-12, MW-19, MW-26, MW-29, and MW-34 monitor the groundwater in the Unit D Aquifer. Monitoring well MW-11 was damaged during the Nisqually earthquake and decommissioned in 2003. Monitoring well MW-25 was installed in 2003 to replace

monitoring well MW-11. However, the screen failed during installation and the well cannot be developed. The well has been left in place for use for water level measurements only. Monitoring well MW-29 was subsequently installed in 2003 as the new replacement well for monitoring well MW-11. Monitoring well MW-28 has been dry since installation and is scheduled to be decommissioned in 2022.

4.6.1. Groundwater Elevations and Flow Direction

Groundwater elevation data for the Unit D Aquifer can found in Figure 11 and Appendix H. Quarterly velocity calculations and potentiometric maps are attached in Appendix G.

Construction differences make the determination of groundwater gradients and flow direction difficult in the area monitored by these wells. The average screened depth below the water table in the wells ranges from near zero in monitoring wells MW-26 and MW-29 to more than 30 ft. in monitoring wells MW-7, MW-12, and MW-34.

The general flow direction in the Unit D Aquifer is away from MW-7 southwest towards MW-12, northwest towards MW-19, and northeast towards MW-25 (Appendix G). The water fluctuations for the monitoring wells are less than two ft. in 2021, and without considerable seasonal trends (Figure 11). This lack of response to the annual cycle of wet and dry seasons can be explained by the landfill location, which is in an area where there is insignificant recharge to the aquifer (Carr, 1983); which is attributable to relatively low-permeability surficial deposits (till) and landfill closures.

4.6.2. Trilinear Diagrams and Ion Balance

The Unit D Aquifer trilinear diagrams and ion balances are located in Appendix I for 2021. The trilinear diagram shows all samples are within the same calcium-magnesium-bicarbonate hydrochemical facie. During 2021, the cation/anion for the wells in this zone are within ten percent (Appendix I), which is sufficient for characterization. There was an exception with monitoring well MW-29 during the second quarter of 2021.

The trilinear diagram shows samples from monitoring well MW-29 to not be within the same calcium-magnesium-bicarbonate hydrochemical facie as in past samples and the cation/anion balance during this quarter is not within ten percent. The sample results for chloride and sulfate in monitoring well MW-29 were five-times and two-times higher than the two-year historical average. The KCSWD Environmental Scientists noted that the purge water from monitoring well MW-29 was yellowish and had some suspended solids present, which is consistent with previous samples. The King County Environmental Laboratory reported that chloride and sulfate results for monitoring well MW-29 were diluted two times, because they were over the analytical range of the instrument and the diluted results matched the initial overrange results. Results from the third and fourth quarters were consistent with previous trilinear diagrams and ion balances.

4.6.3. Groundwater Exceedances

Exceedances of the SGWC and MCL are summarized in tables in Appendix B. Total arsenic exceeded the primary SGWC for all samples collected in the Unit D Aquifer during 2021 and two samples collected from monitoring well MW-29 exceeded the primary MCL for total arsenic (Appendix B). There were no new or statistically significant increases in groundwater criteria exceedances for Unit D Aquifer in 2021. Groundwater exceedances are consistent with previous years and are the result of background arsenic conditions.

4.6.4. Prediction Limits Exceedances

Exceedances of the intrawell prediction limits are summarized in tables in Appendix B. There was an error that resulted previously removed outliers to be included in the datasets for total solids and total suspended solids and two prediction limit exceedances for total dissolved solids to not be reported during first quarter (MW-29) and second quarter (MW-19). This error has been corrected and the prediction limits are correctly reported in Appendix B for all quarters of 2021.

All the 2021 Unit D Aquifer prediction limit exceedances have been removed from retesting protocol.

4.6.5. Volatile Organic Compounds Detections

Groundwater VOC detections are summarized in tables in Appendix B. Acetone was detected in two samples from the Unit D Aquifer during 2021, both results were qualified as 'JT'. Acetone is a known laboratory contaminant.

4.6.6. Statistical and Trends Analyses

Statistical and trend analysis results for the Unit D Aquifer are summarized in Tables 3-1, 3-2, and 3-3.

There was a statistically significant short-term increasing trend for dissolved arsenic and dissolved magnesium in monitoring well MW-12. These increasing trends are not believed to represent a new landfill impact, as arsenic and magnesium are both naturally occurring in the environment.

There was a statistically significant short-term increasing trend for dissolved iron in monitoring well MW-26. This increasing trend is not believed to represent changing conditions in monitoring well MW-26, since iron is naturally occurring in the environment. The dissolved iron short-term median value is less than the long-term median value (see Table 3-1) and both are less than the secondary SGWC of 0.3 mg/L.

All other Unit D Aquifer short-term trend analysis results showed to be either stable or decreasing.

4.6.7. Summary

Raw analytical groundwater data and time-concentration plots for monitoring wells in Unit D Aquifer can be found in Appendices H and F, respectively.

Table 4-1 presents a water quality comparison of background conditions and the Unit D Aquifer characterized beneath the Vashon Landfill. VOCs are not summarized due to the absence of detections in these wells.

Conditions present in wells in the Unit D Aquifer do not indicate impacts attributable to landfill activities. The water quality in this unit is good and is believed to represent natural conditions.

4.7. WEIR and SURFACE WATER QUALITY

The seeps and weirs are located on the western ravine adjacent to the landfill (Figure 3). The elevations for the seeps are 245 ft. for Seep 1; 227 ft. for Seep 2; and 218.74 ft. for Seep 3. The weir sampling locations SW-W1, SW-W2 and SW-W3 are located downstream of each weir. The elevations for the sampling locations are 230.59 ft. for SW-W1; 193.57 ft. for SW-W2; and 192.53 ft. for SW-W3 (Figure 3). The sampling stations consist of a v-notch weir.

Historically, the naming for these locations has on occasion been inadvertently switched. After a thorough review of the data, corrections have been made and the probable results from switching location names have been associated with the correct location name. However, single unusual results may be the result of the naming issues rather than true fluctuations in the data. As a result of this data issue, results reported previously may differ from the current conditions.

The *Vashon Closed Landfill Western Hillslope Investigation* (King County, 2011) identified the groundwater sources for each of the weirs as follows; weir SW-W1 contains groundwater seeping from Unit A, Unit B, Channel Cc1, and possibly Channel Cc2; weir SW-W2 contains groundwater seeping from Channel Cc2 and possibly Channel Cc3; and weir SW-W3 contains groundwater seeping from Channel Cc2 and possibly Channel Cc3. The sampling location of weir SW-W1 is closer to the groundwater seep SW-S1, than weirs SW-W2 and SW-W3 are to their associated seeps. The updated hydrogeological conceptual model further clarified the groundwater sources following out of the seeps and into the weirs with all three weirs being primarily sourced from Channel Cc2 seeps (Aspect et. al., 2020).

4.7.1. Surface Water Exceedances

Exceedances of the WAC 173-201A (Washington State acute and chronic surface water quality criteria) and 40 CFR Parts 131 (federal acute and chronic surface water quality criteria) are summarized in Appendix B. All three weirs had total iron exceedances of the federal chronic surface water criteria. Exceedances of total metal criteria is consistent with previous years.
There were no surface water exceedances for Station SW-E during 2021.

4.7.2. Volatile Organic Compound Detections

Weir and surface water VOC detections can be found in Appendix J.

The VOC detections during 2021 were consistent with previous years. Vinyl chloride is the only VOC routinely detected in the surface water at the weirs. Vinyl chloride was detected in every quarter in SW-W3 and during one quarter in SW-W2, which was qualified as 'JT'. Vinyl chloride has never been detected in Station E.

4.7.3. Statistical Analysis

Statistical results for the weirs and station SW-E are summarized in Table 3-4. For indicator parameters like specific conductance, alkalinity, chloride, nitrate, calcium, and magnesium, short-term median values continue to be similar or lower than long-term median values, indicating stable or improving water quality conditions. Specific conductance, alkalinity, and chloride concentrations continue to be higher in weir SW-W2, compared with SW-W1 and SW-W3, indicating that weir SW-W2 may still be impacted by leachate. Short- and long-term median values for station SW-E continue to be low and stable.

4.7.4. Summary

Raw analytical groundwater data weirs and surfaces water stations can be found in Appendix J.

Conditions in weir SW-W1 continues to show the least evidence of landfill impact, while weir SW-2 has more evidence of landfill impact. Weir SW-W3 exhibits a midrange impact based on conventional parameters and metals and showing detections of vinyl chloride. Water quality monitoring will continue at the weirs to provide water quality data for surface water flow leaving the property.

Station SW-E continues to show no evidence of landfill impact.

4.8. OFFSITE DOMESTIC WELL MONITORING

In 2002, Department of Natural Resources and Parks (DNRP) conducted sampling on Vashon-Maury Island in eleven domestic wells located around the landfill. No evidence of contamination originating from the landfill was found. The data was presented in the *2002 Vashon Island Closed Landfill Annual Report*.

In 2005, King County Solid Waste Division agreed to monitor three of these eleven wells. The first round of these samples was collected in October 2005. One of the three wells is no longer sampled as access is no longer available. Starting in 2010, samples have been collected from off-property wells (DW-85 and DW-PA) bi-annually. Samples from the 85 Acres well (DW-85) are collected from the well head and the Paquette well (DW-PA) sample is taken from one of the properties

connected to that well. In 2021, a new offsite well (DW-LS) was added to the offsite monitoring program. Six samples were collected in 2021 from the three off property wells (DW-85, DW-LS, and DW-PA) (Figure 4). No evidence of contamination originating from the landfill was found.

The results from the domestic wells are included in Appendix H. The domestic well trilinear diagrams and ion balances are in Appendix I for 2021. The trilinear diagram shows all samples are within the same calcium-magnesium-bicarbonate hydrochemical facie. During 2021, the cation/anion for the wells in this zone are within ten percent (Appendix I).

5. LEACHATE

The 2021 leachate results are compiled in Appendix K and include sample results for station LS-LVT (required monitoring under Wastewater Discharge Authorization No. 4366-01). See Figure 5 for a map of the leachate control system.

6. LANDFILL GAS

Landfill gas is monitored by a network of compliance probes installed around the perimeter of the landfill and ambient air stations around the property boundary (Figure 6). The monitoring network comprises of nine ambient air stations, two groundwater monitoring wells, and twenty-six gas probes. Probes are monitored monthly. The results can be found in Appendix L. There were no detections in 2021 and there have been no methane detections at the compliance monitoring points since 2008. The effects of landfill gas on current groundwater conditions are being reviewed to determine whether data gaps exist in the current analysis. In 2017, two sets (shallow and deep) temporary gas probes were installed to continue the determination of landfill gas on the south hillslope. In 2016 and 2018, three gas extraction wells (GW-9, GW-10, and GW-11) were installed on the south slope hillslope of the landfill, to increase the radius of influence of the landfill extraction system. The *Landfill Gas System Evaluation Summary Report* determined that the radius of influence for extracting methane was 190 ft., 135 ft., and 50 ft. for gas wells GW-9, GW-10, and GW-11, respectively (Aspect and Herrera, 2019). In March of 2022, the belt-drive landfill gas blower was replaced by two direct-drive landfill gas blower, after being offline for two years.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1. CONCLUSIONS

Conditions at the Vashon Island Closed Landfill have continued the historic trend, with some VOCs showing decreasing trends. Therefore, most of the conclusions drawn from the previous Annual Reports hold true for this report. The following conclusions reiterate some conclusions from previous Annual Reports:

1. The groundwater generally moves westward in the middle channel of the lacustrine silt, Channel Cc2, within Unit C.
2. The flow direction within the Unit D Aquifer is better defined and potentiometric maps show less radial flow after monitoring well MW-27 was decommissioned. The updated hydrogeological conceptual model provided a further definition in the potentiometric maps (Appendix G).
3. The monitoring wells in the Unit D Aquifer showed low sensitivity to hydrologic activity, based on the observation of very small seasonal water level fluctuations, indicating limited groundwater recharge in the area of the landfill.
4. Landfilling impacts have been recognized in Channel Cc2 at monitoring wells MW-2, MW-21, MW-33, and MW-35, including for VOCs. Detections for many VOCs have declined significantly or are stable in the short-term. Leachate is believed to have contributed to past impacts. Recent data and investigations, specifically levels of VOCs in monitoring wells MW-2, MW-21, MW-33, and MW-35, support transport of historic contaminants from landfill gas.
5. The landfill closure has been effective in improving the water quality condition of impacted wells, based on reductions in specific conductance, total dissolved solids, chloride, and several VOCs.
6. Results obtained from wells in Unit D Aquifer do not show impacts attributable to landfill activities, but instead reflect the natural variations in water quality that exist around the landfill.

7.2. RECOMMENDATIONS/PROPOSED ACTIONS

1. The existing monitoring network as described in the *Vashon Island Closed Landfill Remedial Investigation Report* (RI; Aspect et. al., 2020) shall continue to be monitored following protocols from the *Environmental Monitoring Sampling and Analysis Plan and Quality Assurance Project Plan for Vashon Island Closed Landfill*.
2. Evaluation of the operating efficiency of the landfill gas collection system and probe network will continue into 2022 to determine if more improvements to the collection and treatment system are needed. Furthermore, we will continue to assess the effect of landfill gas wells GW-9, GW-10, and GW-11 have on groundwater conditions.
3. Monitoring of the groundwater wells will continue for Appendix I and II parameters, with the addition of dichlorodifluoromethane and 2,4,5-TP Silvex, 2-methyl-1-propanol, bis(2-

chloroethyl) ether, bis(2-ethylhexyl) phthalate, and diethyl phthalate for monitoring wells MW-2, MW-20, MW-21, MW-33, and MW-35. These new analytes will be added to the prediction limit exceedance check in 2023. The next Appendix III sampling will occur in 2024.

4. The water-bearing zone in Channel Cc2 shall continue with assessment monitoring in accordance with WAC 173-351-430. The RI was completed in 2020. Work started on the Feasibility Study in 2021.
5. In accordance with one of the data gaps identified in the RI, KCSWD will be installing a new well in Channel Cc2 at the southern property boundary.
6. In 2022, KCSWD will be decommissioning monitoring well MW-28 from the monitoring network, since the screen for MW-28 was installed at the contact between Unit D and the unit below (Unit E) and requires a two-foot rise in surrounding groundwater levels to reach the screen bottom.
7. In 2022, KCSWD will continue trying to coordinate the addition of the offsite spring, DW-GW, to the offsite monitoring network.
8. Surface water sampling site SW-E will be sampled quarterly for pH (field), specific conductance (field and laboratory), turbidity (field and laboratory), hardness, total metals, and vinyl chloride.
9. In accordance with WAC 173-350-340, the leachate lagoon at VLF is to be tested in 2025 for leaks.
10. In August 2021, KCSWD submitted a proposed schedule and framework for developing and implementing a program to test select leachate containment and conveyance structures at VLF in accordance with WAC 173-350-330. Public Health – Seattle & King County approved KCSWD's proposal in December 2021 and KCSWD established a Capital Improvement Program project intended to identify and validate asset-specific test methods.
11. In March of 2022, two new direct drive blowers were installed to replace the previous belt drive blower and active landfill gas collection was resumed. KCSWD will be closely monitoring the methane concentration in the landfill gas stack emissions and the groundwater response.

8. REFERENCES

Aspect Consulting, LLC (Aspect) et al., 2012, *Environmental Review, Investigation, and Evaluation Technical Memorandum – Vashon Island Closed Landfill, Agency Draft*, prepared for King County Department of Public Works, Solid Waste Division, Aspect Consulting, LLC, Seattle, WA, March 2012.

Aspect Consulting, LLC (Aspect), 2017, *Vashon Landfill – Influence Testing Summary Report, D310.1.6.4.2*, Seattle, WA, June 2017.

Aspect Consulting, LLC (Aspect) and Herrera (Herrera) Environmental Consultants, 2019, *Landfill Gas System Evaluation Summary Report,* August 2019.

Aspect Consulting, LLC (Aspect et. al.), Anchor QEA, and BHC Consultants, 2020, *Vashon Island Closed Landfill Remedial Investigation Report*, November 2020.

Baedecker, M.J. and W. Back, 1979, *Modern Marine Sediments as a Natural Analog to the Chemically Stressed Environment of a Landfill.* Journal of Hydrology, 43:393-414.

Berryman & Henigar, 1999, *Vashon Landfill 1999 Stormwater Improvements Technical Information Report*, March 1999.

Berryman & Henigar, CH2Mhill, HWA Geosciences Inc. Udaloy Environmental Services, and HDR Engineering, Inc. December 1999. *Pre-design Engineering report for the Vashon Landfill Closure*, prepared for King County Department of Natural Resources, Solid Waste Division.

Berryman & Henigar, CH2Mhill, HWA Geosciences Inc. Udaloy Environmental Services, and HDR Engineering, Inc. November 2000. *Vashon Island Landfill Hydrogeologic Report*, prepared for King County Department of Natural Resources, Solid Waste Division.

Berryman & Henigar and Herrera Environmental Consultants, 2004, *VOC Sampling and Testing Results*, July 2004.

Berryman & Henigar and Udaloy Environmental Services (UES). December 2004. *Vashon Island Landfill Hydrogeologic Report Update*, prepared for King County Department of Natural Resources, Solid Waste Division.

Berryman & Henigar and UES, 2006a, *Vashon Island Closed Landfill Environmental Evaluation*, March 2006.

Berryman & Henigar and UES, 2006b, *Vashon Island Closed Landfill: Potential Effects of Landfill Gas and Leachate on Vashon Landfill Groundwater and Springs*, February 2006.

Carr/Associates. December 1, 1983. *Vashon/ Maury Island Water Resources Study*, prepared for King County Department of Planning and Community Development.

CH2M Hill. March 1995. *Groundwater Monitoring Well Construction Work Plan*, prepared for King County Solid Waste Division.

CH2M Hill. December 1996. *Vashon Island Landfill Monitoring Well Construction Report*, prepared for King County Solid Waste Division.

CH2M HILL, 1997a, *Vashon Island Landfill Interior Gas Collection and Treatment System*, Record Drawings.

CH2M HILL, 1997b, *Vashon Island Landfill Interior Gas Collection and Treatment System Operations and Maintenance Manual*. March 1997.

Challa, J.; D. Skoff; F.J. Quirus. 1997. *Landfill Gas as Source of VOCs in Ground Water*. Practice Periodical of Hazardous, Toxic and Radioactive Waste Management. Vol. 1, No. 2. ASCE

Fisher, S.R., and Potter, K.W., 1989, *Methods for Determining Compliance with Groundwater Quality Regulations at Waste Disposal Facilities, Final Report*, Wisconsin Department of Natural Resources.

Geraghty & Miller, Inc. Environmental Services. 1993. *Vashon Groundwater Management Plan, Update Area Characterization and Data Analysis, Project*. Public Health-Seattle & King County.

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

Golder Associates. 1986. *Geotechnical Memorandum #4, Subtask 1/Task 1B, Geotechnical Data Development Vashon Landfill Leachate Control*.

Harding Lawson Associates. August 8, 1991. *Vashon Landfill Groundwater Quality, Statistical Summary of Data Collection between 1986 and 1991*, prepared for King County Solid Waste Division, Seattle, Washington.

Harding Lawson Associates. June 30, 1993. *Vashon Landfill 1992 Annual Water Quality Report*, prepared for King County Solid Waste Division, Seattle, Washington.

Harper-Owes. 1986. *Vashon Landfill Leachate Control, Task 1A: Conceptual Alternatives Development*, Technical Memorandum prepared for King County Solid Waste Division, Seattle, Washington.

Harper-Owes. 1986. *Vashon Island Leachate Control*, Technical Memorandum prepared for King County Solid Waste Division, Seattle, Washington.

Harper-Owes et al., 1988, *Vashon Island Landfill Leachate Control Facilities Construction Record Drawings*, May 1988.

Kerfoot, H.B. 1994. *Landfill Gas effects on Groundwater Samples at Municipal Solid Waste Facility*. Journal of Air & Waste Management Association. Vol. 44.

King County, 2005, *Vashon-Maury Island Phase I Groundwater Model, A Part of the Vashon-Mary Island Water Resources Evaluation*, King County Department of Natural Resources and Parks, Water and Land Resources Division, October 2005.

King County, 2011, *Vashon Closed Landfill Western Hillslope Investigation*, King County Department of Natural Resources and Parks, Water and Land Resources Division, March 31, 2011.

King County Solid Waste Division, April 2003. *Vashon Island Closed Landfill 2002 Annual Groundwater Data Evaluation.*

King County Solid Waste Division. January 2016. *Environmental Monitoring Sampling and Analysis Plan and Quality Assurance Project Plan for Vashon Island Closed Landfill.*

King County Solid Waste Division, April 2019. *Vashon Island Closed Landfill 2018 Annual Groundwater Data Evaluation.*

King County Department of Natural Resources. April 2000. *Vashon Landfill Final Closure, Contract No. C03056C, Special Provisions*, prepared by Berryman & Henigar.

Nyer, E.K., M.E. Duffin. 1997. *The State of the Art of Bioremediation*. GWMR. Spring.

Prosser, R., A. Janechek. 1995. *Landfill Gas and Groundwater Contamination*. Proceedings of the October 1995 American Society of Civil Engineers Convention.

R. W. Beck and Associates, 1983. *King County Landfills Ground Water Monitoring Investigations, Task 11 Report*.

R.W. Beck and Associates/ Sweet, Edwards & Associates. December 1984. *Groundwater Geology/ Quality Investigations for Rural Landfills in King County, Washington*, prepared for King County Solid Waste Division.

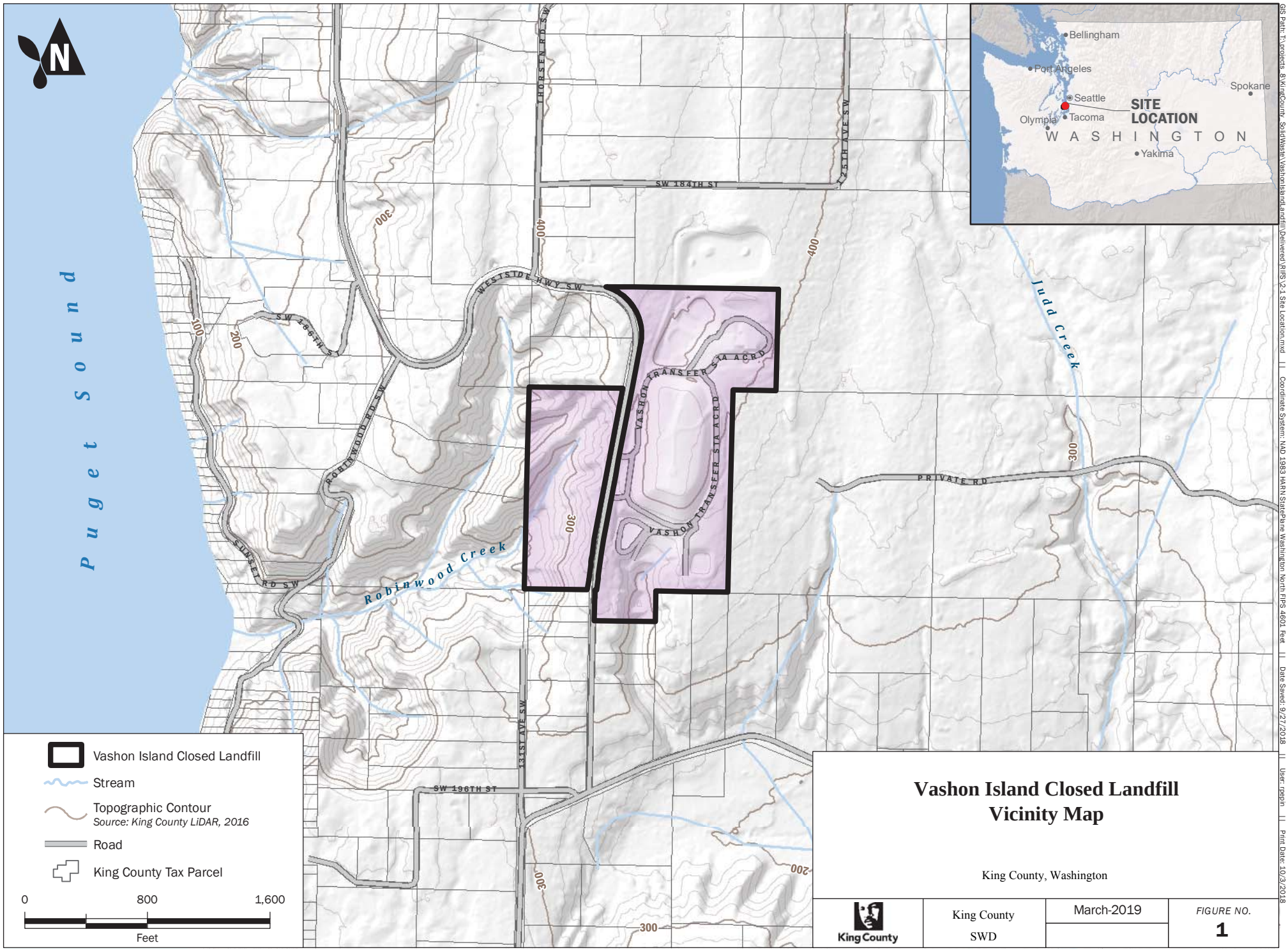
Rekow, K.H., and Chapra, S.C. 1983, *Engineering Approaches for Lake Management, Volume 1, Data Analysis and Empirical Modeling*, Boston, Butterworth, p. 340.

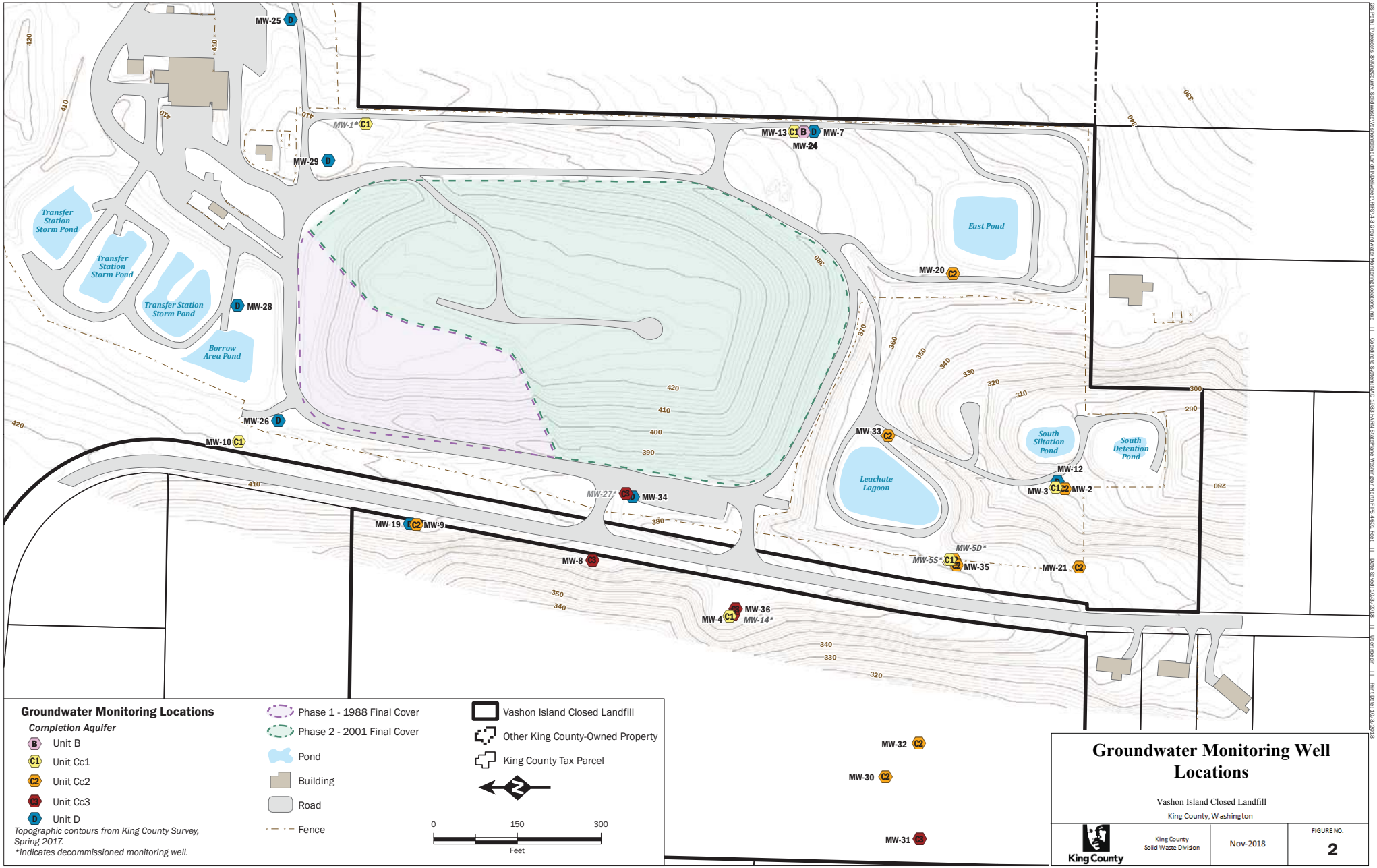
Smayda, T.J. and R.J. Owes. 1991. *Unlined Landfills in the Pacific Northwest: Leachate Composition and Groundwater Impacts, in Proceedings: Nonpoint Source. Pollution: The Unfinished Agenda for the Protection of our Water Quality*, Tacoma, WA.

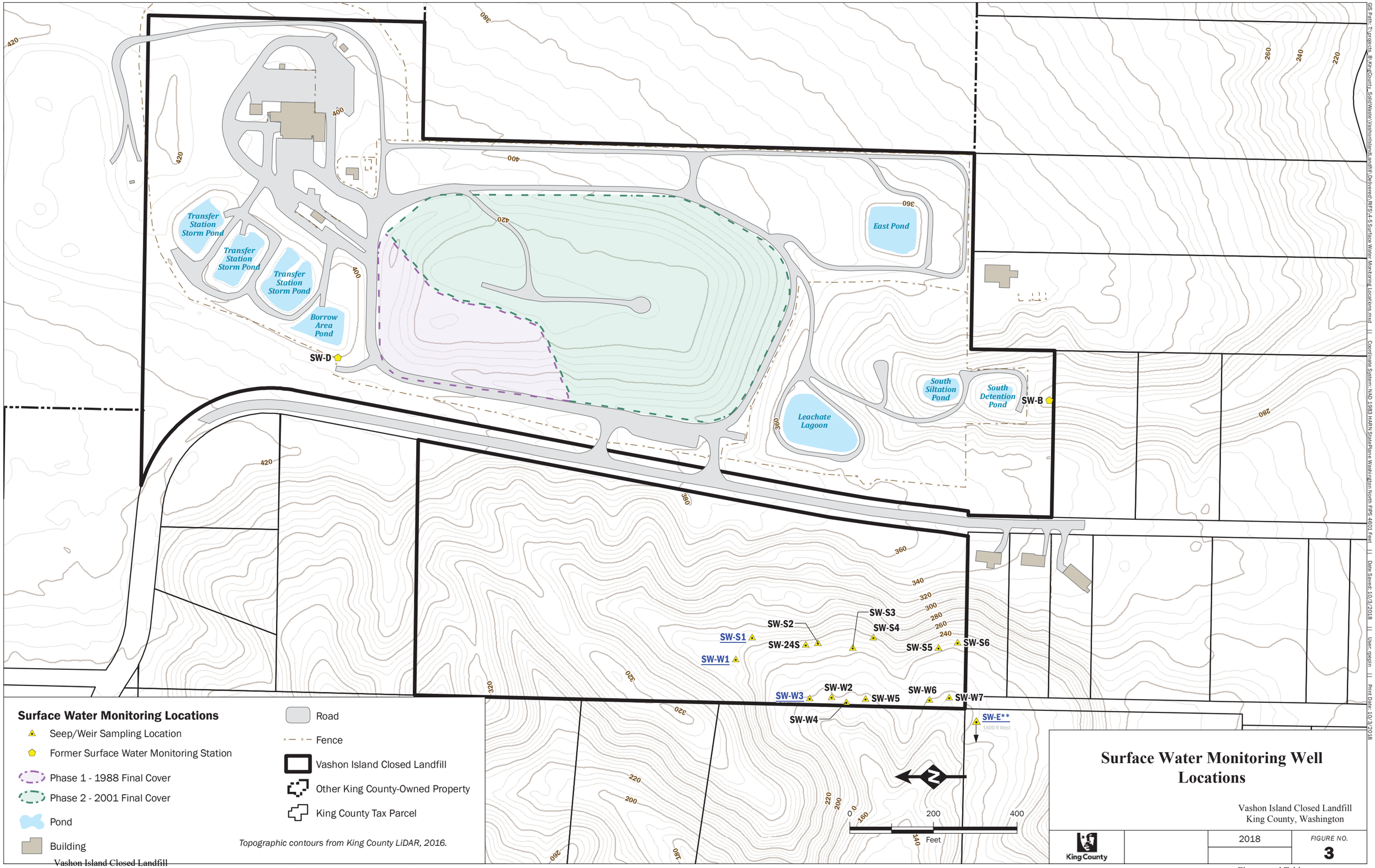
Stumm, W. and J. J. Morgan. 1981. *Aquatic Chemistry: An introduction Emphasizing Chemical Equilibria in Natural Waters*. John Wiley & Sons.

Washington, J. W. 1996. *Gas Partitioning of Dissolved Volatile Organic Compounds in the Vadose Zone: Principles, Temperature Effects and Literature Review*. Groundwater. Vol. 34, No. 4.

FIGURES and TABLES


Puget Sound
Robinwood Creek
Judd Creek
THORSEN RD SW
125TH AVE SW
SW 184TH ST
WESTSIDE HWY SW
SW 196TH ST
ROBINWOOD RD SW
SUNSET RD SW
PRIVATE RD
VASHON TRANSFER STA ACRD
131ST AVE SW
100
200
300
400
Bellingham
Port Angeles
Seattle
Tacoma
Olympia
Spokane
Yakima
SITE LOCATION
WASHINGTON
Vashon Island Closed Landfill
Stream
Topographic Contour
Source: King County LiDAR, 2016
Road
King County Tax Parcel
0
800
1,600
Feet
Vashon Island Closed Landfill
Vicinity Map
King County, Washington
King County
King County
SWD
March-2019
FIGURE NO.
1
GIS Path: T:\projects_8\KingCounty_SolidWaste\VashonIslandLandfill\Delivered\RI\S\2-1 Site Location.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/27/2018 || User: rpopin || Print Date: 10/3/2018


MW-25 D
MW-1* C1
MW-29 D
MW-13 C1 B D MW-7
MW-24
East Pond
MW-20 C2
Transfer Station Storm Pond
Transfer Station Storm Pond
Transfer Station Storm Pond
Borrow Area Pond
D MW-28
MW-26 D
MW-10 C1
MW-27* C3 D MW-34
MW-19 C2 MW-9
MW-8 C3
MW-33 C2
South Siltation Pond
South Detention Pond
Leachate Lagoon
MW-12
MW-3 C1 C2 MW-2
MW-5D*
MW-5S* C1 C2 MW-35
MW-21 C2
MW-4 C1 C3 MW-36
MW-14*
MW-32 C2
MW-30 C2
MW-31 C3
420
410
400
390
380
370
360
350
340
330
320
310
300
290
280
Groundwater Monitoring Locations
Completion Aquifer
B Unit B
C1 Unit Cc1
C2 Unit Cc2
C3 Unit Cc3
D Unit D
Topographic contours from King County Survey, Spring 2017.
*indicates decommissioned monitoring well.
Phase 1 - 1988 Final Cover
Phase 2 - 2001 Final Cover
Pond
Building
Road
Fence
Vashon Island Closed Landfill
Other King County-Owned Property
King County Tax Parcel
0 150 300
Feet
Groundwater Monitoring Well Locations
Vashon Island Closed Landfill
King County, Washington
King County
King County Solid Waste Division
Nov-2018
FIGURE NO.
2



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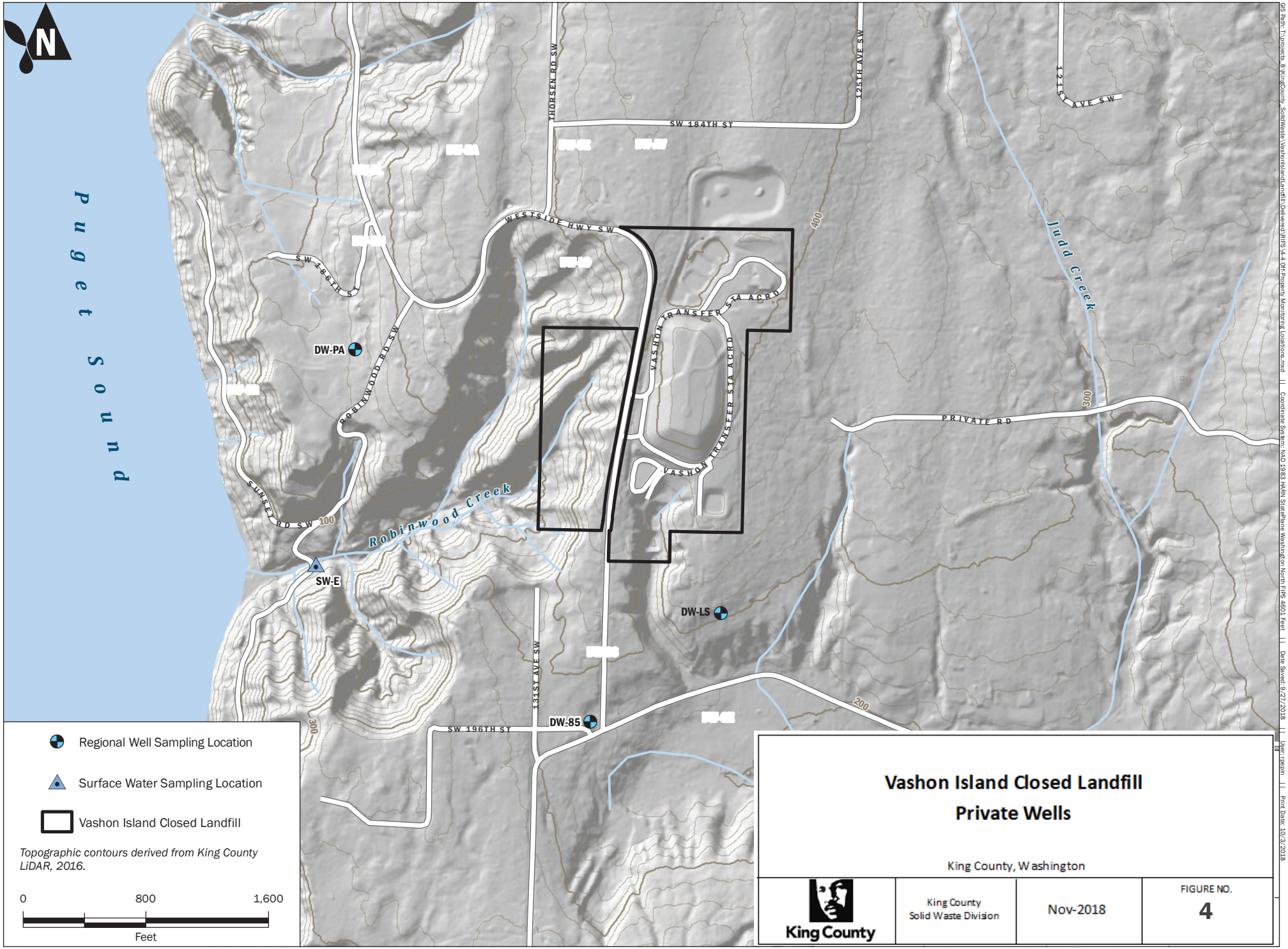
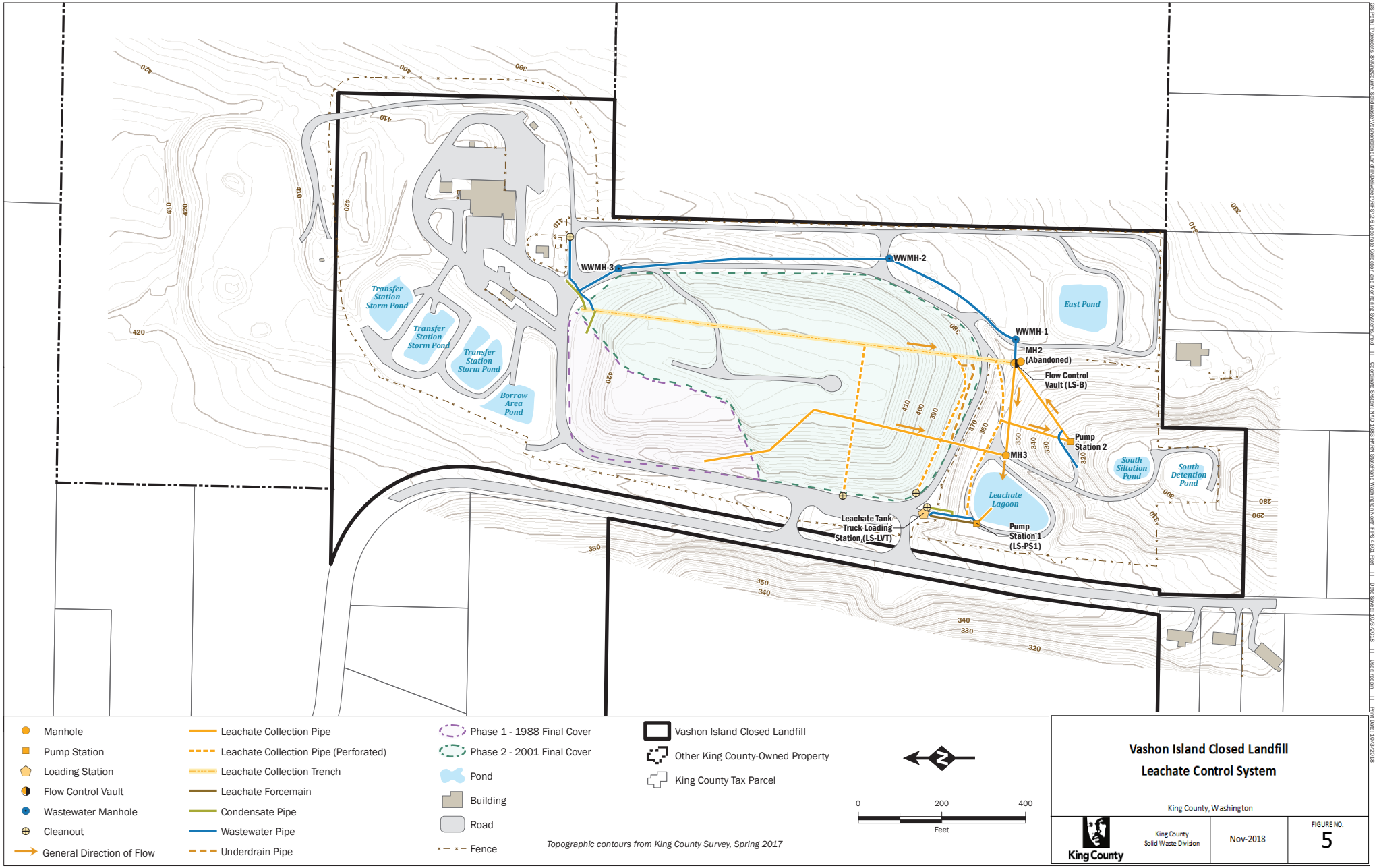

N
Puget Sound
SW 184TH ST
THORSEN RD SW
125TH AVE SW
121ST AVE SW
WESTSIDE HWY SW
SW 486TH ST
ROBINWOOD RD SW
SUNSET RD SW
VASHON TRANSFER STA ACRD
PRIVATE RD
Judd Creek
Robinwood Creek
131ST AVE SW
SW 196TH ST
DW-PA
SW-E
DW-LS
DW-85
100
200
300
400
Regional Well Sampling Location
Surface Water Sampling Location
Vashon Island Closed Landfill
Topographic contours derived from King County LiDAR, 2016.
0
800
1,600
Feet
Vashon Island Closed Landfill
Private Wells
King County, Washington
King County
King County
Solid Waste Division
Nov-2018
FIGURE NO.
4


WWMH-3
WWMH-2
WWMH-1
MH2
(Abandoned)
Flow Control
Vault (LS-B)
MH3
Pump
Station 2
Pump
Station 1
(LS-PS1)
Leachate Tank
Truck Loading
Station (LS-LVT)
Transfer
Station
Storm Pond
Transfer
Station
Storm Pond
Transfer
Station
Storm Pond
Borrow
Area
Pond
East Pond
Leachate
Lagoon
South
Siltation
Pond
South
Detention
Pond
Manhole
Pump Station
Loading Station
Flow Control Vault
Wastewater Manhole
Cleanout
General Direction of Flow
Leachate Collection Pipe
Leachate Collection Pipe (Perforated)
Leachate Collection Trench
Leachate Forcemain
Condensate Pipe
Wastewater Pipe
Underdrain Pipe
Phase 1 - 1988 Final Cover
Phase 2 - 2001 Final Cover
Pond
Building
Road
Fence
Vashon Island Closed Landfill
Other King County-Owned Property
King County Tax Parcel
0
200
400
Feet
Topographic contours from King County Survey, Spring 2017
Vashon Island Closed Landfill
Leachate Control System
King County, Washington
King County
King County
Solid Waste Division
Nov-2018
FIGURE NO.
5

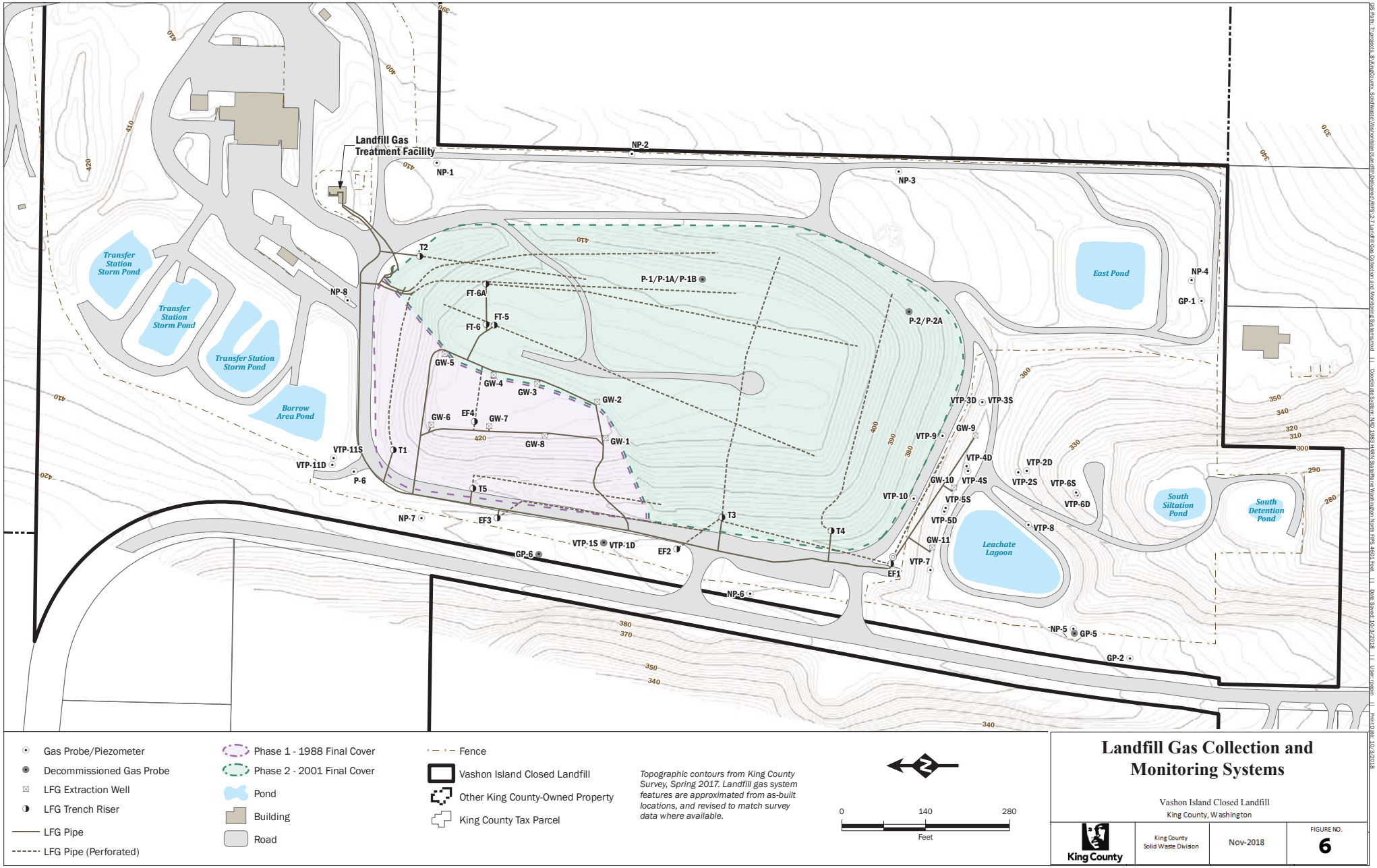

Landfill Gas Treatment Facility
NP-1
NP-2
NP-3
NP-4
NP-5
NP-6
NP-7
NP-8
GP-1
GP-2
GP-5
GP-6
T1
T2
T3
T4
T5
P-1/P-1A/P-1B
P-2/P-2A
P-6
FT-5
FT-6
FT-6A
EF1
EF2
EF3
EF4
GW-1
GW-2
GW-3
GW-4
GW-5
GW-6
GW-7
GW-8
GW-9
GW-10
GW-11
VTP-1D
VTP-1S
VTP-2D
VTP-2S
VTP-3D
VTP-3S
VTP-4D
VTP-4S
VTP-5D
VTP-5S
VTP-6D
VTP-6S
VTP-7
VTP-8
VTP-9
VTP-10
VTP-11D
VTP-11S
Transfer Station Storm Pond
Transfer Station Storm Pond
Transfer Station Storm Pond
Borrow Area Pond
East Pond
Leachate Lagoon
South Siltation Pond
South Detention Pond
Gas Probe/Piezometer
Decommissioned Gas Probe
LFG Extraction Well
LFG Trench Riser
LFG Pipe
LFG Pipe (Perforated)
Phase 1 - 1988 Final Cover
Phase 2 - 2001 Final Cover
Pond
Building
Road
Fence
Vashon Island Closed Landfill
Other King County-Owned Property
King County Tax Parcel
Topographic contours from King County Survey, Spring 2017. Landfill gas system features are approximated from as-built locations, and revised to match survey data where available.
0
140
280
Feet
Landfill Gas Collection and Monitoring Systems
Vashon Island Closed Landfill
King County, Washington
King County
King County Solid Waste Division
Nov-2018
FIGURE NO.
6

Figure 7 - Water Level Elevations in Unit B Aquifer

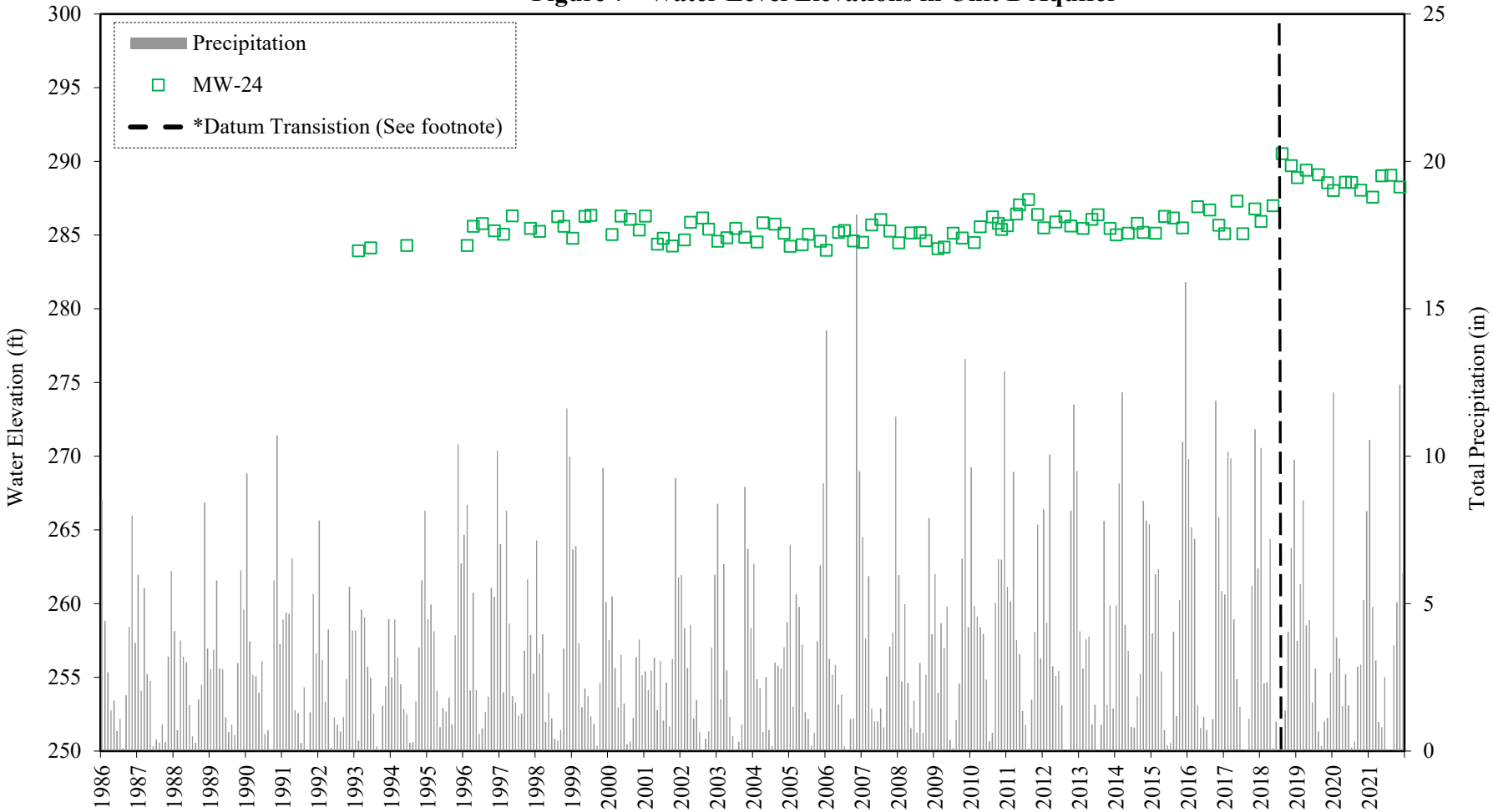


Figure 8 - Water Level Elevations in Channel Cc1

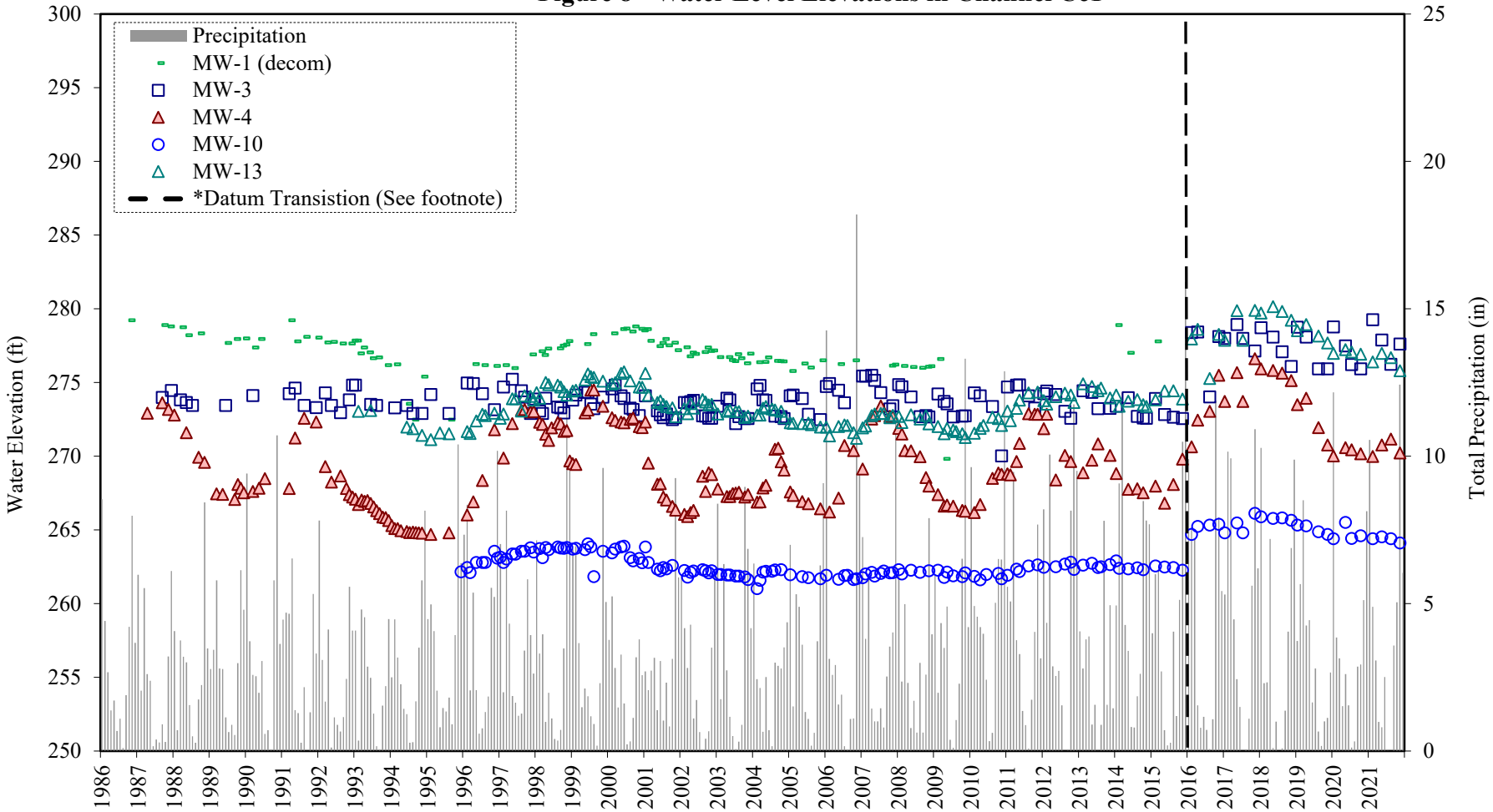


Figure 9 - Water Level Elevations in Channel Cc2

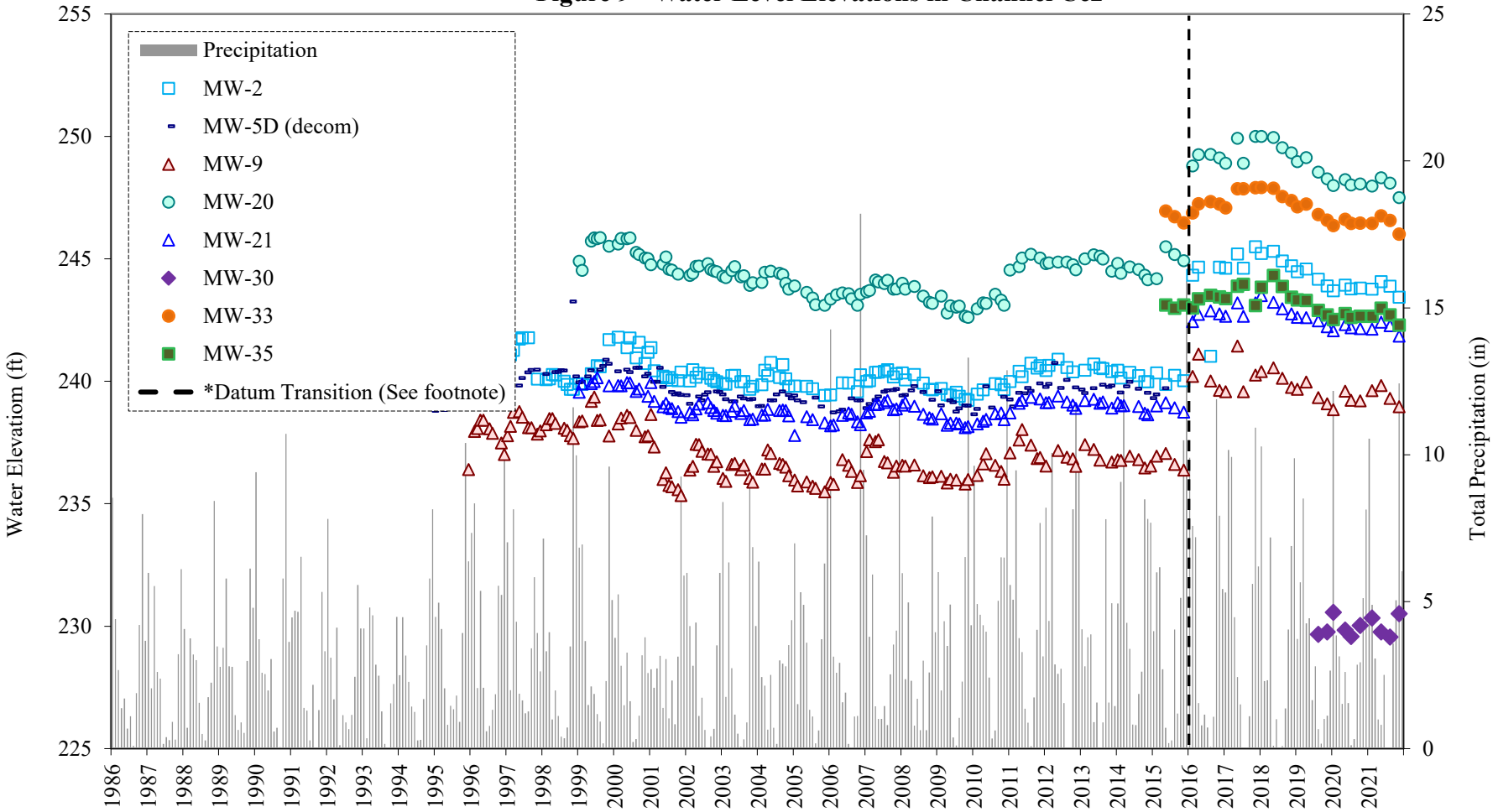


Figure 10 - Water Level Elevations in Channel Cc3

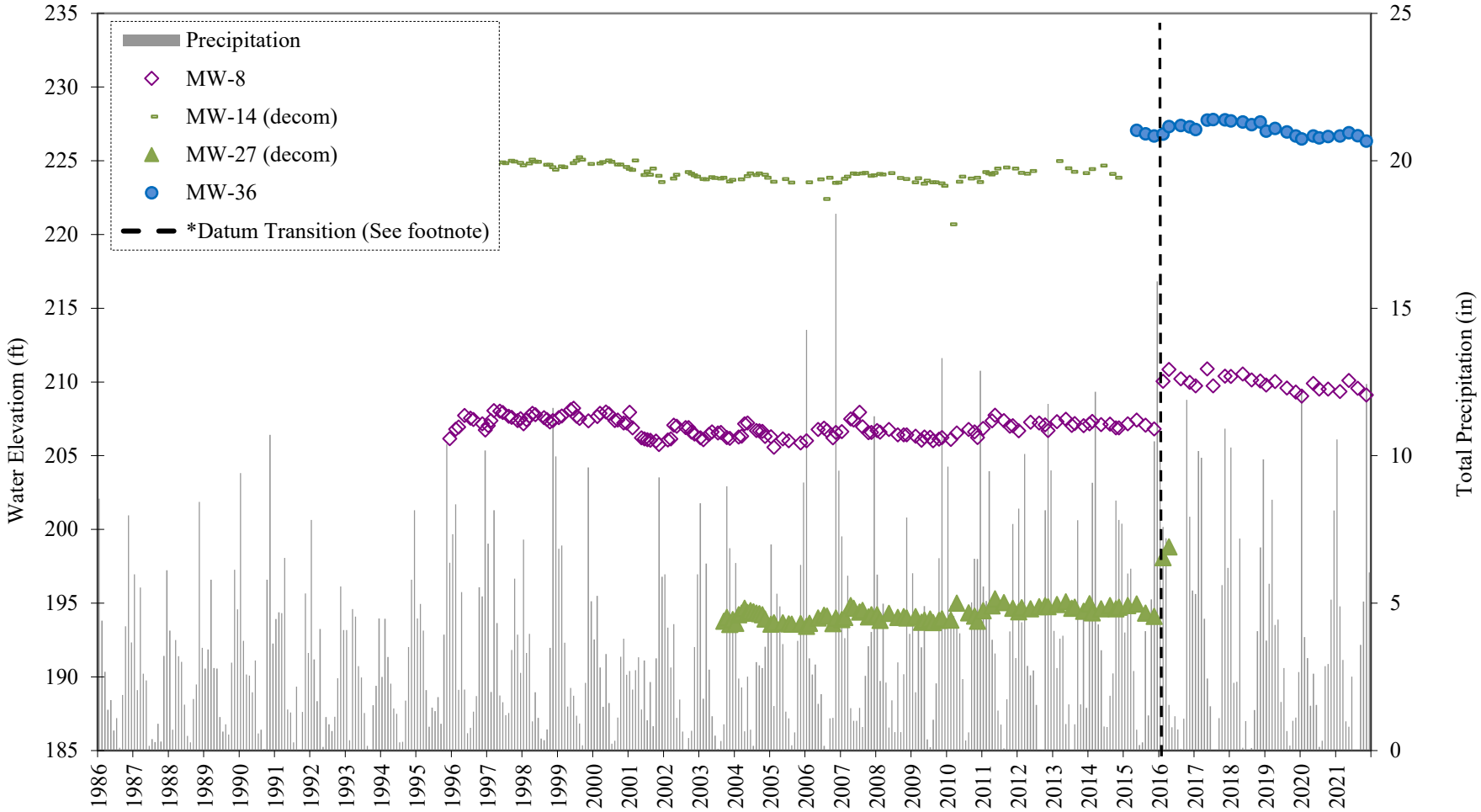


Figure 11 - Water Level Elevations in Unit D Aquifer

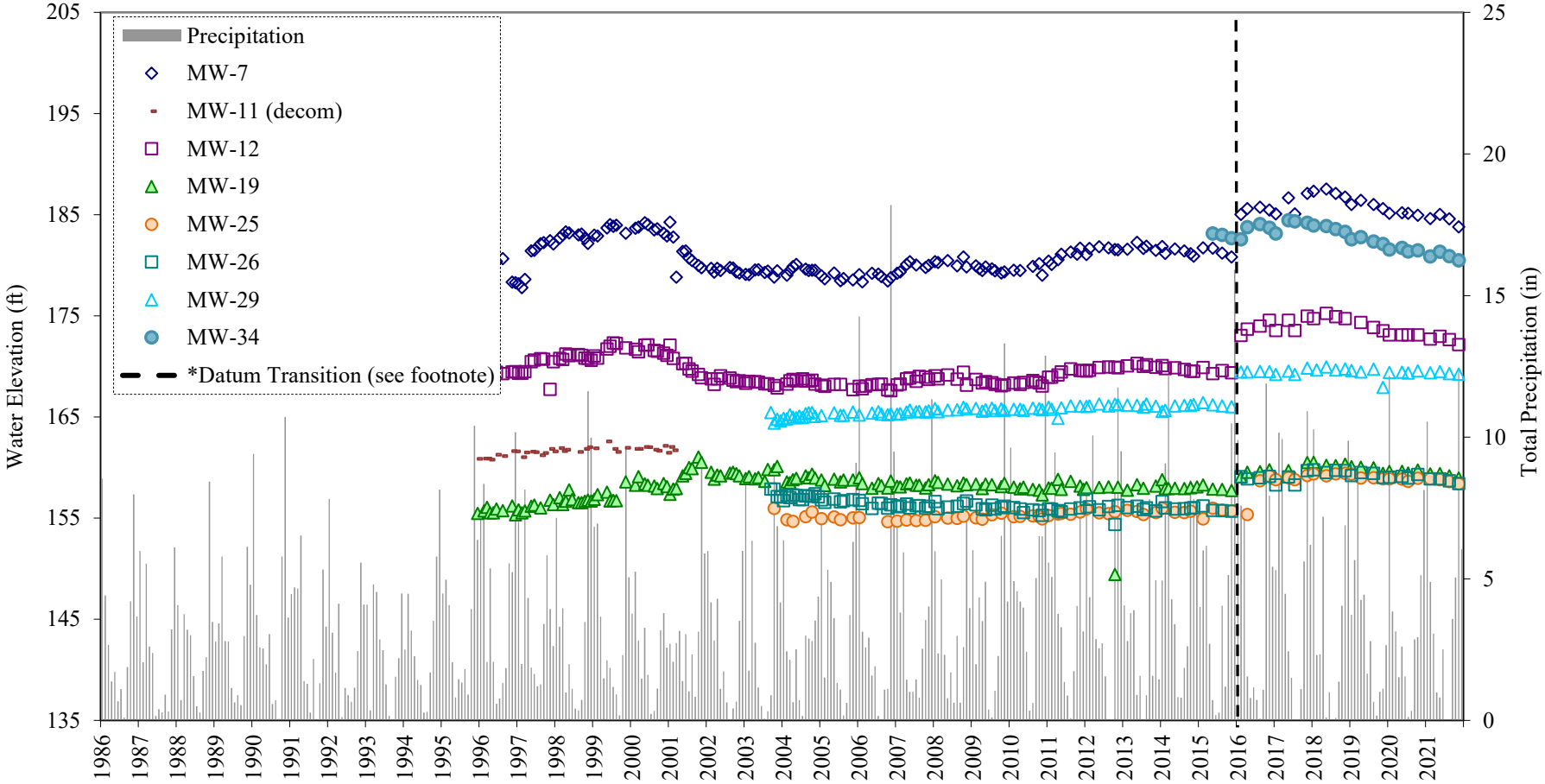


Table 2-1
Significant Maintenance Activities Summary 2021

Maintenance Activity	Resolution
Landfill Gas Blower Maintenance	The landfill gas blower was sent in for repairs, due to the fan moving out of position, causing a lot of noise. It was determine due to the repair needs and the age of the blower to replace the blower with two direct drive blowers running in parallel. The installation of these blowers began in November 2021 and was completed on March 2, 2021.
Leachate Lagoon Liner Testing/Liner Flap Installation	The leachate lagoon liner was tested in 2020, in accordance with the requirement to test surface impoundment every five years in WAC 173-350-340. The test was unsuccessful due to damage to the liner beneath the perimeter road. The damaged liner was repaired and a flap was installed for accessibility during future tests. The liner was retested on May 25, 2021. There were no leaks detects and results were submitted to Public Health - Seattle/King County and Washington State Department of Ecology by June 24, 2021.

Table 2-2
Previous Investigations and Site Improvements

Reference	Deliverable	Major Work Conducted
R.W. Beck and Associates (1983)	Preliminary Report, King County Landfills, Groundwater Geology Investigations	Installation of monitoring wells MW-1, MW-2, MW-3, and MW-4 and groundwater investigation.
R.W. Beck and Associates and Sweet, Edwards and Associates (1984)	Groundwater Geology/Quality Investigations for the Rural Landfills	
Harper-Owes (1985)	Vashon Landfill Leachate Control, Task 1A: Conceptual Alternatives Development	Evaluation of water quality conditions and design and installation of leachate control in preparation for Phase 1 closure.
Harper-Owes (1986)	Vashon Leachate Control, Task 1B: Geotechnical and Water Quality Investigations	
Harper-Owes et al. (1988)	Vashon Island Landfill Leachate Control Facilities Construction Record Drawings	
CH2M Hill (1995)	Groundwater Monitoring Well Construction Work Plan	Installation of eight groundwater monitoring wells (MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-14, and MW-19) and eight gas probes were installed around the perimeter of the refuse area.
CH2M Hill (1996)	Vashon Island Landfill Monitoring Well Construction Report	
CH2M Hill (1997a)	Vashon Island Landfill Interior Gas Collection and Treatment System, Record Drawings	Converting the landfill gas system from passive to active and changing the treatment system from flares to activated carbon
CH2M Hill (1997b)	Vashon Island Landfill Interior Gas Collection and Treatment System, Record Drawings	
Berryman & Henigar (1999)	Stormwater Improvements Technical Information Report	Stormwater system improvements as part of closure.
Berryman & Henigar et al. (2000)	Vashon Island Landfill Hydrogeologic Repor	An evaluation of the site hydrogeology.
Berryman & Henigar and Udaloy Environmental Services (UES) (2004)	Vashon Island Landfill Hydrogeologic Report Update	Installation of three additional monitoring wells (MW-26, MW-27 and MW-28) and one piezometer (MW-25) and a revision to the 2000 hydrogeologic report incorporating these new wells into the hydrogeologic interpretation of the site
Berryman & Henigar and Udaloy Environmental Services (UES) (2006a)	Vashon Island Closed Landfill Environmental Evaluation	An evaluation of the landfill environmental control systems and their interaction with the hydrogeologic environment.
Berryman & Henigar and UES (2006b)	Vashon Island Closed Landfill: Potential Effects of Landfill Gas and Leachate on Vashon Landfill Groundwater and Springs	A chemistry-based evaluation of the source of volatile organic compounds (VOCs) found in some of the wells present at the time.
King County (2011)	Vashon Closed Landfill Western Hillslope Investigation	Reconnaissance of the West Hillslope to help design a stratigraphic model for the VLF, including the installation of monitoring wells MW-30, MW-31, and MW-32.
Aspect and Herrera (2019)	Landfill Gas System Evaluation Summary Report	This Report summarizes findings from an extent of refuse investigation and landfill gas extended influence testing performed at the VLF, and provides recommendations based on LFG control system and treatment technology performance.
Aspect et. al. (2020)	Vashon Island Closed Landfill Remedial Investigation Report	The report documenting the results of the remedial investigation, conducted to define the distribution of contaminants at a site and the associated potential threat to human health and the environment.

Table 2-3
Vashon Island Closed Landfill Groundwater Monitoring Well Completion Details

Well Number	Date Completed	Installed By	Top of PVC Casing Elevation (feet)[a]	Well Casing and Screen	Well Dia. (inches)	Screen slot (inches)	Top of Screen Elevation[a]	Bottom of Screen Elevation[a]	Top of Seal Elevation[a]	Bottom of Seal Elevation[a]	Seal Type	Top of Sand Pack (feet elev.)[a]	Bottom of Sand Pack (feet elev.)[a]	Sand Type	Reference[c]
MW-1[d]	8/9/1983	Sweet- Edwards	407.06	Sch 80 PVC	3	0.010	287.94	277.94	405.94	292.94	Bentonite	292.94	275.94	3/8 minus pea gravel	A
MW-2	9/9/1983	Sweet- Edwards	318.09	Sch 80 PVC	3	0.010	237.39	232.39	316.39	250.39	Bentonite	248.39	231.39	3/8 minus pea gravel	A
MW-3	12/9/1983	Sweet- Edwards	318.12	Sch 80 PVC	3	0.010	281.15	276.15	316.15	284.15	Bentonite	284.15	276.15	3/8 minus pea gravel	A
MW-4	9/14/1983	Sweet- Edwards	377.30	Sch 80 PVC	3	0.010	276.17	266.17	376.17	281.17	Bentonite	281.17	266.17	3/8 minus pea gravel	A
MW-5S[b,d]	6/3/1986	Golder	360.09	Sch 40 PVCb	2	0.020	285.32	275.32	359.32	356.32	Bentonite	356.32	274.82	#8 Monteray & Gravel	B
MW-5D[b,d]	6/3/1986	Golder	360.66	Sch 40 PVCb	2	0.020	244.32	233.32	258.82	253.32	Bentonite	257.32	233.32	#8 Monteray & Gravel	B
MW-6S[b,d]	3/19/1986	Golder	397.7	Sch 40 PVCb	2	0.020	290.88	280.88	395.88	392.88	Bentonite	392.88	279.88	#8 Aqua and Gravel	B
MW-6D[b,d]	3/19/1986	Golder	397.6	Sch 40 PVCb	2	0.020	245.38	235.38	259.88	253.88	Bentonite	247.88	234.88	#8 Aqua	B
MW-7	4/28/1995	CH2M HILL	376.56	Sch 40 PVC	2	0.010	154.40	144.40	374.40	157.40	Bentonite	157.40	142.40	#20 x 40	C
MW-8	6/30/1995	CH2M HILL	386.13	Sch 40 PVC	2	0.010	215.95	205.95	383.95	216.95	Bentonite	216.95	203.95	#20 x 40	C
MW-9	12/6/1995	CH2M HILL	405.32	Sch 40 PVC	2	0.010	236.39	226.39	403.39	239.39	Bentonite	239.39	223.39	#20 x 40	C
MW-10	1/7/1995	CH2M HILL	410.21	Sch 40 PVC	2	0.010	265.04	255.04	408.04	268.04	Bentonite	268.04	253.04	#20 x 40	C
MW-11[d]	5/15/1995	CH2M HILL	409.85	Sch 40 PVC	2	0.010	165.74	155.74	407.74	167.74	Bentonite	167.74	147.74	#20 x 40	C
MW-12	5/26/1995	CH2M HILL	315.67	Sch 40 PVC	2	0.010	142.90	132.90	313.40	146.40	Bentonite	146.40	127.40	#20 x 40	C
MW-13	4/22/1992	Terra	377.37	Sch 40 PVC	2	0.020	267.30	262.30	375.30	269.30	Bentonite	269.30	259.80	#8	D
MW-14[d]	6/21/1995	CH2M HILL	379.14	Sch 40 PVC	2	0.020	216.08	206.08	377.08	223.08	Bentonite	223.08	205.08	#20 x 40	C
MW-19	12/6/1995	CH2M HILL	405.58	Sch 40 PVC	2	0.020	142.85	132.85	402.35	142.35	Bentonite	142.35	126.35	#20 x 40	C
MW-20	10/21/1998	UES	370.43	Sch 40 PVC	2	0.020	240.79	236.49	368.49	244.09	Bentonite	244.09	234.49	#20 x 40	E
MW-21	10/21/1998	UES	348.95	Sch 40 PVC	2	0.020	246.46	237.06	347.06	252.06	Bentonite	252.06	236.06	#20 x 40	E
MW-24	4/27/1992	Terra	377.53	Sch 40 PVC	2	0.020	294.96	284.96	375.46	298.46	Bentonite	298.46	285.46	#8	D
MW-25	11/8/2003	UES	402.48	Sch 80 PVC	4	0.020	152.04	137.94	400.54	155.54	Bentonite	155.54	133.54	#16 x 30	F
MW-26	6/8/2003	UES	406.58	Sch 80 PVC	4	0.020	158.30	144.20	404.40	162.10	Bentonite	162.10	140.70	#16 x 30	F
MW-27[d]	8/15/2003	UES	386.34	Sch 80 PVC	4	0.020	197.55	183.35	384.05	200.55	Bentonite	200.55	180.55	#16 x 30	F
MW-28	8/29/2003	UES	398.72	Sch 80 PVC	4	0.020	177.04	162.64	396.64	180.14	Bentonite	180.14	160.84	#16 x 30	F
MW-29	8/29/2003	UES	413.79	Sch 80 PVC	4	0.020	173.02	158.22	411.22	175.22	Bentonite	175.22	150.22	#16 x 30	G
MW-30	12/14/2009	King County	235.67	Sch 40 PVC	2	0.010	230.40	225.40	234.42	223.42	Bentonite	231.42	225.40	10 x 20 Colorado Silica	J
MW-31	12/15/2009	King County	209.24	Sch 40 PVC	2	0.010	204.24	199.24	207.16	196.66	Bentonite	203.16	197.16	10 x 20 Colorado Silica	J
MW-32	12/14/2009	King County	254.72	Sch 40 PVC	2	0.010	242.82	232.82	252.82	232.82	Bentonite	244.82	232.82	10 x 20 Colorado Silica	J
MW-33	3/13/2015	Aspect Consulting	359.77	Sch 40 PVC	4	0.020	229.78	219.78	357.07	232.90	Bentonite	232.90	217.82	10 x 20 Colorado Silica	I
MW-34	3/26/2015	Aspect Consulting	385.88	Sch 40 PVC	4	0.020	147.96	137.96	383.26	151.26	Bentonite	151.26	135.76	10 x 20 Colorado Silica	I
MW-35	3/18/2015	Aspect Consulting	361.47	Sch 40 PVC	4	0.020	244.25	233.35	358.75	247.25	Bentonite	247.25	233.55	10 x 20 Colorado Silica	I
MW-36	4/2/2015	Aspect Consulting	378.24	Sch 40 PVC	4	0.020	221.25	211.25	375.25	223.25	Bentonite	223.25	210.25	10 x 20 Colorado Silica	I
P-1S[b,d]	12/3/1986	Golder	No data	Sch 40 PVC	2	0.020	307.46	297.46	396.46	393.46	Bentonite	393.46	291.46	#8 Aqua and Gravel	B
P-1D[b,d]	12/3/1986	Golder	No data	Sch 40 PVC	2	0.020	281.96	271.96	291.46	286.46	Bentonite	286.46	271.46	#8 Aqua	B
P-1A[b,d]	3/25/1986	Golder	No data	Sch 40 PVC	2	0.020	283.48	273.48	357.48	289.48	Bentonite	289.48	272.48	#8 Monteray	B
P-1B[b,d]	3/29/1986	Golder	No data	Sch 40 PVC	2	0.020	302.54	292.54	383.54	307.54	Bentonite	307.54	292.54	10 x 20 silica	B
P-2[b,d]	3/19/1986	Golder	No data	Sch 40 PVC	2	0.020	277.19	262.19	287.19	282.19	Bentonite	282.19	260.19	#8 Aqua	B
P-2A[b,d]	3/24/1986	Golder	No data	Sch 40 PVC	2	0.020	297.06	285.06	352.06	310.06	Bentonite	310.06	283.56	#8 Aqua	B
P-4	2/29/1988	Golder	No data	Sch 80 PVC	1	0.020	378.36	376.36	410.86	380.36	Bentonite	380.36	375.36	#16 Monteray	H

[a]All survey data in feet are relative to site NAVD88 datum.

[b]Well installed as a dual-completion.

[c]A = R.W. Beck, 1984; B = Golder Associates, 1986; C = CH2M HILL, 1996; D = Terra Associates., 1992; E = B&H and UES, 1999b; F = B&H and UES, 2003b; G = B&H and UES, 2003a; H = Golder Associates, 1986; I = Aspect Consulting, 2015, J = King County, 2011.

[d]Well has been decommissioned.

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
pH, Field [standard units]						
No. of Analyses	35	54	97	8	102	8
No. of Detections	35	54	97	8	102	8
Minimum	5.44	5.94	6.75	6.84	6.70	6.63
Maximum	6.82	7.97	8.42	7.29	7.96	7.99
Mean	6.05	6.56	7.36	7.04	7.20	7.05
Standard Deviation	0.35	0.34	0.28	0.17	0.23	0.42
Median	6.08	6.455	7.37	7.02	7.21	6.96
Specific Conductance, Field [umhos/cm]						
No. of Analyses	35	54	97	8	101	8
No. of Detections	35	54	97	8	101	8
Minimum	54.1	149.5	100.0	127.3	130.0	130.2
Maximum	200.0	860.0	158.8	147.4	195.0	156.9
Mean	104.1	445.0	131.9	137.9	160.9	139.9
Standard Deviation	31.1	219.2	12.1	8.1	14.4	8.7
Median	100	465	130	135.8	160.1	137.1
Alkalinity [mg/L]						
No. of Analyses	28	33	97	8	99	8
No. of Detections	28	33	97	8	99	8
Minimum	18.5	37.8	52	56.5	30	58.1
Maximum	41	320	70	57.2	80	63.2
Mean	26.84	131.69	56.69	56.79	63.85	60.25
Standard Deviation	5.88	103.18	2.76	0.25	7.38	1.62
Median	26.5	67.6	56	56.75	64	60.45
Ammonia-N [mg/L]						
No. of Analyses	34	66	97	8	104	8
No. of Detections	11	24	14	1	12	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	0.65	0.332	0.06	0.0028	0.07	ND
Mean	0.093	0.043	0.010	ID	0.009	ID
Standard Deviation	0.189	0.069	0.011	ID	0.011	ID
Median	0.005	0.025	0.005	ID	0.005	ID
Chloride [mg/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	35	64	96	8	104	8
Minimum	0.941	ND	ND	3.14	2.5	2.58
Maximum	11	19	30.9	3.53	10.6	2.9
Mean	2.52	8.91	3.38	3.38	3.49	2.70
Standard Deviation	2.13	4.06	2.85	0.13	1.01	0.10
Median	2	7.84	3	3.41	3.075	2.69
Nitrate-N [mg/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	35	41	97	8	103	8
Minimum	0.2	ND	0.21	0.412	ND	0.238
Maximum	5.53	6.3	0.84	0.586	0.28	0.418
Mean	1.701	1.428	0.421	0.470	0.109	0.344
Standard Deviation	1.365	1.717	0.128	0.059	0.058	0.067
Median	1.3	0.3	0.39	0.4575	0.0881	0.3495
Sulfate [mg/L]						
No. of Analyses	35	66	97	8	103	8
No. of Detections	35	66	97	8	103	8
Minimum	4.03	3.7	2.6	8.91	12	8.39
Maximum	19	46	11	9.37	26.81	11.7
Mean	9.4	17.1	9.5	9.1	18.3	9.8
Standard Deviation	4.1	8.7	0.9	0.1	2.8	1.2
Median	9	15	9.6	9.14	19	9.565
Total Dissolved Solids [mg/L]						
No. of Analyses	30	51	96	8	103	8
No. of Detections	30	51	96	8	103	8
Minimum	8	29	46	94.7	68	101
Maximum	90	500	130	131	150	117
Mean	64	287	98	109	116	110
Standard Deviation	16	130	13	11	14	6
Median	65.85	300	99.8	109	119	110

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	5	23	96	8	103	8
Minimum	ND	ND	ND	0.00163	ND	0.00194
Maximum	0.007	0.006	0.002	0.00178	0.003	0.0023
Mean	0.00078	0.00107	0.00161	0.00167	0.00181	0.00211
Standard Deviation	0.00130	0.00108	0.00034	0.00005	0.00030	0.00012
Median	0.0005	0.0005	0.00164	0.00166	0.001865	0.00208
Arsenic, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	9	17	25	8	28	8
Minimum	ND	ND	0.00147	0.00161	0.00155	0.00194
Maximum	0.0005	0.000623	0.00175	0.00171	0.00219	0.00228
Mean	0.00019	0.00039	0.00158	0.00166	0.00185	0.00213
Standard Deviation	0.00018	0.00007	0.00007	0.00004	0.00018	0.00012
Median	0.000117	0.0003665	0.00156	0.00167	0.00189	0.00215
Calcium, Dissolved [mg/L]						
No. of Analyses	29	43	97	8	104	8
No. of Detections	29	43	97	8	104	8
Minimum	5.08	11.1	4.3	9.52	6.5	8.47
Maximum	11	73.6	13	10.3	11.5	9.47
Mean	8.5	37.1	9.0	9.9	9.4	9.0
Standard Deviation	1.5	23.4	1.0	0.2	0.9	0.3
Median	8.64	37	9.02	9.84	9.57	9.05
Calcium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Minimum	5.18	11.2	8.23	9.47	8.41	8.21
Maximum	9.67	26	11.2	10	11.5	9.44
Mean	7.56	14.57	9.55	9.81	9.80	8.86
Standard Deviation	1.45	4.21	0.74	0.16	0.77	0.38
Median	8.16	12.75	9.43	9.865	9.82	8.935
Iron, Dissolved [mg/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	21	40	55	0	65	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	8.6	0.5	0.3	ND	0.49	ND
Mean	0.81	0.07	0.03	ID	0.03	ID
Standard Deviation	2.16	0.10	0.05	ID	0.06	ID
Median	0.03	0.0275	0.012	ID	0.0175	ID
Iron, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	13	17	2	26	4
Minimum	0.0192	ND	ND	ND	ND	ND
Maximum	0.353	0.335	0.041	0.025	2.18	0.0348
Mean	0.134	0.042	0.013	ID	0.150	0.011
Standard Deviation	0.103	0.077	0.008	ID	0.408	0.010
Median	0.134	0.01735	0.012	ID	0.04425	0.0076
Magnesium, Dissolved [mg/L]						
No. of Analyses	29	43	97	8	104	8
No. of Detections	29	43	97	8	104	8
Minimum	1.8	8.03	4.2	9.15	7.7	10.2
Maximum	3.1	56.8	12	9.71	14	11.5
Mean	2.39	27.93	8.38	9.42	10.71	10.69
Standard Deviation	0.28	18.12	0.98	0.17	1.21	0.44
Median	2.37	26	8.29	9.385	10.55	10.6
Magnesium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Minimum	2.06	7.75	8.04	9.24	9.63	9.95
Maximum	2.94	17.7	10.9	9.78	13.6	11.1
Mean	2.45	10.34	9.35	9.39	11.57	10.48
Standard Deviation	0.26	2.65	0.76	0.18	1.12	0.44
Median	2.42	9.24	9.47	9.335	11.4	10.4

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Manganese, Dissolved [mg/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	28	59	10	1	65	5
Minimum	ND	ND	ND	ND	ND	ND
Maximum	2.7	0.97	0.0032	0.0003	0.027	0.000531
Mean	0.2788	0.1341	0.0006	ID	0.0027	0.0002
Standard Deviation	0.7741	0.2060	0.0004	ID	0.0041	0.0002
Median	0.0015	0.0285	0.0005	ID	0.0010	0.0002
Manganese, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	16	6	25	8
Minimum	0.001	0.001	ND	ND	ND	0.000
Maximum	0.036	0.169	0.002	0.001	0.065	0.001
Mean	0.008	0.023	0.001	0.000	0.007	0.001
Standard Deviation	0.010	0.041	0.000	0.000	0.012	0.000
Median	0.005	0.008	0.001	0.000	0.004	0.001
Potassium, Dissolved [mg/L]						
No. of Analyses	29	43	97	8	104	8
No. of Detections	29	43	97	8	104	8
Minimum	1.16	0.88	0.65	1.35	1.1	1.63
Maximum	4.1	2.7	2	1.52	2.24	1.78
Mean	2.73	1.55	1.37	1.45	1.71	1.72
Standard Deviation	0.87	0.54	0.15	0.06	0.17	0.05
Median	2.64	1.6	1.36	1.47	1.7	1.72
Potassium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Minimum	1.17	0.901	1.28	1.39	1.48	1.55
Maximum	2.8	1.24	1.65	1.51	2.5	1.75
Mean	1.99	1.06	1.49	1.45	1.84	1.66
Standard Deviation	0.60	0.10	0.08	0.04	0.17	0.07
Median	2.23	1.035	1.49	1.45	1.815	1.66
Sodium, Dissolved [mg/L]						
No. of Analyses	29	43	97	8	104	8
No. of Detections	29	43	97	8	104	8
Minimum	2.17	5.4	2.3	4.4	4.9	5.64
Maximum	7.1	24.8	6.4	5.43	14.4	6.38
Mean	4.4	11.9	4.6	5.1	6.0	6.1
Standard Deviation	1.3	6.0	0.5	0.3	1.0	0.3
Median	4.5	11	4.6	5.125	5.9	6.05
Sodium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Minimum	2.11	5.84	4.41	4.71	5.4	5.41
Maximum	7.73	9.18	5.72	5.3	15.8	6.44
Mean	4.06	7.06	5.04	5.06	6.52	5.99
Standard Deviation	1.74	0.90	0.33	0.19	1.87	0.30
Median	3.72	7.02	5.04	5.085	6.23	5.995

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	17	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	5	ND	ND	ND	ND
Mean	ID	0.41	ID	ID	ID	ID
Standard Deviation	ID	0.63	ID	ID	ID	ID
Median	ID	0.365	ID	ID	ID	ID
1,2-Dichloropropane [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID
Benzene [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	0	1	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	0.28	ND	0.22	ND
Mean	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID
Chloroethane [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	6	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	5	ND	ND	ND	ND
Mean	ID	0.828	ID	ID	ID	ID
Standard Deviation	ID	1.032	ID	ID	ID	ID
Median	ID	0.1	ID	ID	ID	ID
***cis*-1,2-Dichloroethene [ug/L]**						
No. of Analyses	32	53	97	8	104	8
No. of Detections	0	26	0	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	16	ND	ND	0.79	ND
Mean	ID	1.049	ID	ID	ID	ID
Standard Deviation	ID	2.305	ID	ID	ID	ID
Median	ID	0.5	ID	ID	ID	ID
Dichlorodifluoromethane [ug/L]						
No. of Analyses	28	34	97	8	99	8
No. of Detections	0	12	0	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	5	ND	ND	1.5	ND
Mean	ID	0.871	ID	ID	ID	ID
Standard Deviation	ID	1.309	ID	ID	ID	ID
Median	ID	0.075	ID	ID	ID	ID

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Toluene [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	0	1	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	0.35	ND	0.78	ND
Mean	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID
***trans*-1,2-Dichloroethene [ug/L]**						
No. of Analyses	34	58	97	8	104	8
No. of Detections	0	1	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	5	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID
Trichloroethene [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID
Trichlorofluoromethane [ug/L]						
No. of Analyses	29	44	97	8	104	8
No. of Detections	15	27	1	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	0.67	5	0.2	ND	1	ND
Mean	0.205	0.762	ID	ID	ID	ID
Standard Deviation	0.161	0.927	ID	ID	ID	ID
Median	0.159	0.47	ID	ID	ID	ID
Vinyl Chloride [ug/L]						
No. of Analyses	35	66	97	8	104	8
No. of Detections	0	23	1	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	19	0.02	ND	0.1	ND
Mean	ID	2.724	ID	ID	ID	ID
Standard Deviation	ID	4.745	ID	ID	ID	ID
Median	ID	0.5	ID	ID	ID	ID

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]												
No. of Analyses	152	8	100	8	85	8	86	8	19	8	19	8
No. of Detections	152	8	100	8	85	8	86	8	19	8	19	8
Minimum	6.06	6.57	6.55	6.65	6.57	7.33	6.41	6.55	6.32	6.58	6.37	6.38
Maximum	7.75	6.98	7.98	7.27	8.56	7.89	8.24	6.94	6.87	6.89	6.91	6.78
Mean	6.87	6.83	7.33	6.93	7.78	7.52	6.88	6.79	6.69	6.71	6.68	6.53
Standard Deviation	0.24	0.14	0.25	0.21	0.45	0.16	0.24	0.14	0.14	0.12	0.14	0.15
Median	6.9	6.83	7.35	6.92	7.87	7.485	6.87	6.81	6.72	6.675	6.68	6.51
Specific Conductance, Field [umhos/cm]												
No. of Analyses	152	8	100	8	86	8	86	8	19	8	19	8
No. of Detections	152	8	100	8	86	8	86	8	19	8	19	8
Minimum	230.0	272.1	110.0	160.6	140.0	160.3	200.0	267.6	748.0	548.3	587.6	542.1
Maximum	1024.0	332.3	209.9	195.7	242.1	196.6	480.0	332.3	921.6	713.0	884.9	686.0
Mean	436.2	293.8	158.1	172.6	178.3	174.7	334.9	287.9	819.8	623.0	743.8	616.0
Standard Deviation	122.1	20.8	20.7	10.8	23.6	12.6	69.3	21.6	51.5	61.3	80.5	52.5
Median	415	289.5	153.5	169.6	170	173.7	320	278.55	822	598.9	738	608.5
Alkalinity [mg/L]												
No. of Analyses	100	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	100	8	99	8	85	8	85	8	19	8	19	8
Minimum	110	134	56	68.4	58.5	70.9	116	131	390	319	330	309
Maximum	500	149	100	75.3	94.9	73.8	290	146	496	383	460	345
Mean	211.06	143.00	67.29	71.89	74.04	71.96	187.53	139.38	429.53	348.25	377.21	329.75
Standard Deviation	57.13	4.60	6.28	2.50	6.35	1.11	49.51	4.93	32.86	19.71	38.69	11.99
Median	205	143.5	67.3	72.7	72	71.65	180	140	424	345.5	367	330.5
Ammonia-N [mg/L]												
No. of Analyses	157	8	99	8	85	8	84	8	19	8	19	8
No. of Detections	23	3	12	0	53	8	47	8	19	8	19	8
Minimum	ND	ND	ND	ND	ND	0.0149	ND	0.0056	0.027	0.0152	0.0319	0.0638
Maximum	0.04	0.0036	0.06	ND	0.1	0.0204	0.13	0.0123	0.0651	0.0317	0.0954	0.0715
Mean	0.011	0.002	0.009	ID	0.018	0.017	0.017	0.010	0.035	0.029	0.068	0.067
Standard Deviation	0.009	0.001	0.011	ID	0.013	0.002	0.019	0.002	0.008	0.006	0.012	0.002
Median	0.005	0.001	0.005	ID	0.015	0.0156	0.015	0.0103	0.0329	0.03115	0.0688	0.06665
Chloride [mg/L]												
No. of Analyses	158	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	155	8	99	8	85	8	85	8	19	8	19	8
Minimum	ND	2.22	3	4.33	3	2.99	2.13	1.85	3.84	3.29	3.83	3.89
Maximum	10.6	2.71	23	5.84	4.3	3.26	15.2	2.44	5.78	3.84	5.97	4.39
Mean	4.27	2.42	4.45	4.68	3.58	3.16	3.88	2.05	4.74	3.52	4.64	4.12
Standard Deviation	1.55	0.16	1.96	0.50	0.36	0.10	1.87	0.18	0.64	0.16	0.72	0.19
Median	4	2.42	4.1	4.555	3.5	3.185	3.7	2.05	4.78	3.49	4.21	4.07
Nitrate-N [mg/L]												
No. of Analyses	158	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	74	8	99	8	14	1	52	8	2	0	1	0
Minimum	ND	0.208	ND	0.329	ND	ND	ND	0.176	ND	ND	ND	ND
Maximum	1.25	1.08	1.6	0.753	0.11	0.011	0.555	0.343	0.0426	ND	0.025	ND
Mean	0.124	0.592	0.263	0.466	0.014	ID	0.094	0.263	ID	ID	ID	ID
Standard Deviation	0.233	0.302	0.250	0.132	0.014	ID	0.103	0.050	ID	ID	ID	ID
Median	0.05	0.616	0.19	0.4235	0.005	ID	0.074	0.2695	ID	ID	ID	ID
Sulfate [mg/L]												
No. of Analyses	158	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	158	8	99	8	85	8	85	8	19	8	19	8
Minimum	1.54	13.2	9	10.9	14	14.9	10	12.8	13.9	15.9	13.8	22.4
Maximum	18.8	15.9	18	13.4	18	16.5	19	15.2	17.7	17.9	22.3	29.9
Mean	12.6	14.5	12.8	12.0	16.1	15.6	14.0	13.7	15.7	16.8	19.7	25.9
Standard Deviation	2.8	0.9	1.3	0.8	1.1	0.6	2.7	0.7	1.3	0.7	2.5	2.2
Median	12	14.3	13	12.2	16	15.65	13.6	13.5	15.5	16.95	20.5	25.85
Total Dissolved Solids [mg/L]												
No. of Analyses	147	8	99	8	84	8	85	8	19	8	19	8
No. of Detections	147	8	99	8	84	8	85	8	19	8	19	8
Minimum	34	162	58	113	50	121	157	173	434	363	407	404
Maximum	480	201	160	140	160	142	307	195	519	423	539	460
Mean	267	187	114	126	125	132	224	186	482	396	456	426
Standard Deviation	66	12	18	9	18	7	37	8	27	22	33	19
Median	260	189	114	127.5	127.5	130	222	186	490	396.5	463	427

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]												
No. of Analyses	158	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	97	8	98	8	84	8	78	8	19	8	19	8
Minimum	ND	0.000764	ND	0.00231	ND	0.00184	ND	0.000695	0.0327	0.0371	0.0229	0.0237
Maximum	0.004	0.000982	0.003	0.0024	0.005	0.00207	0.023	0.00127	0.0572	0.0421	0.0384	0.0293
Mean	0.00104	0.00087	0.00239	0.00236	0.00176	0.00197	0.00470	0.00100	0.04162	0.03984	0.03085	0.02765
Standard Deviation	0.00062	0.00008	0.00040	0.00003	0.00049	0.00007	0.00575	0.00020	0.00640	0.00188	0.00446	0.00175
Median	0.001	0.000858	0.00234	0.002355	0.00167	0.001965	0.00173	0.0009805	0.0393	0.0403	0.0299	0.02815
Arsenic, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	12	8	27	8	27	8	24	8	19	8	19	8
Minimum	ND	0.000778	0.00217	0.00221	0.0013	0.00203	ND	0.00161	0.0323	0.038	0.0204	0.0284
Maximum	0.0025	0.00095	0.0025	0.00244	0.0044	0.00377	0.00873	0.00413	0.0471	0.0431	0.0404	0.0553
Mean	0.00074	0.00086	0.00230	0.00234	0.00212	0.00247	0.00317	0.00248	0.03953	0.04086	0.02977	0.03663
Standard Deviation	0.00040	0.00006	0.00009	0.00006	0.00074	0.00060	0.00211	0.00087	0.00372	0.00215	0.00546	0.00910
Median	0.0005	0.0008555	0.00227	0.00234	0.00209	0.00221	0.00306	0.002445	0.0383	0.04195	0.0298	0.03415
Calcium, Dissolved [mg/L]												
No. of Analyses	133	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	133	8	99	8	85	8	85	8	19	8	19	8
Minimum	4.3	20	7.8	12.6	9.1	12.8	16.3	19.4	59.8	56	52.1	61
Maximum	47.9	22.3	15.8	14.9	18	13.4	40	21.7	77.1	63.3	77.4	67.4
Mean	31.2	21.4	12.0	13.9	12.4	13.2	25.3	20.9	69.2	59.2	63.5	63.2
Standard Deviation	9.6	0.7	1.5	0.9	1.6	0.2	6.1	0.8	4.1	2.6	6.3	2.2
Median	30.4	21.55	12	14.1	12.4	13.15	24.2	21	69.1	58.8	63.3	62.5
Calcium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Minimum	18.4	19.8	8.51	12.8	11.5	12.5	16.1	19.4	64.7	55.3	52.8	59.4
Maximum	27.1	22.5	16.7	14.7	14.6	13.6	24.9	22.2	78.7	64.8	73.2	66.9
Mean	22.27	21.35	13.24	13.84	13.36	13.19	20.34	20.81	71.35	59.73	65.85	63.16
Standard Deviation	2.48	0.95	1.75	0.71	0.85	0.33	2.15	0.80	3.60	3.27	4.86	2.47
Median	22.8	21.6	13.1	13.95	13.4	13.25	20	20.85	72.3	59.7	65	63.45
Iron, Dissolved [mg/L]												
No. of Analyses	158	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	104	0	50	0	64	8	85	8	19	8	19	8
Minimum	ND	ND	ND	ND	ND	0.104	0.146	0.196	6.51	5.77	10.8	13.2
Maximum	0.89	ND	0.29	ND	0.51	0.253	5.2	0.564	8.19	6.67	16.4	15.6
Mean	0.07	ID	0.03	ID	0.09	0.17	1.40	0.42	7.39	6.08	13.84	14.03
Standard Deviation	0.11	ID	0.05	ID	0.11	0.05	1.26	0.13	0.46	0.41	1.97	0.87
Median	0.027	ID	0.009	ID	0.061	0.1835	0.957	0.4375	7.52	5.805	13.7	13.65
Iron, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	18	0	19	4	26	8	27	8	19	8	19	8
Minimum	ND	ND	ND	ND	ND	0.204	0.231	0.809	6.44	5.68	11	14.6
Maximum	0.15	ND	0.346	0.0936	5.12	1.38	3.28	1.86	9.1	6.78	18	23.8
Mean	0.020	ID	0.047	0.025	0.669	0.510	1.197	1.205	7.542	6.144	14.358	18.000
Standard Deviation	0.028	ID	0.072	0.030	1.014	0.412	0.785	0.378	0.619	0.442	1.998	2.819
Median	0.0134	ID	0.0177	0.01255	0.521	0.3575	0.974	1.13	7.66	5.89	14.3	17.55
Magnesium, Dissolved [mg/L]												
No. of Analyses	133	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	133	8	99	8	85	8	85	8	19	8	19	8
Minimum	3.9	22.5	6.6	10.3	7.7	11.5	15.2	19.7	51.9	44.1	37.8	42.2
Maximum	53.9	23.8	13	12.3	15.1	12.1	43.2	22.9	65.1	49.7	51.4	47.4
Mean	34.96	23.10	9.49	11.43	10.61	11.75	25.28	21.39	57.21	46.94	44.09	44.51
Standard Deviation	10.84	0.41	1.31	0.65	1.87	0.20	7.75	1.08	3.07	2.39	3.83	2.02
Median	34	23.05	9.3	11.5	10	11.7	23	21.4	56.8	46.6	43.4	44.3
Magnesium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Minimum	19.4	21.5	8.54	10.3	8.69	11.1	14.3	20	49.8	42.3	36.5	42.9
Maximum	31.8	23.5	14	11.8	15.7	12.3	25.7	22.2	61.1	50.7	59.6	47.5
Mean	25.00	22.81	11.06	11.20	12.70	11.80	19.60	21.26	56.14	46.85	44.44	44.84
Standard Deviation	3.80	0.60	1.20	0.49	1.91	0.39	3.26	0.77	2.71	2.90	5.05	1.58
Median	23.8	22.9	10.9	11.15	12.8	11.8	19	21.55	55.8	46.15	43.9	44.45

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Manganese, Dissolved [mg/L]												
No. of Analyses	158	8	99	8	85	8	84	8	19	8	19	8
No. of Detections	157	8	10	0	85	8	84	8	19	8	19	8
Minimum	ND	0.0122	ND	ND	0.0531	0.127	0.165	0.239	0.877	0.878	1.63	2.25
Maximum	0.59	0.0987	0.54	ND	0.548	0.145	1.6	0.505	1.13	1.04	2.56	2.55
Mean	0.1282	0.0498	0.0064	ID	0.2126	0.1379	0.5591	0.4058	1.0271	0.9229	2.2879	2.3950
Standard Deviation	0.0763	0.0309	0.0544	ID	0.0904	0.0062	0.3131	0.0891	0.0745	0.0546	0.2567	0.1041
Median	0.1100	0.0521	0.0005	ID	0.2150	0.1380	0.4900	0.4165	1.0300	0.9025	2.3800	2.4050
Manganese, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	28	8	20	7	27	8	27	8	19	8	19	8
Minimum	0.070	0.018	ND	ND	0.146	0.129	0.168	0.387	0.897	0.897	1.940	2.340
Maximum	0.306	0.107	0.015	0.004	2.920	0.159	1.050	0.536	1.290	1.070	2.790	2.570
Mean	0.144	0.059	0.002	0.001	0.410	0.141	0.532	0.484	1.059	0.938	2.439	2.455
Standard Deviation	0.063	0.032	0.003	0.001	0.513	0.009	0.259	0.054	0.108	0.059	0.234	0.085
Median	0.118	0.059	0.001	0.001	0.302	0.139	0.497	0.492	1.040	0.919	2.440	2.460
Potassium, Dissolved [mg/L]												
No. of Analyses	133	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	133	8	99	8	85	8	85	8	19	8	19	8
Minimum	0.59	2.06	1.2	2	1.5	1.99	1.8	2.25	3.03	3.03	3.07	3.03
Maximum	3.7	2.32	2.41	2.29	2.9	2.2	3.3	2.47	3.79	3.42	3.72	3.37
Mean	2.50	2.20	1.95	2.13	2.07	2.11	2.37	2.34	3.48	3.27	3.35	3.20
Standard Deviation	0.40	0.10	0.20	0.11	0.21	0.08	0.35	0.08	0.17	0.15	0.17	0.11
Median	2.45	2.205	1.92	2.08	2.09	2.12	2.27	2.325	3.49	3.31	3.3	3.165
Potassium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Minimum	2.07	2.07	1.92	2.02	1.98	1.91	2.02	2.11	3.32	3	3.07	3.14
Maximum	2.58	2.3	2.67	2.25	2.48	2.22	2.74	2.47	3.89	3.5	3.88	3.65
Mean	2.32	2.18	2.19	2.11	2.22	2.07	2.26	2.31	3.60	3.26	3.50	3.36
Standard Deviation	0.15	0.08	0.17	0.07	0.12	0.10	0.19	0.12	0.13	0.19	0.21	0.18
Median	2.34	2.205	2.17	2.11	2.21	2.055	2.18	2.29	3.62	3.32	3.46	3.365
Sodium, Dissolved [mg/L]												
No. of Analyses	133	8	99	8	85	8	85	8	19	8	19	8
No. of Detections	133	8	99	8	85	8	85	8	19	8	19	8
Minimum	2.2	7.8	4.5	5.29	4.2	5.15	8.35	8.93	16.9	15.4	13.8	15.6
Maximum	14	9.67	6.59	6.49	8	6.42	13	11.4	21.4	18.9	17.7	18.1
Mean	10.3	9.0	5.3	6.0	6.2	6.0	10.4	10.4	19.0	17.5	15.9	17.0
Standard Deviation	1.7	0.6	0.5	0.4	0.8	0.4	1.0	0.7	1.1	1.1	1.2	0.8
Median	9.9	9.155	5.3	6.13	6.2	6.09	10.2	10.6	19.1	17.85	16	17.1
Sodium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Minimum	8.15	8.58	5.19	5.62	4.85	5.64	9.16	9.66	16.5	16.3	13.2	16.3
Maximum	11.4	9.29	6.84	6.45	7.27	6.47	12.2	10.8	20.8	18.9	17.5	17.8
Mean	9.31	9.05	5.92	6.03	6.23	6.14	10.78	10.42	18.96	17.71	15.99	17.23
Standard Deviation	0.66	0.23	0.44	0.27	0.55	0.26	0.77	0.45	0.97	0.84	1.18	0.53
Median	9.24	9.095	5.87	6.06	6.22	6.16	10.9	10.65	19	17.65	16.1	17.3

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	8	0	0	0	0	0	0	0	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	1.29	1.3	0.12	0.144
Maximum	0.5	ND	ND	ND	ND	ND	ND	ND	2.32	2.06	0.483	0.302
Mean	0.19	ID	ID	ID	ID	ID	ID	ID	1.64	1.73	0.28	0.23
Standard Deviation	0.16	ID	ID	ID	ID	ID	ID	ID	0.30	0.26	0.11	0.05
Median	0.1	ID	ID	ID	ID	ID	ID	ID	1.57	1.69	0.29	0.2185
1,2-Dichloropropane [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	6.26	5.69	0.581	0.321
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	12.5	8.53	1.33	0.546
Mean	ID	ID	ID	ID	ID	ID	ID	ID	8.03	7.59	0.97	0.46
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	1.76	0.86	0.25	0.08
Median	ID	ID	ID	ID	ID	ID	ID	ID	7.42	7.69	1.04	0.4815
Benzene [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	3	0	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	0.934	0.707	0.769	0.509
Maximum	ND	ND	ND	ND	ND	ND	0.25	ND	1.76	1.03	1.17	0.594
Mean	ID	ID	ID	ID	ID	ID	0.098	ID	1.161	0.941	0.953	0.551
Standard Deviation	ID	ID	ID	ID	ID	ID	0.030	ID	0.239	0.100	0.111	0.035
Median	ID	ID	ID	ID	ID	ID	0.1	ID	1.06	0.961	0.959	0.5535
Chloroethane [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	26	0	0	0	0	0	0	0	18	3	0	1
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	2.5	ND	ND	ND	ND	ND	ND	ND	0.947	0.435	ND	0.10
Mean	0.607	ID	ID	ID	ID	ID	ID	ID	0.455	0.174	ID	ID
Standard Deviation	0.845	ID	ID	ID	ID	ID	ID	ID	0.173	0.175	ID	ID
Median	0.1	ID	ID	ID	ID	ID	ID	ID	0.44	0.05	ID	ID
cis **-1,2-Dichloroethene [ug/L]**												
No. of Analyses	143	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	44	2	0	0	0	0	84	8	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	0.445	24.1	23.9	4.92	2.7
Maximum	0.6	0.127	ND	ND	ND	ND	8.7	0.611	52.7	39.4	11.2	4.68
Mean	0.179	ID	ID	ID	ID	ID	2.062	0.538	33.447	32.988	8.129	3.578
Standard Deviation	0.128	ID	ID	ID	ID	ID	2.102	0.057	8.640	4.643	2.120	0.588
Median	0.1	ID	ID	ID	ID	ID	1.11	0.535	31	32.95	8.67	3.595
Dichlorodifluoromethane [ug/L]												
No. of Analyses	100	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	98	8	0	0	20	8	84	8	19	8	19	8
Minimum	ND	1.85	ND	ND	ND	0.147	ND	1.41	3.21	2.68	0.225	0.451
Maximum	ND	4.34	ND	ND	1.75	0.326	ND	2.69	8.82	6.32	1.13	1.07
Mean	ID	3.276	ID	ID	0.212	0.247	ID	1.933	5.133	4.360	0.557	0.716
Standard Deviation	ID	0.956	ID	ID	0.260	0.078	ID	0.498	1.431	1.380	0.280	0.199
Median	ID	3.47	ID	ID	0.1	0.2715	ID	1.8	5.27	4.135	0.476	0.6915

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Toluene [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	2	0	0	0	1	0	0	0	6	1	7	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	2.5	ND	ND	ND	0.22	ND	ND	ND	2.25	0.10	0.21	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.23	ID	0.10	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.50	ID	0.04	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.05	ID	0.1	ID
***trans*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	146	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	17	0	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	0.632	0.715	0.27	0.222
Maximum	ND	ND	ND	ND	ND	ND	0.41	ND	1.15	0.966	0.401	0.259
Mean	ID	ID	ID	ID	ID	ID	0.125	ID	0.829	0.849	0.329	0.238
Standard Deviation	ID	ID	ID	ID	ID	ID	0.076	ID	0.188	0.087	0.041	0.012
Median	ID	ID	ID	ID	ID	ID	0.1	ID	0.733	0.858	0.322	0.236
Trichloroethene [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	10	6	19	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.856	0.866
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	0.17	0.183	1.22	1.45
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.123	0.135	1.024	1.146
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.031	0.055	0.102	0.186
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.131	0.1585	1.04	1.18
Trichlorofluoromethane [ug/L]												
No. of Analyses	133	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	129	8	0	0	0	0	82	8	0	0	0	0
Minimum	ND	0.702	ND	ND	ND	ND	ND	0.734	ND	ND	ND	ND
Maximum	23	2.18	ND	ND	ND	ND	9	1.32	ND	ND	ND	ND
Mean	6.309	1.443	ID	ID	ID	ID	2.126	0.957	ID	ID	ID	ID
Standard Deviation	5.515	0.529	ID	ID	ID	ID	2.265	0.195	ID	ID	ID	ID
Median	4.03	1.31	ID	ID	ID	ID	0.972	0.8985	ID	ID	ID	ID
Vinyl Chloride [ug/L]												
No. of Analyses	168	8	100	8	85	8	85	8	19	8	19	8
No. of Detections	156	6	0	0	0	0	85	8	19	8	19	8
Minimum	ND	ND	ND	ND	ND	ND	0.04	0.042	24.3	11.5	1.78	1.62
Maximum	40	0.0757	ND	ND	ND	ND	1	0.32	53.1	31.2	9.19	6.06
Mean	6.080	0.031	ID	ID	ID	ID	0.326	0.097	33.021	21.788	4.324	4.391
Standard Deviation	8.320	0.025	ID	ID	ID	ID	0.225	0.091	6.593	7.281	2.210	1.570
Median	0.73	0.025	ID	ID	ID	ID	0.327	0.07195	32.1	21.1	4	4.615

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
pH, Field [standard units]				
No. of Analyses	99	8	19	8
No. of Detections	99	8	19	8
Minimum	5.97	6.29	6.51	7.33
Maximum	7.95	6.93	8.95	7.76
Mean	6.83	6.46	7.65	7.62
Standard Deviation	0.33	0.22	0.45	0.14
Median	6.8	6.365	7.75	7.625
Specific Conductance, Field [umhos/cm]				
No. of Analyses	99	8	19	8
No. of Detections	99	8	19	8
Minimum	130.0	146.1	133.2	156.0
Maximum	650.0	169.8	183.4	190.4
Mean	169.1	158.1	174.2	166.6
Standard Deviation	50.8	8.7	10.3	11.3
Median	165	155.35	176.3	162.85
Alkalinity [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	46.5	54.7	67.5	67.7
Maximum	78	59.2	70.9	69.6
Mean	59.07	56.61	69.41	68.65
Standard Deviation	5.91	1.77	1.08	0.77
Median	59.5	56.05	69.7	68.45
Ammonia-N [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	9	1	2	2
Minimum	ND	ND	ND	ND
Maximum	0.43	0.002	0.005	0.0034
Mean	0.014	ID	ID	ID
Standard Deviation	0.045	ID	ID	ID
Median	0.005	ID	ID	ID
Chloride [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	3	4.1	2.89	2.89
Maximum	6.23	4.77	3.28	3.14
Mean	4.38	4.34	3.10	3.04
Standard Deviation	0.46	0.25	0.10	0.08
Median	4.295	4.235	3.1	3.055
Nitrate-N [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	97	8	19	8
Minimum	ND	2.66	0.014	0.017
Maximum	8.1	3.43	0.027	0.022
Mean	3.852	2.983	0.020	0.019
Standard Deviation	0.910	0.304	0.003	0.002
Median	3.80	2.86	0.02	0.019
Sulfate [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	6.71	7.06	12.3	13
Maximum	11	9.01	13.5	14.2
Mean	8.4	7.7	13.0	13.7
Standard Deviation	0.8	0.6	0.4	0.4
Median	8.35	7.58	13.1	13.85
Total Dissolved Solids [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	54	103	111	119
Maximum	150	131	138	141
Mean	117	122	129	130
Standard Deviation	15	9	6	7
Median	120	124.5	130	131.5

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	12	8	19	8
Minimum	ND	0.000491	0.0016	0.00171
Maximum	0.0021	0.000566	0.002	0.00204
Mean	0.00051	0.00051	0.00174	0.00183
Standard Deviation	0.00016	0.00002	0.00011	0.00011
Median	0.0005	0.0005125	0.00172	0.001835
Arsenic, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	11	8	19	8
Minimum	ND	0.000482	0.00157	0.00169
Maximum	0.000508	0.000523	0.00192	0.00194
Mean	0.00049	0.00050	0.00171	0.00180
Standard Deviation	0.00001	0.00001	0.00008	0.00009
Median	0.0005	0.0005035	0.00171	0.001815
Calcium, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	9.67	11.7	10.4	13.7
Maximum	15.9	12.2	14.6	14.7
Mean	11.9	11.9	13.2	14.0
Standard Deviation	1.2	0.2	1.1	0.3
Median	11.9	11.85	13.3	13.9
Calcium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Minimum	9.51	11.6	11.5	13.4
Maximum	12.5	12.2	14.9	14.4
Mean	11.40	11.81	13.46	13.83
Standard Deviation	0.70	0.24	1.02	0.29
Median	11.6	11.75	13.7	13.85
Iron, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	52	0	1	0
Minimum	ND	ND	ND	ND
Maximum	0.17	ND	0.036	ND
Mean	0.03	ID	ID	ID
Standard Deviation	0.03	ID	ID	ID
Median	0.01	ID	ID	ID
Iron, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	8	2	6	1
Minimum	ND	ND	ND	ND
Maximum	0.0687	0.024	0.334	0.113
Mean	0.012	ID	0.028	ID
Standard Deviation	0.017	ID	0.076	ID
Median	0.005	ID	0.005	ID
Magnesium, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	7.1	9.41	7.95	9.17
Maximum	11.9	10.2	10	9.89
Mean	9.27	9.72	9.19	9.52
Standard Deviation	0.75	0.26	0.60	0.24
Median	9.275	9.69	9.16	9.53
Magnesium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Minimum	8.27	9.33	7.8	9.35
Maximum	10	10	10.3	9.88
Mean	9.18	9.56	9.31	9.61
Standard Deviation	0.44	0.22	0.67	0.18
Median	9.29	9.535	9.51	9.64

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Manganese, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	4	0	19	8
Minimum	ND	ND	0.0009	0.000347
Maximum	0.0029	ND	0.0356	0.000948
Mean	0.0005	ID	0.0040	0.0007
Standard Deviation	0.0004	ID	0.0078	0.0002
Median	0.0005	ID	0.0016	0.0007
Manganese, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	4	5	19	8
Minimum	ND	ND	0.003	0.001
Maximum	0.002	0.000	0.243	0.119
Mean	0.000	0.000	0.022	0.016
Standard Deviation	0.000	0.000	0.055	0.041
Median	0.001	0.000	0.006	0.002
Potassium, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	0.9	1.07	2.3	2.56
Maximum	1.5	1.21	2.9	2.87
Mean	1.10	1.16	2.65	2.74
Standard Deviation	0.11	0.05	0.17	0.10
Median	1.1	1.165	2.66	2.73
Potassium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Minimum	1.02	1.1	2.49	2.52
Maximum	1.29	1.19	2.97	2.82
Mean	1.14	1.15	2.72	2.69
Standard Deviation	0.06	0.03	0.11	0.10
Median	1.12	1.14	2.7	2.685
Sodium, Dissolved [mg/L]				
No. of Analyses	98	8	19	8
No. of Detections	98	8	19	8
Minimum	4.5	5.69	5.47	5.91
Maximum	7.31	7.05	6.91	6.99
Mean	6.1	6.5	6.2	6.5
Standard Deviation	0.5	0.4	0.4	0.3
Median	6.165	6.59	6.13	6.475
Sodium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Minimum	5.64	5.99	5.22	5.96
Maximum	6.61	6.78	6.88	6.79
Mean	6.22	6.47	6.26	6.47
Standard Deviation	0.26	0.25	0.40	0.26
Median	6.275	6.505	6.34	6.5

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
1,2-Dichloropropane [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
Benzene [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
Chloroethane [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
cis **-1,2-Dichloroethene [ug/L]**				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
Dichlorodifluoromethane [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	11	0	0	0
Minimum	ND	ND	ND	ND
Maximum	0.64	ND	ND	ND
Mean	0.128	ID	ID	ID
Standard Deviation	0.104	ID	ID	ID
Median	0.1	ID	ID	ID

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Toluene [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	1	0	0	0
Minimum	ND	ND	ND	ND
Maximum	0.33	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
***trans* -1,2-Dichloroethene [ug/L]**				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
Trichloroethene [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID
Trichlorofluoromethane [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	20	0	0	0
Minimum	ND	ND	ND	ND
Maximum	0.56	ND	ND	ND
Mean	0.147	ID	ID	ID
Standard Deviation	0.114	ID	ID	ID
Median	0.1	ID	ID	ID
Vinyl Chloride [ug/L]				
No. of Analyses	97	8	19	8
No. of Detections	0	0	0	0
Minimum	ND	ND	ND	ND
Maximum	ND	ND	ND	ND
Mean	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID
Median	ID	ID	ID	ID

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	6.76	7.48	6.59	6.95	6.84	7.13	7.34	7.07	6.65	7.08	6.64	6.47
Maximum	8.38	8.06	8.37	7.37	8.54	7.55	9.20	8.19	7.80	7.48	7.32	7.55
Mean	7.68	7.69	7.45	7.16	7.63	7.36	8.10	7.78	7.51	7.32	6.97	6.82
Standard Deviation	0.30	0.19	0.28	0.15	0.25	0.14	0.27	0.34	0.19	0.15	0.15	0.32
Median	7.77	7.69	7.475	7.15	7.65	7.385	8.13	7.845	7.54	7.345	6.95	6.745
Specific Conductance, Field [umhos/cm]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	100.0	165.6	115.0	141.4	100.0	192.9	136.1	171.7	165.0	212.0	150.0	172.7
Maximum	194.2	189.6	185.0	166.2	230.0	218.5	200.0	191.0	265.0	242.9	210.0	197.1
Mean	161.9	177.1	142.5	152.5	196.5	202.6	172.3	179.4	218.4	223.2	197.6	182.0
Standard Deviation	16.7	8.3	14.3	8.8	23.9	9.7	14.2	7.8	22.1	12.4	12.0	9.0
Median	160	176.15	140	151.45	200	199.95	170	178.65	215	218.3	200.5	178.5
Alkalinity [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	58	77	30	62.3	64	82.4	67.2	74.7	88	98.6	67.4	67.9
Maximum	100	79.6	66.3	64.6	110	86.3	86	77.4	140	101	80.2	71.1
Mean	73.94	78.30	58.13	63.30	84.15	84.83	74.56	75.83	99.30	99.69	70.18	69.70
Standard Deviation	4.95	0.99	4.60	0.75	11.90	1.28	3.33	0.87	7.06	0.92	2.76	1.12
Median	73.7	78.25	58.45	63.25	84.8	84.8	74.95	75.75	100.5	99.45	69.7	69.8
Ammonia-N [mg/L]												
No. of Analyses	98	8	97	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	7	1	84	8	70	8	13	7	3	1
Minimum	0.073	0.213	ND	ND	ND	0.0176	0.03	0.24	ND	ND	ND	ND
Maximum	0.32	0.25	0.06	0.0028	0.2	0.0345	0.3	0.264	0.03	0.0038	0.0587	0.0029
Mean	0.208	0.233	0.008	ID	0.045	0.028	0.224	0.250	0.009	0.003	0.007	ID
Standard Deviation	0.051	0.012	0.008	ID	0.033	0.005	0.045	0.010	0.007	0.001	0.014	ID
Median	0.21	0.232	0.005	ID	0.0357	0.02945	0.229	0.2485	0.005	0.00285	0.001	ID
Chloride [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	2.7	3.17	2.6	2.95	3.7	4.32	3	3.48	3.39	3.38	4.58	4.6
Maximum	5	3.46	5	3.3	37.6	4.79	9.11	3.85	5.6	17.4	5.2	5.24
Mean	3.21	3.35	3.08	3.10	5.45	4.56	3.93	3.72	3.87	5.27	5.01	4.94
Standard Deviation	0.32	0.09	0.35	0.10	3.32	0.14	0.78	0.12	0.32	4.90	0.15	0.22
Median	3.105	3.37	3	3.1	5	4.58	3.825	3.76	3.885	3.54	5.03	4.935
Nitrate-N [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	42	6	98	8	35	2	32	8	1	0	19	8
Minimum	ND	ND	0.55	0.677	ND	ND	ND	0.012	ND	ND	1.78	1.59
Maximum	0.34	0.023	1.9	0.787	0.81	0.013	0.232	0.028	0.082	ND	2.57	1.99
Mean	0.022	0.014	0.738	0.706	0.023	ID	0.026	0.017	ID	ID	2.194	1.701
Standard Deviation	0.037	0.007	0.141	0.035	0.081	ID	0.030	0.005	ID	ID	0.251	0.127
Median	0.016	0.0135	0.739	0.6945	0.01	ID	0.025	0.016	ID	ID	2.19	1.68
Sulfate [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	8.7	10.5	9	9.63	12	16.1	11	12.7	14.9	14.9	12	12.5
Maximum	14	11.4	12	10.8	24	17.9	14.2	13.9	18	33.2	13.9	14
Mean	10.5	11.0	10.2	10.0	18.7	16.9	13.1	13.4	16.4	18.0	13.0	13.4
Standard Deviation	0.6	0.3	0.5	0.4	2.1	0.6	0.7	0.4	0.9	6.2	0.5	0.5
Median	10.5	11.1	10	9.92	18	16.75	13.05	13.55	16.35	15.85	13.1	13.5
Total Dissolved Solids [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	63	123	53	99.3	80	135	90	126	90	135	131	117
Maximum	160	137	150	119	170	147	450	153	170	163	147	149
Mean	117	131	103	112	134	142	135	138	146	152	137	133
Standard Deviation	16	5	16	7	19	5	42	9	14	9	5	10
Median	120	132	103.5	114	140	143	133	138.5	149.5	152.5	135	132

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	0.0021	0.00475	0.0017	0.00201	0.00102	0.000967	0.002	0.00288	0.00384	0.00391	0.00111	0.00127
Maximum	0.022	0.00512	0.0056	0.00217	0.027	0.00107	0.00341	0.00317	0.008	0.00422	0.00138	0.00141
Mean	0.00690	0.00486	0.00211	0.00206	0.00355	0.00101	0.00289	0.00296	0.00458	0.00405	0.00132	0.00131
Standard Deviation	0.00304	0.00012	0.00039	0.00006	0.00373	0.00003	0.00040	0.00010	0.00067	0.00011	0.00006	0.00004
Median	0.006125	0.004835	0.002005	0.00204	0.0022	0.0009985	0.003	0.002955	0.0045	0.004055	0.00133	0.001295
Arsenic, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Minimum	0.00455	0.00497	0.00185	0.00201	0.00108	0.00102	0.00294	0.00333	0.00354	0.0065	0.00116	0.00128
Maximum	0.00592	0.00541	0.00228	0.00208	0.00211	0.00168	0.0108	0.00398	0.0155	0.0181	0.00178	0.00138
Mean	0.00513	0.00522	0.00205	0.00205	0.00142	0.00132	0.00443	0.00356	0.00716	0.01022	0.00134	0.00131
Standard Deviation	0.00025	0.00014	0.00011	0.00003	0.00025	0.00024	0.00172	0.00023	0.00357	0.00393	0.00012	0.00003
Median	0.00511	0.005235	0.002045	0.002055	0.00135	0.0013	0.0039	0.003485	0.00608	0.00914	0.00132	0.00131
Calcium, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	9.2	15.3	7.7	11.4	9.2	14.8	11.2	16.8	13.6	18.9	10.8	13.1
Maximum	18	16.9	13	12.1	19.6	15.5	18.7	18.6	23	21.4	14.6	14.3
Mean	13.3	15.9	10.0	11.7	14.2	15.1	15.9	17.4	18.7	20.0	13.4	13.6
Standard Deviation	1.7	0.5	1.2	0.2	1.9	0.2	1.4	0.5	1.5	0.8	1.0	0.4
Median	13	15.85	9.88	11.65	14.2	15	15.9	17.35	18.6	19.8	13.8	13.5
Calcium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Minimum	12.2	15.5	7.97	11.3	13.5	14.9	14.9	17.2	17.6	19.5	11.9	13.3
Maximum	16.8	16.1	12.8	11.8	16.8	15.5	19.1	18	22.2	20.7	14.9	13.9
Mean	14.85	15.86	10.90	11.56	15.10	15.15	17.20	17.54	19.89	20.05	13.67	13.60
Standard Deviation	1.22	0.21	1.16	0.17	0.85	0.21	1.27	0.30	1.23	0.39	0.78	0.20
Median	14.7	15.85	10.75	11.55	15.3	15.15	17.6	17.55	20	19.95	13.8	13.6
Iron, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	69	8	51	0	97	8	70	8	70	8	0	0
Minimum	ND	0.0121	ND	ND	ND	0.0139	0.033	0.0739	0.29	0.703	ND	ND
Maximum	0.22	0.0427	0.42	ND	0.191	0.0766	0.23	0.101	0.975	0.88	ND	ND
Mean	0.04	0.02	0.03	ID	0.06	0.05	0.10	0.09	0.69	0.78	ID	ID
Standard Deviation	0.04	0.01	0.06	ID	0.04	0.02	0.04	0.01	0.13	0.06	ID	ID
Median	0.032	0.0175	0.01	ID	0.045	0.05235	0.101	0.0909	0.7175	0.785	ID	ID
Iron, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	26	8	16	5	27	8	27	8	27	8	14	1
Minimum	ND	0.0852	ND	ND	0.0607	0.11	0.14	0.547	0.729	1.8	ND	ND
Maximum	0.0953	0.193	0.937	0.0536	1.09	0.893	10.5	1.48	5.85	6.09	1.38	0.0211
Mean	0.034	0.154	0.071	0.017	0.298	0.436	2.546	0.914	2.131	3.326	0.118	ID
Standard Deviation	0.023	0.041	0.189	0.016	0.242	0.306	2.922	0.327	1.541	1.471	0.323	ID
Median	0.026	0.166	0.0139	0.0154	0.212	0.3295	1.7	0.775	1.7	2.965	0.015	ID
Magnesium, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	6.3	9.6	6.2	9.53	8.4	13.8	5.4	7.3	10	13.9	10.8	11.6
Maximum	11	10.5	10.1	9.98	17.1	14.4	8.06	7.77	16.2	15.1	13.7	12.8
Mean	8.30	10.00	7.93	9.71	12.82	14.03	6.76	7.48	13.15	14.39	12.09	12.20
Standard Deviation	0.91	0.32	0.98	0.15	1.89	0.23	0.64	0.17	1.37	0.43	0.80	0.41
Median	8.23	9.935	7.8	9.7	13	13.95	6.7	7.44	13.3	14.3	12.3	12.15
Magnesium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Minimum	7.81	9.83	7.86	9.41	12.2	13.7	6.13	7.22	11.9	13.9	11	11.7
Maximum	11.1	10.7	10.7	10.1	16	14.7	9.59	7.76	15.9	14.8	13.4	12.6
Mean	9.27	10.05	9.15	9.68	14.27	14.18	7.49	7.49	14.24	14.46	12.15	12.33
Standard Deviation	0.94	0.28	0.86	0.21	0.96	0.35	0.77	0.18	0.95	0.27	0.61	0.35
Median	9.09	10	9.275	9.69	14.5	14.1	7.5	7.495	14.3	14.5	12.2	12.45

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Manganese, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	98	8	70	8	70	8	19	8
No. of Detections	96	8	4	2	97	8	70	8	70	8	12	6
Minimum	ND	0.132	ND	ND	ND	0.317	0.042	0.0577	0.0678	0.0867	ND	ND
Maximum	0.255	0.175	0.1400	0.0003	1.3500	0.5330	0.0846	0.0655	0.1230	0.1010	0.0158	0.0002
Mean	0.1406	0.1458	0.0019	ID	0.4377	0.4664	0.0636	0.0617	0.0927	0.0925	0.0011	0.0001
Standard Deviation	0.0333	0.0137	0.0141	ID	0.1887	0.0644	0.0077	0.0031	0.0080	0.0052	0.0036	0.0001
Median	0.1405	0.1445	0.0005	ID	0.4720	0.4815	0.0641	0.0619	0.0924	0.0917	0.0002	0.0001
Manganese, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	14	8	27	8	27	8	27	8	18	8
Minimum	0.147	0.187	ND	0.000	0.441	0.498	0.053	0.066	0.085	0.101	ND	0.000
Maximum	0.557	0.340	0.015	0.001	0.863	0.653	0.203	0.091	0.211	0.270	0.050	0.001
Mean	0.213	0.253	0.001	0.000	0.554	0.549	0.089	0.076	0.111	0.136	0.005	0.000
Standard Deviation	0.087	0.062	0.003	0.000	0.093	0.049	0.035	0.007	0.031	0.059	0.012	0.000
Median	0.182	0.250	0.001	0.000	0.522	0.544	0.081	0.074	0.098	0.113	0.001	0.000
Potassium, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	99	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	99	8	70	8	70	8	19	8
Minimum	1.6	2.67	1.40	1.74	1.70	2.26	2.10	2.82	1.55	2.01	1.35	1.44
Maximum	3.6	2.97	2.30	1.94	3.30	2.53	3.30	3.22	2.50	2.37	1.68	1.64
Mean	2.56	2.81	1.74	1.85	2.42	2.42	2.87	3.02	2.07	2.18	1.55	1.56
Standard Deviation	0.28	0.11	0.17	0.08	0.24	0.10	0.23	0.13	0.18	0.13	0.09	0.08
Median	2.54	2.805	1.76	1.87	2.43	2.44	2.92	3.02	2.10	2.19	1.54	1.56
Potassium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Minimum	2.12	2.66	1.67	1.77	2.29	2.37	2.76	2.84	2.02	2.05	1.47	1.46
Maximum	2.95	2.91	2.08	1.91	2.86	2.56	3.37	3.14	2.36	2.24	1.80	1.60
Mean	2.69	2.75	1.84	1.85	2.50	2.46	3.08	3.03	2.20	2.14	1.60	1.53
Standard Deviation	0.16	0.10	0.11	0.06	0.12	0.07	0.16	0.10	0.10	0.06	0.08	0.05
Median	2.7	2.72	1.83	1.85	2.47	2.45	3.06	3.03	2.18	2.14	1.59	1.53
Sodium, Dissolved [mg/L]												
No. of Analyses	98	8	98	8	98	8	70	8	70	8	19	8
No. of Detections	98	8	98	8	98	8	70	8	70	8	19	8
Minimum	4.77	5.68	4.3	5.22	4.8	6.57	6.5	8.42	5.08	6.02	5.9	6.11
Maximum	7.5	6.76	10	6.31	7.54	7.32	9.54	10.1	7.56	7.09	7.46	7.37
Mean	5.9	6.3	5.5	5.9	6.4	6.9	8.1	9.2	6.2	6.7	6.6	6.8
Standard Deviation	0.5	0.3	0.9	0.3	0.6	0.2	0.8	0.6	0.5	0.3	0.5	0.4
Median	5.92	6.375	5.355	6.01	6.3	6.895	8.225	9.16	6.195	6.665	6.72	6.81
Sodium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Minimum	5.36	5.89	5.02	5.37	6.09	6.49	7.06	8.63	5.33	6.31	5.92	6.22
Maximum	6.83	6.96	6.74	6.23	8.01	7.33	10.1	10	7.1	6.87	7.25	7.18
Mean	6.03	6.42	5.90	5.90	6.90	7.01	8.62	9.28	6.52	6.70	6.64	6.89
Standard Deviation	0.44	0.32	0.46	0.25	0.45	0.27	0.77	0.47	0.42	0.21	0.38	0.31
Median	6.1	6.4	5.9	5.94	6.97	7.01	8.65	9.415	6.56	6.785	6.72	7

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
1,2-Dichloropropane [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Benzene [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Chloroethane [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
***cis* -1,2-Dichloroethene [ug/L]**												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Dichlorodifluoromethane [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Toluene [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	0.946	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
***trans*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trichloroethene [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	1	0	1	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	0.35	ND	0.28	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Trichlorofluoromethane [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Vinyl Chloride [ug/L]												
No. of Analyses	98	8	99	8	99	8	70	8	70	8	19	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID	ID

NOTES:

Short - eight most recent analyses in the last two years.
Long - historical data up to the last eight samples.
umhos/cm - microSiemens per centimeter
mg/L - milligram per liter
ug/L - microgram per liter
ID - insufficient Data (i.e. the number of detections is less than 3)
ND - Not Detected (i.e. at laboratory MDL - Method Detection Limit)

Table 3-2
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
pH, Field [standard units]	D	--	D	--	--	--
Specific Conductance, Field [umhos/cm]	D	D	I	--	D	--
Alkalinity [mg/L]	D	D	--	--	D	--
Ammonia-N [mg/L]	D	D	D	--	D	--
Chloride [mg/L]	D	--	I	--	--	--
Nitrate-N [mg/L]	--	I	I	D	I	--
Sulfate [mg/L]	D	--	D	--	D	--
Total Dissolved Solids [mg/L]	D	D	I	--	D	--
Arsenic, Dissolved [mg/L]	--a	D	--	I	I	--
Arsenic, Total [mg/L]	D	--	--	--	I	--
Calcium, Dissolved [mg/L]	D	D	I	--	--	--
Calcium, Total [mg/L]	D	I	I	--	--	--
Iron, Dissolved [mg/L]	D	D	D	--	--	--
Iron, Total [mg/L]	--	D	D	--	D	--
Magnesium, Dissolved [mg/L]	--	D	I	--	--	--
Magnesium, Total [mg/L]	--	--	I	--	--	--
Manganese, Dissolved [mg/L]	D	D	D	--	--	--
Manganese, Total [mg/L]	--	--	D	--	D	--
Potassium, Dissolved [mg/L]	D	D	I	--	I	--
Potassium, Total [mg/L]	D	--	--	--	D	--
Sodium, Dissolved [mg/L]	D	D	I	--	I	--
Sodium, Total [mg/L]	D	--	I	--	--	--
1,1-Dichloroethane [ug/L]	--	D	--	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--
Benzene [ug/L]	--	--	--	--	--	--
Chloroethane [ug/L]	--	--a	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--
Dichlorodifluoromethane [ug/L]	--	D	--	--	--	--
Toluene [ug/L]	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--a	--	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]	--	D	--	--	--	--
Vinyl Chloride [ug/L]	--	D	--	--	--a	--

Table 3-2
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc2											
	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]	I	--	D	--	D	--	--	--	--	--	--	--
Specific Conductance, Field [umhos/cm]	D	D	I	--	I	--	D	--	D	D	D	--
Alkalinity [mg/L]	D	D	--	--	I	--	D	--	D	D	D	--
Ammonia-N [mg/L]	D	--	D	--	--	--	--	--	D	--	--	--
Chloride [mg/L]	D	--	I	--	D	--	D	D	D	--	D	--
Nitrate-N [mg/L]	D	I	I	--	D	--	I	--	--	--	--	--
Sulfate [mg/L]	--	--	D	I	--	--	--	--	I	--	I	I
Total Dissolved Solids [mg/L]	D	--	I	--	I	--	D	--	D	D	D	--
Arsenic, Dissolved [mg/L]	--	--	--	--	I	--	--	--	D	--	--	--
Arsenic, Total [mg/L]	I	--	I	--	I	--	I	--	D	--	I	--
Calcium, Dissolved [mg/L]	D	--	I	--	I	--	D	I	--	--	--	--
Calcium, Total [mg/L]	D	--	I	--	--	--	--	--	D	D	--	--
Iron, Dissolved [mg/L]	D	--	D	--	I	--	D	--	D	D	I	--
Iron, Total [mg/L]	--	--	D	--	I	D	I	--	D	D	I	--
Magnesium, Dissolved [mg/L]	D	--	I	--	I	--	D	--	--	--	--	--
Magnesium, Total [mg/L]	D	--	--	--	I	--	--	--	--	D	--	--
Manganese, Dissolved [mg/L]	--	--	D	--	I	--	--	--	D	--	I	--
Manganese, Total [mg/L]	I	--	D	--	D	D	I	--	D	--	--	--
Potassium, Dissolved [mg/L]	D	--	I	--	I	--	D	--	--	--	--	--
Potassium, Total [mg/L]	D	D	--	--	--	--	D	--	--	D	D	--
Sodium, Dissolved [mg/L]	D	--	I	--	--	--	--	--	--	--	--	--
Sodium, Total [mg/L]	--	--	I	--	I	--	--	--	--	D	--	--
1,1-Dichloroethane [ug/L]	--	--	--	--	--	--	--	--	D	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--	--	--	D	--	--	--
Benzene [ug/L]	--	--	--	--	--	--	--	--	D	--	--	--
Chloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	I	--	--	--	--	--	--	--	D	--	--	--
Dichlorodifluoromethane [ug/L]	D	D	--	--	I	D	D	D	--	D	--	--
Toluene [ug/L]	--	--	--	--	--a	--	--	--	--a	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	D	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]	D	--	--	--	--	--	D	--	--	--	--	--
Vinyl Chloride [ug/L]	D	--	--	--	--	--	D	--	--	D	--	--

Table 3-2
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
pH, Field [standard units]	--	D	D	--
Specific Conductance, Field [umhos/cm]	--	D	D	--
Alkalinity [mg/L]	D	--	D	--
Ammonia-N [mg/L]	D	--	D	--
Chloride [mg/L]	--	--	D	--
Nitrate-N [mg/L]	D	I	--	--
Sulfate [mg/L]	D	D	--	I
Total Dissolved Solids [mg/L]	--	--	--	--
Arsenic, Dissolved [mg/L]	D	--	--	--
Arsenic, Total [mg/L]	D	--	--	--
Calcium, Dissolved [mg/L]	--	--	I	I
Calcium, Total [mg/L]	I	--	I	--
Iron, Dissolved [mg/L]	D	--	--	--
Iron, Total [mg/L]	D	--	D	--
Magnesium, Dissolved [mg/L]	--	--	I	--
Magnesium, Total [mg/L]	I	--	I	--
Manganese, Dissolved [mg/L]	--	--	D	D
Manganese, Total [mg/L]	D	--	--	--
Potassium, Dissolved [mg/L]	I	--	I	--
Potassium, Total [mg/L]	--	D	I	--
Sodium, Dissolved [mg/L]	I	--	I	--
Sodium, Total [mg/L]	--	--	I	--
1,1-Dichloroethane [ug/L]	--	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--
Benzene [ug/L]	--	--	--	--
Chloroethane [ug/L]	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	--	--	--
Dichlorodifluoromethane [ug/L]	--	--	--	--
Toluene [ug/L]	--a	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--
Trichloroethene [ug/L]	--	--	--	--
Trichlorofluoromethane [ug/L]	--	--	--	--
Vinyl Chloride [ug/L]	--	--	--	--

Table 3-2
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]	D	--	D	--	D	--	D	--	D	--	--	--
Specific Conductance, Field [umhos/cm]	I	--	I	D	--	--	I	D	I	D	D	--
Alkalinity [mg/L]	I	--	I	--	D	--	--	--	--	--	D	--
Ammonia-N [mg/L]	I	--	D	--	D	--	I	--	D	--	D	--
Chloride [mg/L]	I	--	I	--	D	--	--	--	D	--	--	--
Nitrate-N [mg/L]	--	--	--	D	D	--	D	--	D	--	--	--
Sulfate [mg/L]	I	--	I	--	D	--	I	--	D	--	--	--
Total Dissolved Solids [mg/L]	I	--	I	--	--	--	I	--	I	--	--	--
Arsenic, Dissolved [mg/L]	D	--	D	I	D	--	D	--	D	--	--	--
Arsenic, Total [mg/L]	--	--	I	--	--	--	I	--	--	--	--	--
Calcium, Dissolved [mg/L]	I	--	I	--	--	--	I	--	I	--	I	--
Calcium, Total [mg/L]	I	--	I	--	--	--	I	--	I	--	--	--
Iron, Dissolved [mg/L]	--	--	D	--	D	--	--	I	I	--	--	--
Iron, Total [mg/L]	I	--	--	--	I	--	I	--	--	--	--	--
Magnesium, Dissolved [mg/L]	I	--	I	I	--	--	I	--	I	--	--	--
Magnesium, Total [mg/L]	I	--	I	--	--	--	I	--	I	--	I	--
Manganese, Dissolved [mg/L]	I	--	--a	--	D	--	I	--	--	--	D	--
Manganese, Total [mg/L]	--	--	D	--	--	--	I	--	--	--	D	--
Potassium, Dissolved [mg/L]	I	--	I	--	--	--	I	--	I	--	--	--
Potassium, Total [mg/L]	I	--	I	--	--	--	--	--	--	--	--	--
Sodium, Dissolved [mg/L]	I	--	I	--	I	--	--	--	I	--	I	--
Sodium, Total [mg/L]	I	--	I	--	--	--	--	--	I	--	I	--
1,1-Dichloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Benzene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Toluene [ug/L]	--	--	--	--	--a	--	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride [ug/L]	--	--	--	--	--a	--	--	--	--	--	--	--

NOTES:

Short	- eight most recent analyses in the last two years.
Long	- historical data up to the last eight samples, but no greater than 50 samples.
D	- decreasing trend
I	- increasing trend
--	- no detectable trend or too few data point to determine significance
NaN	- too few data points to calculate probability
Probability	- probability null hypothesis (i.e. 'No Trend') is true (aka p-value)
Significance	- trend is significant at 0.05
umhos/cm	- microSiemens per centimeter
mg/L	- milligram per liter
ug/L	- microgram per liter
[a]	Trend analysis resulted in artificial decreasing trend caused by changes in MDL.

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
pH, Field [standard units]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	35	50	50	8	50	8
Trend	D	--	D	--	--	--
S-value	-227	195	-325	-2	47	0
Probability	0.001327	0.104474	0.006679	0.901539	0.700225	1
Significant	YES	NO	YES	NO	NO	NO
Specific Conductance, Field [umhos/cm]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	35	50	50	8	50	8
Trend	D	D	**I**	--	D	--
S-value	-352	-788	470	-14	-274	-16
Probability	5.7E-07	4.58E-11	7.65E-05	0.107762	0.022078	0.063487
Significant	YES	YES	YES	NO	YES	NO
Alkalinity [mg/L]						
No. of Analyses	28	33	50	8	50	8
No. of Detections	28	33	50	8	50	8
Trend	D	D	--	--	D	--
S-value	-219	-262	-87	-4	-543	8
Probability	1.61E-05	5.23E-05	0.471494	0.706197	5.73E-06	0.386476
Significant	YES	YES	NO	NO	YES	NO
Ammonia-N [mg/L]						
No. of Analyses	34	50	50	8	50	8
No. of Detections	11	22	8	1	1	0
Trend	D	D	D	--	D	--
S-value	-370	-735	-684	-3	-645	0
Probability	2.22E-08	5.39E-10	5.35E-10	0.662521	2.31E-10	NaN
Significant	YES	YES	YES	--	YES	--
Chloride [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	35	49	50	8	50	8
Trend	D	--	**I**	--	--	--
S-value	-325	-94	272	15	159	-16
Probability	3.84E-06	0.435789	0.023248	0.080905	0.185833	0.063487
Significant	YES	NO	YES	NO	NO	NO
Nitrate-N [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	35	37	50	8	49	8
Trend	--	**I**	**I**	D	**I**	--
S-value	56	602	896	-20	363	2
Probability	0.434091	4.24E-07	6.94E-14	0.018741	0.002461	0.901539
Significant	NO	YES	YES	YES	YES	NO
Sulfate [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	35	50	50	8	50	8
Trend	D	--	D	--	D	--
S-value	-439	-102	-614	4	-837	-5
Probability	4.64E-10	0.398002	2.89E-07	0.710523	2.54E-12	0.617989
Significant	YES	NO	YES	NO	YES	NO
Total Dissolved Solids [mg/L]						
No. of Analyses	30	50	50	8	50	8
No. of Detections	30	50	50	8	50	8
Trend	D	D	**I**	--	D	--
S-value	-164	-743	313	1	-288	-8
Probability	0.00362	5.31E-10	0.008932	1	0.016125	0.371419
Significant	YES	YES	YES	NO	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	5	23	50	8	50	8
Trend	--a	D	--	**I**	**I**	--
S-value	--	-527	-234	20	327	2
Probability	NaN	1.55E-06	0.050917	0.016965	0.006347	0.901539
Significant	--	YES	NO	YES	YES	NO
Arsenic, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	9	17	25	8	28	8
Trend	D	--	--	--	**I**	--
S-value	-43	21	-47	15	101	6
Probability	0.009879	0.448066	0.280875	0.076189	0.047743	0.536187
Significant	YES	NO	NO	NO	YES	NO
Calcium, Dissolved [mg/L]						
No. of Analyses	29	43	50	8	50	8
No. of Detections	29	43	50	8	50	8
Trend	D	D	**I**	--	--	--
S-value	-214	-540	558	2	140	10
Probability	6.33E-05	1.68E-08	3.16E-06	0.901539	0.244389	0.26551
Significant	YES	YES	YES	NO	NO	NO
Calcium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Trend	D	**I**	**I**	--	--	--
S-value	-50	90	133	11	41	2
Probability	0.002795	0.000712	0.002044	0.212486	0.429105	0.901539
Significant	YES	YES	YES	NO	NO	NO
Iron, Dissolved [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	21	27	10	0	22	0
Trend	D	D	D	--	--	--
S-value	-339	-395	-385	0	-72	0
Probability	1.05E-06	0.000721	3.94E-06	NaN	0.512086	NaN
Significant	YES	YES	YES	--	NO	--
Iron, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	13	17	2	26	4
Trend	--	D	D	--	D	--
S-value	-14	-91	-94	-7	-201	-8
Probability	0.427711	0.00056	0.026522	0.32394	7.75E-05	0.352425
Significant	NO	YES	YES	--	YES	NO
Magnesium, Dissolved [mg/L]						
No. of Analyses	29	43	50	8	50	8
No. of Detections	29	43	50	8	50	8
Trend	--	D	**I**	--	--	--
S-value	15	-574	652	9	113	5
Probability	0.79248	2E-09	5.15E-08	0.318567	0.34624	0.617989
Significant	NO	YES	YES	NO	NO	NO
Magnesium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Trend	--	--	**I**	--	--	--
S-value	-24	36	118	3	1	-7
Probability	0.158996	0.183986	0.006219	0.803089	1	0.454427
Significant	NO	NO	YES	NO	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Manganese, Dissolved [mg/L]						
No. of Analyses	35	50	50	8	50	8
No. of Detections	28	43	8	1	26	5
Trend	D	D	D	--	--	--
S-value	-350	-483	-537	-7	206	-1
Probability	6.37E-07	5.47E-05	8.76E-08	0.19043	0.070627	1
Significant	YES	YES	YES	--	NO	NO
Manganese, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	16	6	25	8
Trend	--	--	D	--	D	--
S-value	-10	-17	-154	-11	-137	-6
Probability	0.582951	0.544486	0.000246	0.212486	0.007171	0.536187
Significant	NO	NO	YES	NO	YES	NO
Potassium, Dissolved [mg/L]						
No. of Analyses	29	43	50	8	50	8
No. of Detections	29	43	50	8	50	8
Trend	D	D	**I**	--	**I**	--
S-value	-320	-611	542	-4	235	1
Probability	2.12E-09	1.56E-10	5.85E-06	0.710523	0.049671	1
Significant	YES	YES	YES	NO	YES	NO
Potassium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Trend	D	--	--	--	D	--
S-value	-57	7	38	-14	-115	-4
Probability	0.00062	0.819963	0.38665	0.107762	0.024113	0.710523
Significant	YES	NO	NO	NO	YES	NO
Sodium, Dissolved [mg/L]						
No. of Analyses	29	43	50	8	50	8
No. of Detections	29	43	50	8	50	8
Trend	D	D	**I**	--	**I**	--
S-value	-134	-552	634	0	240	-5
Probability	0.012571	7.81E-09	1.18E-07	1	0.045513	0.617989
Significant	YES	YES	YES	NO	YES	NO
Sodium, Total [mg/L]						
No. of Analyses	13	18	25	8	28	8
No. of Detections	13	18	25	8	28	8
Trend	D	--	**I**	--	--	--
S-value	-48	52	106	-4	-12	1
Probability	0.004138	0.053218	0.01409	0.710523	0.827737	1
Significant	YES	NO	YES	NO	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

		Channel Cc1					
Well Location		MW-3	MW-4	MW-10		MW-13	
Time Interval		Long	Long	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	17	0	0	0	0
	Trend	--	D	--	--	--	--
	S-value	0	-727	0	0	0	0
	Probability	NaN	4.67E-10	NaN	NaN	NaN	NaN
	Significant	--	YES	--	--	--	--
1,2-Dichloropropane [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	0	0	0	0	0
	Trend	--	--	--	--	--	--
	S-value	0	0	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
Benzene [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	0	0	0	0	0
	Trend	--	--	--	--	--	--
	S-value	0	0	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
Chloroethane [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	6	0	0	0	0
	Trend	--	--a	--	--	--	--
	S-value	0	--	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
***cis* -1,2-Dichloroethene [ug/L]**							
	No. of Analyses	32	50	50	8	50	8
	No. of Detections	0	26	0	0	0	0
	Trend	--	--	--	--	--	--
	S-value	0	88	0	0	0	0
	Probability	NaN	0.463219	NaN	NaN	NaN	NaN
	Significant	--	NO	--	--	--	--
Dichlorodifluoromethane [ug/L]							
	No. of Analyses	28	34	50	8	50	8
	No. of Detections	0	12	0	0	0	0
	Trend	--	D	--	--	--	--
	S-value	0	-361	0	0	0	0
	Probability	NaN	1.03E-08	NaN	NaN	NaN	NaN
	Significant	--	YES	--	--	--	--

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

		Channel Cc1					
Well Location		MW-3	MW-4	MW-10		MW-13	
Time Interval		Long	Long	Long	Short	Long	Short
Toluene [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	0	0	0	0	0
	Trend	--	--	--	--	--	--
	S-value	0	0	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**							
	No. of Analyses	34	50	50	8	50	8
	No. of Detections	0	1	0	0	0	0
	Trend	--	--a	--	--	--	--
	S-value	0	--	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
Trichloroethene [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	0	0	0	0	0
	Trend	--	--	--	--	--	--
	S-value	0	0	0	0	0	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN
	Significant	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]							
	No. of Analyses	29	44	50	8	50	8
	No. of Detections	15	27	0	0	0	0
	Trend	--	D	--	--	--	--
	S-value	-86	-525	0	0	0	0
	Probability	0.103692	8.18E-08	NaN	NaN	NaN	NaN
	Significant	NO	YES	--	--	--	--
Vinyl Chloride [ug/L]							
	No. of Analyses	35	50	50	8	50	8
	No. of Detections	0	15	0	0	1	0
	Trend	--	D	--	--	--a	--
	S-value	0	-788	0	0	--	0
	Probability	NaN	1.28E-11	NaN	NaN	NaN	NaN
	Significant	--	YES	--	--	--	--

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	**I**	--	D	--	D	--	--	--	--	--	--	--
S-value	248	-6	-369	-10	-682	-3	13	-15	-35	-15	-53	-13
Probability	0.038692	0.536187	0.002053	0.26551	1.21E-08	0.803089	0.919971	0.080905	0.233092	0.080905	0.068081	0.134625
Significant	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO
Specific Conductance, Field [umhos/cm]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	D	**I**	--	**I**	--	D	--	D	D	D	--
S-value	-714	-20	437	-4	470	-10	-477	-10	-138	-22	-87	-14
Probability	2.41E-09	0.018741	0.00025	0.710523	8.15E-05	0.26551	6.75E-05	0.26551	1.62E-06	0.009375	0.002623	0.107762
Significant	YES	YES	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO
Alkalinity [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	D	--	--	**I**	--	D	--	D	D	D	--
S-value	-998	-26	201	10	320	-11	-815	14	-144	-21	-122	-8
Probability	7.32E-17	0.001982	0.094241	0.26551	0.007611	0.212486	9.67E-12	0.107762	5.56E-07	0.012649	2.28E-05	0.37908
Significant	YES	YES	NO	NO	YES	NO	YES	NO	YES	YES	YES	NO
Ammonia-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	8	3	2	0	42	8	31	8	19	8	19	8
Trend	D	--	D	--	--	--	--	--	D	--	--	--
S-value	-497	-13	-650	0	125	-10	186	-5	-63	-14	-53	-8
Probability	2.48E-06	0.082194	3.26E-10	NaN	0.298414	0.26551	0.117734	0.612407	0.030075	0.107762	0.068534	0.386476
Significant	YES	NO	YES	--	NO	NO	NO	NO	YES	NO	NO	NO
Chloride [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	D	--	D	D	D	--	D	--
S-value	-412	-10	277	12	-615	2	-732	-20	-145	-12	-98	-14
Probability	0.000584	0.26551	0.020903	0.173546	2.75E-07	0.901539	9.48E-10	0.016965	4.71E-07	0.173546	0.000685	0.107762
Significant	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO	YES	NO
Nitrate-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	39	8	49	8	10	1	46	8	2	0	1	0
Trend	D	**I**	**I**	--	D	--	**I**	--	--	--	--	--
S-value	-283	24	646	10	-327	-7	376	12	25	1	9	7
Probability	0.01765	0.004434	6.83E-08	0.26551	0.001135	0.19043	0.001699	0.173546	0.182197	NaN	0.595973	NaN
Significant	YES	YES	YES	NO	YES	--	YES	NO	NO	--	NO	--
Sulfate [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	--	--	D	**I**	--	--	--	--	**I**	--	**I**	**I**
S-value	177	-8	-438	17	-103	-4	39	-5	69	2	96	18
Probability	0.140694	0.386476	0.00025	0.041601	0.392378	0.710523	0.750368	0.610492	0.017085	0.901539	0.000869	0.035448
Significant	NO	NO	YES	YES	NO	NO	NO	NO	YES	NO	YES	YES
Total Dissolved Solids [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	**I**	--	D	--	D	D	D	--
S-value	-787	-8	440	0	509	-8	-740	8	-113	-22	-104	-4
Probability	4.79E-11	0.386476	0.000233	1	2.08E-05	0.386476	6.28E-10	0.386476	8.74E-05	0.009375	0.000311	0.710523
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc2											
Well Location	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	30	8	50	8	50	8	43	8	19	8	19	8
Trend	--	--	--	--	**I**	--	--	--	D	--	--	--
S-value	-39	16	-122	3	257	3	-38	-2	-95	-8	55	-8
Probability	0.743289	0.063487	0.310784	0.800021	0.032081	0.803089	0.756526	0.901539	0.000992	0.386476	0.058862	0.386476
Significant	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO
Arsenic, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	12	8	27	8	27	8	24	8	19	8	19	8
Trend	**I**	--	**I**	--	**I**	--	**I**	--	D	--	**I**	--
S-value	109	12	103	-10	230	-13	110	-14	-71	-10	75	-2
Probability	0.019954	0.173546	0.032858	0.23186	1.8E-06	0.134625	0.022958	0.107762	0.014326	0.26551	0.009539	0.901539
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Calcium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	**I**	--	D	**I**	--	--	--	--
S-value	-732	-6	489	15	584	12	-652	20	-13	-16	43	-10
Probability	9.51E-10	0.536187	4.28E-05	0.080905	1.01E-06	0.166905	5.1E-08	0.018741	0.674236	0.063487	0.141726	0.26551
Significant	YES	NO	YES	NO	YES	NO	YES	YES	NO	NO	NO	NO
Calcium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Trend	D	--	**I**	--	--	--	--	--	D	D	--	--
S-value	-187	-15	127	10	64	-2	-93	10	-81	-24	-21	-16
Probability	0.000104	0.080905	0.008525	0.26551	0.187876	0.900004	0.05491	0.26551	0.005129	0.004434	0.484108	0.063487
Significant	YES	NO	YES	NO	NO	NO	NO	NO	YES	YES	NO	NO
Iron, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	7	0	8	0	30	8	50	8	19	8	19	8
Trend	D	--	D	--	**I**	--	D	--	D	D	**I**	--
S-value	-270	0	-268	0	459	-15	-492	14	-94	-19	98	-4
Probability	0.000181	NaN	0.000443	NaN	7.33E-05	0.080905	4E-05	0.107762	0.001116	0.021896	0.000661	0.710523
Significant	YES	--	YES	--	YES	NO	YES	NO	YES	YES	YES	NO
Iron, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	18	0	19	4	26	8	27	8	19	8	19	8
Trend	--	--	D	--	**I**	D	**I**	--	D	D	**I**	--
S-value	-87	0	-115	-6	193	-24	130	-14	-105	-23	93	0
Probability	0.081368	NaN	0.015908	0.506555	6.22E-05	0.004434	0.007149	0.107762	0.00027	0.006091	0.001253	1
Significant	NO	--	YES	NO	YES	YES	YES	NO	YES	YES	YES	NO
Magnesium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	**I**	--	D	--	--	--	--	--
S-value	-788	-15	578	10	698	0	-657	16	-41	-14	-36	14
Probability	4.56E-11	0.080905	1.36E-06	0.258095	5.43E-09	1	4.04E-08	0.063487	0.161173	0.107762	0.220483	0.107762
Significant	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO
Magnesium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Trend	D	--	--	--	**I**	--	--	--	--	D	--	--
S-value	-220	-13	85	4	159	-15	-94	11	-20	-24	-31	-2
Probability	4.87E-06	0.134625	0.079004	0.706197	0.000972	0.080905	0.052479	0.212486	0.505965	0.004434	0.293917	0.900004
Significant	YES	NO	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc2											
	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Manganese, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	49	8	7	0	50	8	50	8	19	8	19	8
Trend	--	--	D	--	**I**	--	--	--	D	--	**I**	--
S-value	223	-10	-563	0	375	-14	-22	6	-62	-13	65	3
Probability	0.063102	0.26551	5.28E-09	NaN	0.001757	0.107762	0.860545	0.536187	0.032442	0.134625	0.024795	0.803089
Significant	NO	NO	YES	--	YES	NO	NO	NO	YES	NO	YES	NO
Manganese, Total [mg/L]												
No. of Analyses	28	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	28	8	20	7	27	8	27	8	19	8	19	8
Trend	**I**	--	D	--	D	D	**I**	--	D	--	--	--
S-value	105	-10	-122	-6	-158	-22	105	2	-109	-14	26	1
Probability	0.039871	0.26551	0.010861	0.536187	0.001062	0.009375	0.030153	0.901539	0.000151	0.107762	0.381479	1
Significant	YES	NO	YES	NO	YES	YES	YES	NO	YES	NO	NO	NO
Potassium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	**I**	--	D	--	--	--	--	--
S-value	-411	6	579	2	305	9	-539	12	46	-8	5	7
Probability	0.000597	0.536187	1.3E-06	0.901539	0.010885	0.318567	6.71E-06	0.173546	0.114738	0.386476	0.888388	0.454427
Significant	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO
Potassium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Trend	D	D	--	--	--	--	D	--	--	D	D	--
S-value	-149	-22	56	4	11	-2	-115	1	0	-18	-67	-12
Probability	0.002015	0.008321	0.25104	0.690242	0.834626	0.901539	0.017378	1	1	0.035448	0.020784	0.173546
Significant	YES	YES	NO	NO	NO	NO	YES	NO	NO	YES	YES	NO
Sodium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	19	8	19	8
Trend	D	--	**I**	--	--	--	--	--	--	--	--	--
S-value	-240	-2	539	-3	-131	0	180	-3	0	-15	20	0
Probability	0.045549	0.901539	6.75E-06	0.803089	0.2767	1	0.132671	0.803089	1	0.080905	0.505965	1
Significant	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
Sodium, Total [mg/L]												
No. of Analyses	27	8	27	8	27	8	27	8	19	8	19	8
No. of Detections	27	8	27	8	27	8	27	8	19	8	19	8
Trend	--	--	**I**	--	**I**	--	--	--	--	D	--	--
S-value	-59	-5	100	-4	129	-12	91	-2	22	-19	5	-3
Probability	0.226415	0.617989	0.03899	0.710523	0.007595	0.173546	0.059172	0.900004	0.460412	0.024822	0.88857	0.800021
Significant	NO	NO	YES	NO	YES	NO	NO	NO	NO	YES	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc2											
	MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	19	8	19	8
Trend	--	--	--	--	--	--	--	--	D	--	--	--
S-value	0	0	0	0	0	0	0	0	-78	8	-56	6
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.007027	0.386476	0.054181	0.536187
Significant	--	--	--	--	--	--	--	--	YES	NO	NO	NO
1,2-Dichloropropane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	19	8	19	8
Trend	--	--	--	--	--	--	--	--	D	--	--	--
S-value	0	0	0	0	0	0	0	0	-91	0	-34	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00164	1	0.247996	1
Significant	--	--	--	--	--	--	--	--	YES	NO	NO	NO
Benzene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	19	8	19	8
Trend	--	--	--	--	--	--	--	--	D	--	--	--
S-value	0	0	0	0	0	0	0	0	-104	-10	-25	6
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.000311	0.26551	0.401103	0.536187
Significant	--	--	--	--	--	--	--	--	YES	NO	NO	NO
Chloroethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	18	3	0	1
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	-55	0	0	3
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.058862	1	NaN	0.662521
Significant	--	--	--	--	--	--	--	--	NO	NO	--	--
***cis*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	13	2	0	0	0	0	50	8	19	8	19	8
Trend	**I**	--	--	--	--	--	--	--	D	--	--	--
S-value	411	9	0	0	0	0	-201	-2	-85	4	-10	-16
Probability	1.39E-05	0.188445	NaN	NaN	NaN	NaN	0.094279	0.901539	0.003295	0.710523	0.752714	0.063487
Significant	YES	--	--	--	--	--	NO	NO	YES	NO	NO	NO
Dichlorodifluoromethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
No. of Detections	50	8	0	0	19	8	50	8	19	8	19	8
Trend	D	D	--	--	**I**	D	D	D	--	D	--	--
S-value	-607	-20	0	0	482	-20	-709	-18	-38	-18	-42	-8
Probability	3.99E-07	0.018741	NaN	NaN	3.8E-06	0.018741	3.17E-09	0.035448	0.195231	0.035448	0.151205	0.386476
Significant	YES	YES	--	--	YES	YES	YES	YES	NO	YES	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location		Channel Cc2											
		MW-2		MW-9		MW-20		MW-21		MW-33		MW-35	
Time Interval		Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Toluene [ug/L]													
	No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
	No. of Detections	0	0	0	0	1	0	0	0	6	1	7	0
	Trend	--	--	--	--	--a	--	--	--	--a	--	--	--
	S-value	0	0	0	0	--	0	0	0	--	3	-28	0
	Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.662521	0.318964	NaN
	Significant	--	--	--	--	--	--	--	--	--	--	NO	--
***trans* -1,2-Dichloroethene [ug/L]**													
	No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
	No. of Detections	0	0	0	0	0	0	8	0	19	8	19	8
	Trend	--	--	--	--	--	--	--	--	D	--	--	--
	S-value	0	0	0	0	0	0	151	0	-117	10	42	11
	Probability	NaN	NaN	NaN	NaN	NaN	NaN	0.08223	NaN	4.94E-05	0.26551	0.150704	0.212486
	Significant	--	--	--	--	--	--	NO	--	YES	NO	NO	NO
Trichloroethene [ug/L]													
	No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
	No. of Detections	0	0	0	0	0	0	0	0	10	6	19	8
	Trend	--	--	--	--	--	--	--	--	--	--	--	--
	S-value	0	0	0	0	0	0	0	0	50	7	42	8
	Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.073706	0.454427	0.150704	0.386476
	Significant	--	--	--	--	--	--	--	--	NO	NO	NO	NO
Trichlorofluoromethane [ug/L]													
	No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
	No. of Detections	50	8	0	0	0	0	49	8	0	0	0	0
	Trend	D	--	--	--	--	--	D	--	--	--	--	--
	S-value	-683	12	0	0	0	0	-651	12	0	0	0	0
	Probability	1.16E-08	0.173546	NaN	NaN	NaN	NaN	5.4E-08	0.173546	NaN	NaN	NaN	NaN
	Significant	YES	NO	--	--	--	--	YES	NO	--	--	--	--
Vinyl Chloride [ug/L]													
	No. of Analyses	50	8	50	8	50	8	50	8	19	8	19	8
	No. of Detections	50	6	0	0	0	0	50	8	19	8	19	8
	Trend	D	--	--	--	--	--	D	--	--	D	--	--
	S-value	-739	-13	0	0	0	0	-885	-4	-57	-22	-51	-12
	Probability	6.62E-10	0.134625	NaN	NaN	NaN	NaN	1E-13	0.710523	0.05009	0.009375	0.080243	0.173546
	Significant	YES	NO	--	--	--	--	YES	NO	NO	YES	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location		Channel Cc3			
		MW-8		MW-36	
Time Interval		Long	Short	Long	Short
pH, Field [standard units]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	--	D	D	--
	S-value	-21	-18	-62	-5
	Probability	0.867038	0.035448	0.031312	0.617989
	Significant	NO	YES	YES	NO
Specific Conductance, Field [umhos/cm]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	--	D	D	--
	S-value	203	-22	-59	-10
	Probability	0.089448	0.009375	0.042189	0.26551
	Significant	NO	YES	YES	NO
Alkalinity [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	D	--	D	--
	S-value	-367	-8	-63	1
	Probability	0.002194	0.386476	0.029672	1
	Significant	YES	NO	YES	NO
Ammonia-N [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	2	1	2	2
	Trend	D	--	D	--
	S-value	-647	-1	-87	-11
	Probability	6.8E-10	1	0.000813	0.100178
	Significant	YES	--	YES	--
Chloride [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	--	--	D	--
	S-value	-49	0	-71	1
	Probability	0.687842	1	0.014207	1
	Significant	NO	NO	YES	NO
Nitrate-N [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	D	**I**	--	--
	S-value	-470	18	37	-11
	Probability	8.72E-05	0.035448	0.202432	0.205298
	Significant	YES	YES	NO	NO
Sulfate [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	D	D	--	**I**
	S-value	-412	-20	-23	18
	Probability	0.000583	0.018741	0.438104	0.032667
	Significant	YES	YES	NO	YES
Total Dissolved Solids [mg/L]					
	No. of Analyses	50	8	19	8
	No. of Detections	50	8	19	8
	Trend	--	--	--	--
	S-value	140	-11	13	-7
	Probability	0.243571	0.212486	0.672846	0.444833
	Significant	NO	NO	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	12	8	19	8
Trend	D	--	--	--
S-value	-375	6	53	2
Probability	4.7E-05	0.536187	0.067742	0.901539
Significant	YES	NO	NO	NO
Arsenic, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	11	8	19	8
Trend	D	--	--	--
S-value	-81	6	56	-2
Probability	0.048831	0.536187	0.052808	0.901539
Significant	YES	NO	NO	NO
Calcium, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	50	8	19	8
Trend	--	--	**I**	**I**
S-value	35	-4	101	19
Probability	0.775014	0.700116	0.000443	0.022615
Significant	NO	NO	YES	YES
Calcium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Trend	**I**	--	**I**	--
S-value	126	1	93	13
Probability	0.005687	1	0.00127	0.126484
Significant	YES	NO	YES	NO
Iron, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	9	0	1	0
Trend	D	--	--	--
S-value	-323	0	-18	0
Probability	5.44E-05	NaN	0.120691	NaN
Significant	YES	--	NO	--
Iron, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	8	2	6	1
Trend	D	--	D	--
S-value	-74	-1	-47	-1
Probability	0.047706	1	0.049481	1
Significant	YES	--	YES	--
Magnesium, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	50	8	19	8
Trend	--	--	**I**	--
S-value	158	0	87	6
Probability	0.188969	1	0.002591	0.536187
Significant	NO	NO	YES	NO
Magnesium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Trend	**I**	--	**I**	--
S-value	95	-4	84	1
Probability	0.03818	0.710523	0.003666	1
Significant	YES	NO	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Manganese, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	19	8
Trend	--	--	D	D
S-value	0	0	-117	-18
Probability	NaN	NaN	4.84E-05	0.035448
Significant	--	--	YES	YES
Manganese, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	4	5	19	8
Trend	D	--	--	--
S-value	-136	-7	-49	-12
Probability	0.001136	0.444833	0.093092	0.173546
Significant	YES	NO	NO	NO
Potassium, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	50	8	19	8
Trend	**I**	--	**I**	--
S-value	330	-7	66	10
Probability	0.005725	0.454427	0.02249	0.26551
Significant	YES	NO	YES	NO
Potassium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Trend	--	D	**I**	--
S-value	-2	-17	62	-2
Probability	0.982064	0.041601	0.0323	0.901539
Significant	NO	YES	YES	NO
Sodium, Dissolved [mg/L]				
No. of Analyses	50	8	19	8
No. of Detections	50	8	19	8
Trend	**I**	--	**I**	--
S-value	309	-4	67	-4
Probability	0.009936	0.710523	0.020941	0.710523
Significant	YES	NO	YES	NO
Sodium, Total [mg/L]				
No. of Analyses	26	8	19	8
No. of Detections	26	8	19	8
Trend	--	--	**I**	--
S-value	85	-8	72	-6
Probability	0.06397	0.386476	0.012534	0.536187
Significant	NO	NO	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Channel Cc3			
	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
1,2-Dichloropropane [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Benzene [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Chloroethane [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Dichlorodifluoromethane [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Toluene [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	1	0	0	0
Trend	--a	--	--	--
S-value	--	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
***trans* -1,2-Dichloroethene [ug/L]**				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Trichloroethene [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Trichlorofluoromethane [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Vinyl Chloride [ug/L]				
No. of Analyses	50	8	19	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	D	--	D	--	D	--	D	--	D	--	--	--
S-value	-401	0	-330	-11	-367	-15	-327	2	-286	-12	-25	-16
Probability	0.000814	1	0.005892	0.212486	0.002178	0.080905	0.006364	0.901539	0.017019	0.173546	0.400525	0.063487
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO
Specific Conductance, Field [umhos/cm]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	D	--	--	**I**	D	**I**	D	D	--
S-value	488	-16	581	-22	126	-16	379	-20	380	-22	-60	-16
Probability	4.1E-05	0.063487	9.72E-07	0.009375	0.294302	0.063487	0.001488	0.018741	0.001481	0.009375	0.038884	0.063487
Significant	YES	NO	YES	YES	NO	NO	YES	YES	YES	YES	YES	NO
Alkalinity [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	D	--	--	--	--	--	D	--
S-value	465	6	655	-10	-661	7	-43	11	103	-2	-87	11
Probability	0.000103	0.536187	4.43E-08	0.26551	3.33E-08	0.454427	0.725136	0.212486	0.385556	0.900004	0.00256	0.212486
Significant	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO
Ammonia-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	2	1	46	8	50	8	10	7	3	1
Trend	**I**	--	D	--	D	--	**I**	--	D	--	D	--
S-value	326	-5	-646	-3	-338	-8	317	-3	-653	-15	-82	-7
Probability	0.006538	0.617989	1.13E-09	0.662521	0.004798	0.386476	0.008166	0.803089	1.76E-10	0.080905	0.001311	0.19043
Significant	YES	NO	YES	--	YES	NO	YES	NO	YES	NO	YES	--
Chloride [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	D	--	--	--	D	--	--	--
S-value	351	-1	466	-6	-637	-2	-3	1	-431	8	-13	-2
Probability	0.003384	1	9.83E-05	0.536187	1.03E-07	0.901539	0.986641	1	0.00032	0.386476	0.674236	0.901539
Significant	YES	NO	YES	NO	YES	NO	NO	NO	YES	NO	NO	NO
Nitrate-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	20	6	50	8	18	2	31	8	1	0	19	8
Trend	--	--	--	D	D	--	D	--	D	--	--	--
S-value	-192	3	-204	-18	-507	9	-443	14	-295	0	29	-2
Probability	0.091083	0.803089	0.089335	0.035448	4.61E-06	0.188445	0.000185	0.095108	4.07E-05	NaN	0.327286	0.901539
Significant	NO	NO	NO	YES	YES	--	YES	NO	YES	--	NO	NO
Sulfate [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	D	--	**I**	--	D	--	--	--
S-value	420	2	435	-12	-462	0	251	1	-508	1	-17	-4
Probability	0.000436	0.900004	0.000269	0.173546	0.00011	1	0.035616	1	2.17E-05	1	0.574228	0.706197
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO
Total Dissolved Solids [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	--	--	**I**	--	**I**	--	--	--
S-value	712	-9	636	-16	-221	-4	430	5	339	-1	33	-12
Probability	2.54E-09	0.318567	1.04E-07	0.063487	0.0652	0.706197	0.000326	0.617989	0.004578	1	0.260367	0.173546
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Arsenic, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	D	--	D	**I**	D	--	D	--	D	--	--	--
S-value	-607	4	-253	21	-1005	-11	-368	12	-610	8	-23	2
Probability	3.98E-07	0.710523	0.034747	0.012649	4.44E-17	0.212486	0.002131	0.166905	3.46E-07	0.386476	0.437915	0.900004
Significant	YES	NO	YES	YES	YES	NO	YES	NO	YES	NO	NO	NO
Arsenic, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Trend	--	--	**I**	--	--	--	**I**	--	--	--	--	--
S-value	-83	8	93	16	-34	-10	150	-2	39	-4	18	-3
Probability	0.087047	0.386476	0.042009	0.054127	0.491203	0.26551	0.001879	0.901539	0.428254	0.710523	0.549141	0.788653
Significant	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
Calcium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	--	--	**I**	--	**I**	--	**I**	--
S-value	676	11	685	2	-54	11	539	10	532	3	69	15
Probability	1.57E-08	0.212486	1.04E-08	0.900004	0.657181	0.202866	6.53E-06	0.26551	8.51E-06	0.803089	0.016904	0.074619
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	YES	NO
Calcium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Trend	**I**	--	**I**	--	--	--	**I**	--	**I**	--	--	--
S-value	197	6	191	0	48	8	122	16	134	1	53	9
Probability	4.23E-05	0.52982	2.77E-05	1	0.326375	0.37908	0.011478	0.059451	0.005387	1	0.067742	0.318567
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO
Iron, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	21	8	8	0	49	8	50	8	50	8	0	0
Trend	--	--	D	--	D	--	--	**I**	**I**	--	--	--
S-value	-11	8	-334	0	-299	8	213	22	322	-10	0	0
Probability	0.925535	0.386476	1.18E-05	NaN	0.012637	0.386476	0.076109	0.009375	0.007236	0.26551	NaN	NaN
Significant	NO	NO	YES	--	YES	NO	NO	YES	YES	NO	--	--
Iron, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	26	8	16	5	27	8	27	8	27	8	14	1
Trend	**I**	--	--	--	**I**	--	**I**	--	--	--	--	--
S-value	207	2	0	0	110	-10	159	-14	62	-6	-45	7
Probability	1.74E-05	0.901539	1	1	0.023038	0.26551	0.000988	0.107762	0.203395	0.536187	0.119872	0.19043
Significant	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO	NO	--
Magnesium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	**I**	--	--	**I**	--	**I**	--	--	--
S-value	656	10	767	17	32	-2	704	16	509	11	54	12
Probability	4.21E-08	0.26551	1.44E-10	0.046063	0.795183	0.900004	4.04E-09	0.063487	2.09E-05	0.212486	0.063219	0.173546
Significant	YES	NO	YES	YES	NO	NO	YES	NO	YES	NO	NO	NO
Magnesium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Trend	**I**	--	**I**	--	--	--	**I**	--	**I**	--	**I**	--
S-value	188	-3	147	-9	-16	-11	122	-6	120	-6	70	1
Probability	9.65E-05	0.800021	0.001284	0.318567	0.753797	0.212486	0.011635	0.536187	0.012971	0.520912	0.015333	1
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Unit D Aquifer											
	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Manganese, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	49	8	3	2	49	8	50	8	50	8	12	6
Trend	**I**	--	--a	--	D	--	**I**	--	--	--	D	--
S-value	340	-8	--	1	-283	12	323	-10	38	4	-94	-3
Probability	0.00455	0.386476	NaN	1	0.018267	0.173546	0.007063	0.26551	0.756878	0.710523	0.000821	0.803089
Significant	YES	NO	--	--	YES	NO	YES	NO	NO	NO	YES	NO
Manganese, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	14	8	27	8	27	8	27	8	18	8
Trend	--	--	D	--	--	--	**I**	--	--	--	D	--
S-value	93	-6	-146	-6	82	6	163	-3	54	2	-83	8
Probability	0.05491	0.536187	0.000861	0.536187	0.091226	0.536187	0.000732	0.803089	0.269105	0.901539	0.00412	0.386476
Significant	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO
Potassium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	--	--	**I**	--	**I**	--	--	--
S-value	622	6	669	-8	48	-9	487	-2	528	-4	19	6
Probability	1.99E-07	0.536187	2.19E-08	0.386476	0.693847	0.318567	4.66E-05	0.901539	1.02E-05	0.710523	0.527174	0.52982
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO
Potassium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Trend	**I**	--	**I**	--	--	--	--	--	--	--	--	--
S-value	184	-5	130	-13	-42	-6	11	-2	80	-11	-36	-8
Probability	0.000132	0.617989	0.00439	0.134625	0.392189	0.536187	0.834626	0.901539	0.09867	0.202866	0.217452	0.386476
Significant	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
Sodium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	19	8
Trend	**I**	--	**I**	--	**I**	--	--	--	**I**	--	**I**	--
S-value	407	-8	748	-5	241	-6	229	2	428	-2	59	-2
Probability	0.000681	0.386476	4.1E-10	0.617989	0.044655	0.536187	0.056398	0.901539	0.000354	0.901539	0.042442	0.901539
Significant	YES	NO	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO
Sodium, Total [mg/L]												
No. of Analyses	27	8	26	8	27	8	27	8	27	8	19	8
No. of Detections	27	8	26	8	27	8	27	8	27	8	19	8
Trend	**I**	--	**I**	--	--	--	--	--	**I**	--	**I**	--
S-value	100	-2	164	-8	66	-9	-15	2	142	-8	73	0
Probability	0.03899	0.901539	0.000326	0.386476	0.17487	0.318567	0.770396	0.901539	0.003255	0.386476	0.01177	1
Significant	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	YES	NO

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

	Unit D Aquifer											
Well Location	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Benzene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--

Table 3-3
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2021

Well Location	Unit D Aquifer											
	MW-7		MW-12		MW-19		MW-26		MW-29		MW-34	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short	Long	Short
Toluene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Trend	--	--	--	--	--a	--	--	--	--	--	--	--
S-value	0	0	0	0	--	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	0	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	0	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	19	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Trend	--	--	--	--	--a	--	--	--	--	--	--	--
S-value	0	0	0	0	--	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--	--	--	--	--	--	--

NOTES:

Short - eight most recent analyses in the last two years.
Long - historical data up to the last eight samples, but no greater than 50 samples.
D - decreasing trend
I - increasing trend
-- - no detectable trend or too few data point to determine significance
NaN - too few data points to calculate probability
Probability - probability null hypothesis (i.e. 'No Trend') is true (aka p-value)
Significance - trend is significant at 0.05
umhos/cm - microSiemens per centimeter
mg/L - milligram per liter
ug/L - microgram per liter
[a] Trend analysis resulted in artificial decreasing trend caused by changes in MDL.

Table 3-4
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	West Hillslope Seep/Weir							
	SW-W1		SW-W2		SW-W3		SW-E	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short
pH, Field [standard units]								
No. of Analyses	80	8	112	8	112	8	29	8
No. of Detections	80	8	112	8	112	8	29	8
Minimum	6.54	7.21	6.88	7.44	ND	7.25	6.42	6.53
Maximum	8.76	7.78	8.89	8.21	ND	7.75	10.18	8.02
Mean	7.55	7.41	7.95	7.96	ID	7.57	7.63	7.69
Standard Deviation	0.43	0.18	0.37	0.22	ID	0.16	0.68	0.50
Median	7.61	7.375	8.035	8	ID	7.62	7.6	7.895
Specific Conductance, Field [umhos/cm]								
No. of Analyses	81	8	113	8	113	8	28	8
No. of Detections	81	8	113	8	113	8	28	8
Minimum	70	163.9	325	236.2	190	76.4	110	119.9
Maximum	860	221.9	1200	613.2	1034	300.5	370	211.3
Mean	309.67	194.00	735.50	487.90	436.56	218.54	192.25	178.89
Standard Deviation	161.97	23.46	182.26	117.12	161.26	85.22	46.49	32.58
Median	235.8	190.6	710	513	410	249.8	188.75	190.35
Alkalinity [mg/L]								
No. of Analyses	52	8	72	8	71	8		
No. of Detections	52	8	72	8	71	8		
Minimum	66.2	64.2	222	226	86.6	97.4		
Maximum	150	88	530	304	290	139		
Mean	89.29	75.34	382.60	270.88	168.83	124.30		
Standard Deviation	17.75	8.87	73.36	28.69	52.02	13.85		
Median	86.75	76.8	387.5	276	154	126.5		
Ammonia-N [mg/L]								
No. of Analyses	80	8	114	8	113	8		
No. of Detections	51	8	50	8	38	8		
Minimum	ND	0.0119	ND	0.0028	ND	0.0071		
Maximum	0.14	0.0415	45	0.0091	0.2	0.0445		
Mean	0.024	0.024	0.409	0.006	0.015	0.013		
Standard Deviation	0.027	0.009	4.213	0.002	0.024	0.013		
Median	0.0164	0.0215	0.0098	0.00685	0.0062	0.00855		
Chemical Oxygen Demand [mg/L]								
No. of Analyses	80	8	113	8	112	8		
No. of Detections	73	8	111	8	98	8		
Minimum	ND	7.3	ND	13	ND	5.6		
Maximum	100	71.5	130	37	160	41.4		
Mean	19.45	23.68	20.91	19.05	17.65	16.39		
Standard Deviation	16.20	20.34	17.65	7.75	19.79	11.05		
Median	15	17.5	16	16.5	14	15		
Chloride [mg/L]								
No. of Analyses	80	8	112	8	112	8		
No. of Detections	80	8	110	8	110	8		
Minimum	3	5.69	ND	13.6	ND	6.88		
Maximum	15	7.66	79	19	48	9.34		
Mean	6.03	6.45	30.36	16.86	11.78	8.56		
Standard Deviation	1.81	0.68	11.49	1.77	5.91	0.80		
Median	5.575	6.285	30.85	17	9.9	8.69		
Nitrate-N [mg/L]								
No. of Analyses	80	8	114	8	113	8		
No. of Detections	72	8	85	8	105	8		
Minimum	ND	0.3	ND	0.0518	ND	0.141		
Maximum	4.26	2.32	9	0.326	1.4	0.587		
Mean	1.51	1.20	0.23	0.14	0.36	0.29		
Standard Deviation	1.08	0.75	0.84	0.09	0.27	0.15		
Median	1.425	1.22	0.12	0.108	0.301	0.2565		

Table 3-4
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	West Hillslope Seep/Weir							
	SW-W1		SW-W2		SW-W3		SW-E	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short
Sulfate [mg/L]								
No. of Analyses	80	8	114	8	113	8		
No. of Detections	79	8	114	8	113	8		
Minimum	ND	7.23	4.6	12	6	9.26		
Maximum	35.9	10.6	29.9	16.2	109	12.5		
Mean	11.24	8.63	9.12	14.18	12.12	11.70		
Standard Deviation	4.85	1.26	3.52	1.23	9.39	1.03		
Median	10.05	8.235	8.075	14.15	11.4	11.9		
Arsenic, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	45	8	49	8	51	8	28	8
Minimum	ND	0.00198	ND	0.00112	0.0017	0.00288	0.00112	0.00142
Maximum	0.0086	0.0052	0.0160	0.0016	0.0039	0.0039	0.0023	0.0022
Mean	0.0027	0.0035	0.0017	0.0014	0.0028	0.0034	0.0018	0.0018
Standard Deviation	0.0018	0.0012	0.0021	0.0002	0.0006	0.0004	0.0003	0.0003
Median	0.0022	0.0032	0.0015	0.0014	0.0027	0.0033	0.0018	0.0018
Arsenic, Total [mg/L]								
No. of Analyses	81	8	113	8	112	8	28	8
No. of Detections	81	8	113	8	111	8	28	8
Minimum	0.00197	0.00329	0.00151	0.00155	ND	0.00372	0.00149	0.00169
Maximum	0.0830	0.0153	0.0170	0.0068	0.0520	0.0076	0.0106	0.0027
Mean	0.0108	0.0072	0.0045	0.0034	0.0059	0.0049	0.0024	0.0022
Standard Deviation	0.0115	0.0036	0.0028	0.0021	0.0060	0.0012	0.0016	0.0003
Median	0.0064	0.0068	0.0038	0.0031	0.0046	0.0046	0.0022	0.0023
Calcium, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	48	8	51	8	51	8	28	8
Minimum	12.2	13.3	35	39.1	17.2	18.5	7.78	8.97
Maximum	18.5	18	74.3	54.6	33	25.7	17	16.1
Mean	15.50	15.40	56.52	47.83	23.75	22.88	13.93	13.90
Standard Deviation	1.60	1.58	7.79	5.20	3.45	2.29	2.62	2.39
Median	15.5	15.2	56.4	47.85	23	23.1	14.7	14.5
Calcium, Total [mg/L]								
No. of Analyses	76	8	107	8	106	8	28	8
No. of Detections	76	8	107	8	106	8	28	8
Minimum	12.4	14	27	40.2	17.3	19	8.51	9.74
Maximum	84.8	17.8	127	54.7	93	25.4	18.9	16.4
Mean	28.51	15.98	73.11	48.60	40.31	23.28	14.64	14.19
Standard Deviation	19.71	1.39	20.69	5.05	19.10	2.25	2.65	2.27
Median	18.1	15.95	68	50.05	34	23.95	15.3	15
Iron, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	47	8	51	8	51	8	28	8
Minimum	ND	0.161	0.0115	0.0151	0.018	0.0308	0.033	0.0381
Maximum	1.43	0.534	8.97	0.138	0.215	0.136	0.221	0.171
Mean	0.2649	0.2546	0.2475	0.0414	0.0715	0.0635	0.0715	0.0747
Standard Deviation	0.2895	0.1246	1.2502	0.0416	0.0512	0.0352	0.0453	0.0454
Median	0.1780	0.2115	0.0284	0.0225	0.0490	0.0552	0.0531	0.0584
Iron, Total [mg/L]								
No. of Analyses	81	8	113	8	112	8	28	8
No. of Detections	81	8	113	8	112	8	28	8
Minimum	0.682	1.12	0.364	0.392	0.49	0.407	0.226	0.306
Maximum	76	11	27.9	6.26	37.5	6.03	14.9	2.46
Mean	7.57	2.90	4.26	2.36	3.39	1.67	1.35	0.73
Standard Deviation	10.48	3.29	4.77	2.23	5.26	2.00	2.86	0.71
Median	3.78	1.89	2.77	1.80	1.86	0.72	0.58	0.53

Table 3-4
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	West Hillslope Seep/Weir							
	SW-W1		SW-W2		SW-W3		SW-E	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short
Magnesium, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	48	8	51	8	51	8	28	8
Minimum	10.1	10.1	28.9	31.9	11.7	14.6	6.36	7.52
Maximum	16	13.6	63.6	45.2	25.8	21.3	15.8	14.9
Mean	12.64	11.86	48.06	39.58	19.48	19.05	12.43	12.23
Standard Deviation	1.24	1.07	7.24	4.63	2.90	2.17	2.54	2.44
Median	12.65	11.85	46.80	40.05	19.30	19.50	12.65	12.95
Magnesium, Total [mg/L]								
No. of Analyses	76	8	107	8	107	8	28	8
No. of Detections	76	8	107	8	107	8	28	8
Minimum	10.1	11	20	32.7	14.5	14.9	6.98	8.04
Maximum	55.3	13.1	104	47.2	89	23.6	15.7	14.8
Mean	18.76	12.11	61.94	40.45	31.71	19.74	12.90	12.53
Standard Deviation	9.95	0.91	18.63	5.08	14.52	2.73	2.27	2.35
Median	14.15	12.20	58.10	41.05	27.00	19.65	13.55	13.25
Manganese, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	48	8	51	8	51	8	28	8
Minimum	0.0113	0.235	0.016	0.0155	0.112	0.302	0.00616	0.00748
Maximum	3.18	0.904	2.4	0.058	0.581	0.631	0.0188	0.0121
Mean	0.386	0.519	0.116	0.034	0.305	0.443	0.011	0.010
Standard Deviation	0.499	0.250	0.332	0.016	0.101	0.093	0.003	0.002
Median	0.269	0.472	0.056	0.028	0.301	0.432	0.010	0.010
Manganese, Total [mg/L]								
No. of Analyses	81	8	112	8	111	8	28	8
No. of Detections	81	8	112	8	111	8	28	8
Minimum	0.325	0.504	0.126	0.107	0.254	0.558	0.0243	0.0238
Maximum	18	3.52	17.9	1.19	8.56	0.963	1.14	0.171
Mean	2.322	1.196	1.930	0.477	1.182	0.712	0.104	0.073
Standard Deviation	2.781	0.964	2.487	0.394	1.443	0.155	0.206	0.048
Median	1.360	0.908	0.972	0.428	0.763	0.668	0.058	0.073
Potassium, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	47	8	51	8	50	8	28	8
Minimum	ND	1.05	1.2	2.69	ND	2.03	1.68	1.68
Maximum	1.53	1.45	4.05	3.28	2.8	2.46	2.78	2.06
Mean	1.09	1.23	3.16	2.99	2.12	2.30	1.99	1.90
Standard Deviation	0.22	0.14	0.41	0.19	0.38	0.13	0.21	0.13
Median	1.10	1.22	3.17	2.97	2.13	2.30	1.97	1.91
Potassium, Total [mg/L]								
No. of Analyses	76	8	108	8	107	8	28	8
No. of Detections	76	8	108	8	107	8	28	8
Minimum	0.82	1.02	1.8	2.64	1.7	2.04	1.65	1.7
Maximum	2.8	1.73	5.6	3.59	17	2.77	3.38	2.34
Mean	1.34	1.28	3.43	3.05	2.63	2.41	1.99	1.97
Standard Deviation	0.40	0.22	0.53	0.27	1.48	0.23	0.30	0.18
Median	1.21	1.25	3.37	3.09	2.40	2.38	1.97	1.96

Table 3-4
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2021

Well Location	West Hillslope Seep/Weir							
	SW-W1		SW-W2		SW-W3		SW-E	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short
Sodium, Dissolved [mg/L]								
No. of Analyses	48	8	51	8	51	8	28	8
No. of Detections	48	8	51	8	51	8	28	8
Minimum	5.44	6.26	9.55	12.4	6.21	7.24	4.47	4.71
Maximum	8.04	7.87	19.3	17.5	11.1	9.88	7.65	7.8
Mean	6.87	7.09	15.29	15.36	8.71	8.90	6.50	6.59
Standard Deviation	0.58	0.59	1.71	1.75	0.86	0.86	0.82	1.00
Median	6.85	7.08	15.10	15.70	8.66	9.15	6.63	6.88
Sodium, Total [mg/L]								
No. of Analyses	76	8	108	8	106	8	28	8
No. of Detections	76	8	108	8	106	8	28	8
Minimum	5.33	6.32	7.8	12.5	6.52	7.25	4.73	4.74
Maximum	17.2	8.01	25	17.7	18.2	10.4	7.43	7.57
Mean	8.63	7.15	16.03	15.50	10.97	9.20	6.60	6.61
Standard Deviation	2.93	0.64	2.36	1.84	2.86	1.12	0.74	0.98
Median	7.26	7.28	16.00	15.85	10.00	9.31	6.74	6.86
Vinyl Chloride [ug/L]								
No. of Analyses	78	8	111	8	110	8	28	8
No. of Detections	18	5	1	1	83	8	0	0
Minimum	ND	ND	ND	0.0184	ND	0.0291	ND	ND
Maximum	1	0.0244	ND	ND	1	0.0598	ND	ND
Mean	0.058	0.015	ID	ID	0.075	0.050	ID	ID
Standard Deviation	0.191	0.009	ID	ID	0.158	0.012	ID	ID
Median	0.010	0.017	ID	ID	0.043	0.057	ID	ID

NOTES:

Short	- eight most recent analyses in the last two years.
Long	- historical data up to the last eight samples, but no greater than 50 samples.
umhos/cm	- microSiemens per centimeter
mg/L	- milligram per liter
ug/L	- microgram per liter
ID	- insufficient Data (i.e. the number of detections is less than 3)
ND	- Not Detected (i.e. at laboratory MDL - Method Detection Limit)

Table 3-5
Summary of Statistical Analyses for Appendix III Analytes
Channel Cc1
Vashon Island Closed Landfill
January 1, 2021 - December 31, 2021

	Channel Cc2				
Well Location	MW-2	MW-20	MW-21	MW-33	MW-35
Time Interval	Short	Short	Short	Short	Short
2,4,5-TP Silvex [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	4	4
Minimum	ND	ND	ND	0.03	0.03
Maximum	ND	ND	ND	0.05	0.05
Mean	ID	ID	ID	0.04	0.04
Standard Deviation	ID	ID	ID	0.01	0.01
Median	ID	ID	ID	0.0432	0.04385
2-Methyl-1-Propanol [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND
Maximum	ND	ND	ND	ND	ND
Mean	ID	ID	ID	ID	ID
Standard Deviation	ID	ID	ID	ID	ID
Median	ID	ID	ID	ID	ID
Bis(2-Chloroethyl)Ether [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	1	4	4
Minimum	ND	ND	ND	1.44	0.363
Maximum	ND	ND	0.266	5.39	1.28
Mean	ID	ID	ID	3.63	1.00
Standard Deviation	ID	ID	ID	1.80	0.43
Median	ID	ID	ID	3.845	1.17
Bis(2-Ethylhexyl)Phthalate [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	1	2	3	2
Minimum	ND	ND	ND	ND	ND
Maximum	ND	1.15	1.22	25.4	20.2
Mean	ID	ID	ID	11.682	ID
Standard Deviation	ID	ID	ID	12.181	ID
Median	ID	ID	ID	10.545	ID
Diethyl Phthalate [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	4	1
Minimum	ND	ND	ND	1.04	ND
Maximum	ND	ND	ND	1.51	0.54
Mean	ID	ID	ID	1.25	ID
Standard Deviation	ID	ID	ID	0.24	ID
Median	ID	ID	ID	1.23	ID

NOTES:

Short - four most recent analyses in the last year.
ug/L - microgram per liter
ID - insufficient Data (i.e. the number of detections is less than 3)
ND - Not Detected (i.e. at laboratory MDL - Method Detection Limit)

Table 3-6
Summary of Trend Analyses for Appendix III Analytes
Channel Cc1
Vashon Island Closed Landfill
January 1, 2021 - December 31, 2021

	Channel Cc2				
Well Location	MW-2	MW-20	MW-21	MW-33	MW-35
Time Interval	Short	Short	Short	Short	Short
2,4,5-TP Silvex [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	4	4
Trend	--	--	--	--	--
S-value	-5	-3	-1	-4	-4
Probability	NaN	NaN	NaN	0.30818	0.30818
Significant	--	--	--	NO	NO
2-Methyl-1-Propanol [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	0	0
Trend	--	--	--	--	--
S-value	0	0	0	0	3
Probability	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--
Bis(2-Chloroethyl)Ether [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	1	4	4
Trend	--	--	--	--	--
S-value	-2	-4	-2	-2	-2
Probability	NaN	NaN	0.734095	0.734095	0.734095
Significant	--	--	--	NO	NO
Bis(2-Ethylhexyl)Phthalate [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	1	2	3	2
Trend	--	--	--	--	--
S-value	-2	-4	-2	2	-2
Probability	NaN	0.30818	0.734095	0.734095	0.734095
Significant	--	--	--	NO	--
Diethyl Phthalate [ug/L]					
No. of Analyses	4	4	4	4	4
No. of Detections	0	0	0	4	1
Trend	--	--	--	--	--
S-value	-2	-4	0	2	4
Probability	NaN	NaN	NaN	0.734095	0.30818
Significant	--	--	--	NO	--

NOTES:

Short - four most recent analyses in the last year.

-- - no detectable trend or too few data point to determine significance

NaN - too few data points to calculate probability

Probability - probability null hypothesis (i.e. 'No Trend') is true (aka p-value)

Significance - trend is significant at 0.05

ug/L - microgram per liter

Table 4-1
Comparison of Background Conditions and Unit D Aquifer
Vashon Island Closed Landfill

Constituent	Area Background Range*	Unit D Aquifer Jan. 2020 - Dec. 2021
General Indicators		
pH (Field)	6.5 to 8.3	6.47 to 8.19
Specific Conductance (Field)	80 to 545	141.4 to 242.9
Chloride	1.6 to 14	2.95 to 17.4
Nitrate	<0.2 to 5.8	<0.01 to 1.99
Sulfate	<0.50 to 41	9.63 to 33.2
Metals		
Arsenic, Total	<0.001 to 0.017	0.00102 to 0.0181
Iron, Total	0.04 to 10	<0.01 to 6.09
Manganese, Total	0.005 to 0.960	0.000133 to 0.653
Sodium, Total	5.0 to 62	5.37 to 10

Notes:
All values except pH (standard units) and specific conductivity (umhos/cm) are reported in milligrams per liter (mg/L).

*Background values are based on Carr (1983) and Vashon-Maury Island Groundwater Management Plan (1998)

Appendix A

Standards, Qualifiers, and
Prediction Limits

Water Quality Standards

Analyte	CAS No.	National Drinking Water Regulation MCL		Eff. Date	Ref.	Washington State Groundwater Quality Criteria Criterion*		Eff. Date	Ref.
Primary Standards									
A. Inorganics									
Antimony	7440-36-0	0.006	mg/L	17-Jan-94	FR v. 57 No.138	0.006	mg/L	17-Jan-94	WAC 173-200
Arsenic c	7440-38-2	0.01	mg/L	23-Jan-06	66 FR 28342	0.00005	mg/L	01-Dec-90	WAC 173-200
Asbestos	132207-33-1	7	mf/L	30-Jul-92	FR v. 56 No. 20	7	mf/L	30-Jul-92	WAC 173-200
Barium	7440-39-3	2.0	mg/L	1-Jan-93	FR v. 56 No. 126	1.0	mg/L	01-Dec-90	WAC 173-200
Beryllium	7440-41-7	0.004	mg/L	17-Jan-94	FR v. 57 No.138	0.004	mg/L	17-Jan-94	WAC 173-200
Cadmium	7440-43-9	0.005	mg/L	30-Jul-92	FR v. 56 No. 20	0.005	mg/L	01-Dec-90	WAC 173-200
Chromium	7440-47-3	0.1	mg/L	30-Jul-92	FR v. 56 No. 20	0.05	mg/L	01-Dec-90	WAC 173-200
Copper	7440-50-8	1.3**	mg/L	7-Dec-92	FR v. 57 No. 125	1.0	mg/L	01-Dec-90	WAC 173-200
Cyanide	57-12-5	0.2	mg/L	17-Jan-94	FR v. 57 No.138	0.2	mg/L	17-Jan-94	WAC 173-200
Fluoride	16984-48-8	4.0	mg/L	2-Oct-87	40 CFR 141	4.0	mg/L	01-Dec-90	WAC 173-200
Lead	7439-92-1	0.015**	mg/L	7-Dec-92	FR v. 57 No. 125	0.015	mg/L	01-Dec-90	WAC 173-200
Mercury	7439-97-6	0.002	mg/L	2-Apr-86	40 CFR 141	0.002	mg/L	01-Dec-90	WAC 173-200
Nickel	7440-02-0	0.1	mg/L	17-Jan-94	FR v. 57 No.138	0.1	mg/L	17-Jan-94	WAC 173-200
Nitrate	14797-55-8	10.0	mg/L	2-Apr-86	FR v. 56 No. 20	10.0	mg/L	01-Dec-90	WAC 173-200
Nitrate and Nitrite	14797-55-8+14797-65-0	10.0	mg/L	30-Jul-92	FR v. 56 No. 20	10.0	mg/L	30-Jul-92	WAC 173-200
Nitrite	14797-65-0	1	mg/L	30-Jul-92	FR v. 56 No. 20	1.0	mg/L	30-Jul-92	WAC 173-200
Selenium	7782-49-2	0.05	mg/L	30-Jul-92	FR v. 56 No. 20	0.01	mg/L	01-Dec-90	WAC 173-200
Silver	7440-22-4	--				0.05	mg/L	01-Dec-90	WAC 173-200
Sodium	7440-23-5	20***	mg/L	20-Sep-04		20***	mg/L	03-Jul-04	WAC 246-290
Thallium	7440-28-0	0.002	mg/L	17-Jan-94	FR v. 57 No.138	0.002	mg/L	17-Jan-94	WAC 173-200
Total Coliforms		1/100	mL	24-Dec-75	40 CFR 141	1/100	mL	01-Dec-90	WAC 173-200
Turbidity		1	NTU	24-Dec-75	40 CFR 141	--	--	--	--
B. Organic Chemicals									
Alachlor	15972-60-8	2	µg/L	30-Jul-92	FR v. 56 No. 20	2	µg/L	30-Jul-92	WAC 173-200
Atrazine	1912-24-9	3	µg/L	30-Jul-92	FR v. 56 No. 20	3	µg/L	30-Jul-92	WAC 173-200
Benzene c	71-43-2	5	µg/L	9-Jan-89	40 CFR 141	1	µg/L	01-Dec-90	WAC 173-200
Bis(2-ethylhexyl)phthalate	117-81-7	6	µg/L	17-Jan-94	FR v. 57 No.138	6	µg/L	01-Dec-90	WAC 173-200
Bromodichloromethane c	75-27-4	--				0.3	µg/L	01-Dec-90	WAC 173-200
Bromoform c	75-25-2	--				5	µg/L	01-Dec-90	WAC 173-200
Carbofuran	1563-66-2	40	µg/L	30-Jul-92	FR v. 56 No. 20	40	µg/L	30-Jul-92	WAC 173-200
Carbon Tetrachloride c	56-23-5	5	µg/L	9-Jan-89	40 CFR 141	0.3	µg/L	01-Dec-90	WAC 173-200
Chlordane c	5103-71-9	2	µg/L	30-Jul-92	FR v. 56 No. 20	0.06	µg/L	01-Dec-90	WAC 173-200
Chlorobenzene	108-90-7	100	µg/L	30-Jul-92	FR v. 56 No. 20	100	µg/L	30-Jul-92	WAC 173-200
Chlorodibromomethane c	124-48-1	--				0.5	µg/L	01-Dec-90	WAC 173-200
Chloroform c	67-66-3	--				7	µg/L	01-Dec-90	WAC 173-200
2,4-D	94-75-7	70	µg/L	30-Jul-92	FR v. 56 No. 20	70	µg/L	01-Dec-90	WAC 173-200
Dalapon	75-99-0	200	µg/L	17-Jan-94	FR v. 57 No.138	200	µg/L	17-Jan-94	WAC 173-200
1,2-Dibromo-3-chloropropane	96-12-8	0.2	µg/L	30-Jul-92	FR v. 56 No. 20	0.2	µg/L	30-Jul-92	WAC 173-200
1,2-Dichlorobenzene	95-50-1	600	µg/L	30-Jul-92	FR v. 56 No. 20	600	µg/L	30-Jul-92	WAC 173-200
1,4-Dichlorobenzene c	106-46-7	75	µg/L	9-Jan-89	40 CFR 141	4	µg/L	01-Dec-90	WAC 173-200
1,1-Dichloroethane c	75-34-3	--				1	µg/L	01-Dec-90	WAC 173-200
1,2-Dichloroethane c	107-06-2	5	µg/L	9-Jan-89	40 CFR 141	0.5	µg/L	01-Dec-90	WAC 173-200
1,1-Dichloroethene	75-35-4	7	µg/L	9-Jan-89	40 CFR 141	7	µg/L	01-Dec-90	WAC 173-200
c-1,2-Dichloroethene	156-59-2	70	µg/L	30-Jul-92	FR v. 56 No. 20	70	µg/L	30-Jul-92	WAC 173-200
t-1,2-Dichloroethene	156-60-5	100	µg/L	30-Jul-92	FR v. 56 No. 20	100	µg/L	30-Jul-92	WAC 173-200
1,2-Dichloropropane c	78-87-5	5	µg/L	30-Jul-92	FR v. 56 No. 20	0.6	µg/L	01-Dec-90	WAC 173-200
1,3-Dichloropropene tot. c	542-75-6	--				0.2	µg/L	01-Dec-90	WAC 173-200
Di(ethylhexyl)adipate	103-23-1	400	µg/L	17-Jan-94	FR v. 57 No.138	400	µg/L	17-Jan-94	WAC 173-200
Dinoseb	88-85-7	7	µg/L	17-Jan-94	FR v. 57 No.138	7	µg/L	17-Jan-94	WAC 173-200
Diquat	231-36-7	20	µg/L	17-Jan-94	FR v. 57 No.138	20	µg/L	17-Jan-94	WAC 173-200
Endothall	145-73-3	100	µg/L	17-Jan-94	FR v. 57 No.138	100	µg/L	17-Jan-94	WAC 173-200
Endrin	72-20-8	2	µg/L	17-Jan-94	40 CFR 141	0.2	µg/L	01-Dec-90	WAC 173-200
Ethylbenzene	100-41-4	700	µg/L	30-Jul-92	FR v. 56 No. 20	700	µg/L	30-Jul-92	WAC 173-200
Ethylene dibromide c	106-93-4	0.05	µg/L	30-Jul-92	FR v. 56 No. 20	0.001	µg/L	01-Dec-90	WAC 173-200
Glyphosate	1071-83-6	70	µg/L	17-Jan-94	FR v. 57 No.138	70	µg/L	17-Jan-94	WAC 173-200
Heptachlor c	76-44-8	0.4	µg/L	30-Jul-92	FR v. 56 No. 20	0.02	µg/L	01-Dec-90	WAC 173-200
Heptachlor epoxide c	1024-57-3	0.2	µg/L	30-Jul-92	FR v. 56 No. 20	0.009	µg/L	01-Dec-90	WAC 173-200
Hexachlorobenzene	118-74-1	1	µg/L	17-Jan-94	FR v. 57 No.138	0.05	µg/L	01-Dec-90	WAC 173-200
Hexachlorocyclopentadiene (HEX)	77-47-4	50	µg/L	17-Jan-94	FR v. 57 No.138	50	µg/L	17-Jan-94	WAC 173-200
Lindane c	58-89-9	0.2	µg/L	30-Jul-92	FR v. 56 No. 20	0.06	µg/L	01-Dec-90	WAC 173-200

Water Quality Standards

Analyte	CAS No.	National Drinking Water Regulation MCL		Eff. Date	Ref.	Washington State Groundwater Quality Criteria Criterion*		Eff. Date	Ref.
Methoxychlor	72-43-5	40	µg/L	30-Jul-92	FR v. 56 No. 20	40	µg/L	30-Jul-92	WAC 173-200
Methylene Chloride c	75-09-2	5	µg/L	17-Jan-94	FR v. 57 No.138	5	µg/L	17-Jan-94	WAC 173-200
Oxamyl (vydate)	23135-22-0	200	µg/L	17-Jan-94	FR v. 57 No.138	200	µg/L	17-Jan-94	WAC 173-200
PAHs [Benzo(a)pyrene]		0.2	µg/L	17-Jan-94	FR v. 57 No.138	0.01	µg/L	17-Jan-94	WAC 173-200
PCBs c	27323-18-8	0.5	µg/L	30-Jul-92	FR v. 56 No. 20	0.01	µg/L	01-Dec-90	WAC 173-200
Pentachlorophenol	87-86-5	1	µg/L	1-Jan-93	FR v. 56 No. 126	1	µg/L	01-Jan-93	WAC 173-200
Picloram	1918-02-1	500	µg/L	17-Jan-94	FR v. 57 No.138	500	µg/L	17-Jan-94	WAC 173-200
Simazine	122-34-9	4	µg/L	17-Jan-94	FR v. 57 No.138	4	µg/L	17-Jan-94	WAC 173-200
Styrene	100-42-5	100	µg/L	30-Jul-92	FR v. 56 No. 20	100	µg/L	30-Jul-92	WAC 173-200
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3E-05	µg/L	17-Jan-94	FR v. 57 No.138	0.0000006	µg/L	01-Dec-90	WAC 173-200
Tetrachloroethylene c	127-18-4	5	µg/L	30-Jul-92	FR v. 56 No. 20	0.8	µg/L	30-Jul-92	WAC 173-200
Toluene	108-88-3	1000	µg/L	30-Jul-92	FR v. 56 No. 20	1000	µg/L	30-Jul-92	WAC 173-200
Total Trihalomethanes c	75-27-4, 75-25-2, 124-48-1, 67-66-3	100	µg/L	29-Nov-79	40 CFR 141	--	--	--	--
Toxaphene c	8001-35-2	3	µg/L	30-Jul-92	FR v. 56 No. 20	0.08	µg/L	01-Dec-90	WAC 173-200
2,4,5-TP	93-72-1	50	µg/L	30-Jul-92	FR v. 56 No. 20	100	µg/L	01-Dec-90	WAC 173-200
1,2,4-Trichlorobenzene	120-82-1	70	µg/L	17-Jan-94	FR v. 57 No.138	70	µg/L	17-Jan-94	WAC 173-200
1,1,1-Trichloroethane	71-55-6	200	µg/L	9-Jan-89	40 CFR 141	200	µg/L	01-Dec-90	WAC 173-200
1,1,2-Trichloroethane	79-00-5	5	µg/L	17-Jan-94	FR v. 57 No.138	5	µg/L	17-Jan-94	WAC 173-200
Trichloroethylene (TCE) c	79-01-6	5	µg/L	9-Jan-89	40 CFR 141	3	µg/L	01-Dec-90	WAC 173-200
Vinyl chloride c	75-01-4	2	µg/L	9-Jan-89	40 CFR 141	0.02	µg/L	01-Dec-90	WAC 173-200
Xylenes (total)	1330-20-7	10000	µg/L	30-Jul-92	FR v. 56 No. 20	10000	µg/L	30-Jul-92	WAC 173-200
C. Radionuclides and Radioactivity									
Radium 226 & Radium 228		5	pCi/L	9-Jul-76	FR v. 41 No. 133	5	pCi/L	01-Dec-90	WAC 173-200
Radium 226	13982-63-3	--				3	pCi/L	01-Dec-90	WAC 173-200
Radium 228	15262-20-1	--				5	pCi/L	01-Dec-90	WAC 173-200
Gross Alpha particle activity		15	pCi/L	9-Jul-76	FR v. 41 No. 133	15	pCi/L	01-Dec-90	WAC 173-200
Tritium	10028-17-8	20,000	pCi/L	9-Jul-76	FR v. 41 No. 133	20,000	pCi/L	01-Dec-90	WAC 173-200
Strontium	7440-24-6	8	pCi/L	9-Jul-76	FR v. 41 No. 133	8	pCi/L	01-Dec-90	WAC 173-200
Gross Beta particle activity		50	pCi/L	9-Jul-76	FR v. 41 No. 133	50	pCi/L	01-Dec-90	WAC 173-200
D. Additional Carcinogens Listed in Groundwater Criteria									
Acrylamide	79-06-1	--				0.02	µg/L	01-Dec-90	WAC 173-200
Acrylonitrile	107-13-1	--				0.07	µg/L	01-Dec-90	WAC 173-200
Aldrin	309-00-2	--				0.005	µg/L	01-Dec-90	WAC 173-200
Aniline	62-53-3	--				14	µg/L	01-Dec-90	WAC 173-200
Aramite	140-57-8	--				3	µg/L	01-Dec-90	WAC 173-200
Azobenzene	103-33-3	--				0.7	µg/L	01-Dec-90	WAC 173-200
Benzidine	92-87-5	--				0.0004	µg/L	01-Dec-90	WAC 173-200
Benzo(a)pyrene	50-32-8	--				0.008	µg/L	01-Dec-90	WAC 173-200
Benzotrichloride	98-07-7	--				0.007	µg/L	01-Dec-90	WAC 173-200
Benzyl chloride	100-44-7	--				0.5	µg/L	01-Dec-90	WAC 173-200
Bis(chloroethyl)ether	111-44-4	--				0.07	µg/L	01-Dec-90	WAC 173-200
Bis(chloromethyl)ether	542-88-1	--				0.0004	µg/L	01-Dec-90	WAC 173-200
Carbazole	86-74-8	--				5	µg/L	01-Dec-90	WAC 173-200
4-Chloro-2-methyl analine	95-69-2	--				0.1	µg/L	01-Dec-90	WAC 173-200
4-Chloro-2-methyl analine hydrochloride	3165-93-3	--				0.2	µg/L	01-Dec-90	WAC 173-200
o-Chloronitrobenzene	88-73-3	--				3	µg/L	01-Dec-90	WAC 173-200
p-Chloronitrobenzene	100-00-5	--				5	µg/L	01-Dec-90	WAC 173-200
Chlorthalonil	1897-45-6	--				30	µg/L	01-Dec-90	WAC 173-200
Diallate	2303-16-4	--				1	µg/L	01-Dec-90	WAC 173-200
DDT (includes DDE and DDD)	50-29-3, 72-55-9, 72-54-8	--				0.3	µg/L	01-Dec-90	WAC 173-200
1,2-Dibromomethane	106-93-4	--				0.001	µg/L	01-Dec-90	WAC 173-200
3,3'-Dichlorobenzidine	91-94-1	--				0.2	µg/L	01-Dec-90	WAC 173-200
Dichlorovos	62-73-7	--				0.3	µg/L	01-Dec-90	WAC 173-200
Dieldrin	60-57-1	--				0.005	µg/L	01-Dec-90	WAC 173-200
3,3'-Dimethoxybenzidine	119-90-4	--				6.0	µg/L	01-Dec-90	WAC 173-200
3,3-Dimethylbenzidine	119-93-7	--				0.007	µg/L	01-Dec-90	WAC 173-200
1,2-Dimethylhydrazine	540-73-8	--				60	µg/L	01-Dec-90	WAC 173-200
2,4-Dinitrotoluene	121-14-2	--				0.1	µg/L	01-Dec-90	WAC 173-200
2,6-Dinitrotoluene	606-20-2	--				0.1	µg/L	01-Dec-90	WAC 173-200
1,4-Dioxane	123-91-1	--				7	µg/L	01-Dec-90	WAC 173-200
1,2-Diphenylhydrazine	122-66-7	--				0.09	µg/L	01-Dec-90	WAC 173-200

Water Quality Standards

Analyte	CAS No.	National Drinking Water Regulation MCL		Eff. Date	Ref.	Washington State Groundwater Quality Criteria Criterion*		Eff. Date	Ref.
Direct Black 38	1937-37-7	--				0.009	µg/L	01-Dec-90	WAC 173-200
Direct Blue 6	2602-46-2	--				0.009	µg/L	01-Dec-90	WAC 173-200
Direct Brown 95	16071-86-6	--				0.009	µg/L	01-Dec-90	WAC 173-200
Epichlorohydrin	106-89-8	--				8	µg/L	01-Dec-90	WAC 173-200
Ethyl acrylate	140-88-5	--				2	µg/L	01-Dec-90	WAC 173-200
Ethylene thiourea	96-45-7	--				2	µg/L	01-Dec-90	WAC 173-200
Folpet	133-07-3	--				20	µg/L	01-Dec-90	WAC 173-200
Furazolidone	67-45-8	--				0.02	µg/L	01-Dec-90	WAC 173-200
Furium	531-82-8	--				0.002	µg/L	01-Dec-90	WAC 173-200
Furmecyclox	60568-05-0	--				3	µg/L	01-Dec-90	WAC 173-200
Hexachlorocyclohexane (alpha)	319-84-6	--				0.001	µg/L	01-Dec-90	WAC 173-200
Hexachlorocyclohexane (technical)	608-73-1	--				0.05	µg/L	01-Dec-90	WAC 173-200
Hexachlorodibenzo-p-dioxin, mix	34465-46-8	--				0.00001	µg/L	01-Dec-90	WAC 173-200
Hydrazine/hydrazine sufate	302-01-2/10034-93-2	--				0.03	µg/L	01-Dec-90	WAC 173-200
2-Methoxy-5-nitroanaline	99-59-2	--				2.0	µg/L	01-Dec-90	WAC 173-200
2-Methylaniline	95-53-4	--				0.2	µg/L	01-Dec-90	WAC 173-200
2-Methylaniline hydrochloride	636-21-5	--				0.5	µg/L	01-Dec-90	WAC 173-200
4,4'-Methylene bis(N,N'-dimethyl) aniline	101-61-1	--				2.0	µg/L	01-Dec-90	WAC 173-200
Mirex	2385-85-5	--				0.05	µg/L	01-Dec-90	WAC 173-200
Nitrofurazone	59-87-0	--				0.06	µg/L	01-Dec-90	WAC 173-200
N-Nitrosodiethanolamine	1116-54-7	--				0.03	µg/L	01-Dec-90	WAC 173-200
N-Nitrosodiethylamine	55-18-5	--				0.0005	µg/L	01-Dec-90	WAC 173-200
N-Nitrosodimethylamine	62-75-9	--				0.002	µg/L	01-Dec-90	WAC 173-200
N-Nitrosodiphenylamine	86-30-6	--				17.0	µg/L	01-Dec-90	WAC 173-200
N-Nitroso-di-n-propylamine	621-64-7	--				0.01	µg/L	01-Dec-90	WAC 173-200
N-Nitrosopyrrolidine	930-55-2	--				0.04	µg/L	01-Dec-90	WAC 173-200
N-Nitroso-di-n-butylamine	924-16-3	--				0.02	µg/L	01-Dec-90	WAC 173-200
N-Nitroso-N-methylethylylamine	10595-95-6	--				0.004	µg/L	01-Dec-90	WAC 173-200
PBBs	59536-65-1	--				0.01	µg/L	01-Dec-90	WAC 173-200
o-Phenylenediamine	95-54-5	--				0.005	µg/L	01-Dec-90	WAC 173-200
Propylene oxide	75-56-9	--				0.01	µg/L	01-Dec-90	WAC 173-200
p,a,a,a-Tetrachlorotoluene	5216-25-1	--				0.004	µg/L	01-Dec-90	WAC 173-200
2,4-Toluenediamine	95-80-7	--				0.002	µg/L	01-Dec-90	WAC 173-200
o-Toluidine	95-53-4	--				0.2	µg/L	01-Dec-90	WAC 173-200
2,4,6-Trichlorophenol	88-06-2	--				4.0	µg/L	01-Dec-90	WAC 173-200
Trimethyl phosphate	512-56-1	--				2.0	µg/L	01-Dec-90	WAC 173-200
Secondary Standards									
Aluminum	7429-90-5	0.05-0.2	mg/L	30-Jul-92	FR v. 56 No. 20	0.05-0.2	mg/L	30-Jul-92	WAC 173-200
Copper	7440-50-8	1.0	mg/L	7-Dec-92	FR v. 57 No. 125	1.0	mg/L	01-Dec-90	WAC 173-200
Iron	7439-89-6	0.3	mg/L	2-Apr-86	40 CFR 143	0.3	mg/L	01-Dec-90	WAC 173-200
Manganese	7439-96-5	0.05	mg/L	2-Apr-86	40 CFR 143	0.05	mg/L	01-Dec-90	WAC 173-200
Color		15	units	2-Apr-86	40 CFR 143	15	units	01-Dec-90	WAC 173-200
pH	12408-02-5	6.5-8.5	units	2-Apr-86	40 CFR 143	6.5-8.5	units	01-Dec-90	WAC 173-200
Specific Conductivity		--				700	µS/cm		WAC 246-290
Total Dissolved Solids		500	mg/L	2-Apr-86	40 CFR 143	500	mg/L	01-Dec-90	WAC 173-200
Chloride	16887-00-6	250	mg/L	2-Apr-86	40 CFR 143	250	mg/L	01-Dec-90	WAC 173-200
Fluoride	16984-48-8	2.0	mg/L	2-Apr-86	40 CFR 143	p			
Silver	7440-22-4	0.1	mg/L	30-Jul-92	FR v. 56 No. 20	p			
Sulfate	14808-79-8	250	mg/L	2-Apr-86	40 CFR 143	250	mg/L	01-Dec-90	WAC 173-200
Surfactants		0.5	mg/L	2-Apr-86	40 CFR 143	0.5	mg/L	01-Dec-90	WAC 173-200
Corrosivity		non-corrosive		2-Apr-86	40 CFR 143	non-corrosive		01-Dec-90	WAC 173-200
Odor-Threshold		3	units	2-Apr-86	40 CFR 143	3	units	01-Dec-90	WAC 173-200
Zinc	7440-66-6	5.0	mg/L	2-Apr-86	40 CFR 143	5.0	mg/L	01-Dec-90	WAC 173-200

NOTES:

p = Listed as a primary standard

c = Listed as a carcinogen in the Washington State Groundwater Quality Criteria

-- = no standard established

* = Criteria shall be the most stringent concentration of the Federal MCLG, MCL, or State MCL

** = treatment technique in lieu of an MCL

*** = A Drinking Water Advisory, not an enforceable standard.

National Primary and Secondary Drinking Water Regulations (40 CFR Parts 141 and 143)

Washington State Groundwater Quality Criteria = Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200)

mg/L = milligrams per liter

mf/L = million fibers per liter

mL = milliliter

NTU = Nephelometric Turbidity Unit

µg/L = micrograms per liter

pCi/L = per liter

µS/cm = microSiemen per centimeter

units = standard unit for either color, pH, or odor

MCL = Maximum Contaminant Level

MCLG = Maximum Contaminant Level Goal

Compiled by KCSWD 1/12/94. Revised 12/13/19

KING COUNTY SOLID WASTE DIVISION
QUALIFIER INFORMATION
(Effective 8/27/2015)

QUAL	QUALIFIER DESCRIPTION
U	Undetected; Analyte Concentration Less than Method Detection Limit (< MDL)
T	Estimated; Less than Reporting Detection Limit (<RDL) but Greater than Method Detection Limit (> MDL)
J	Reported Value is an Estimate
B	Matrix Target Analyte Present in Blank, AND, Sample Result Less than or Equal to 10x Blank Detection
C	Confluent Growth
E	Estimated; Outside Expected Accuracy
H	Exceeds Holding Time
R	Data Rejected
S	Sample Handling Errors
X	Too Numerous to Count
D	Re-analysis Due to Dilution
P	PASS – Qualitative Result Acceptable
F	FAIL – Qualitative Result is not Acceptable
G	Estimated with Low Bias (Coliform; BOD; All Other Chemistry Parameters)
L	Estimated with High Bias (BOD; All Other Chemistry Parameters)

Prediction Limit Transformations for 2021

Parameter	Unit	Prediction Limits for MW-20			Prediction Limits for MW-7			Prediction Limits for MW-12			Prediction Limits for MW-19			Prediction Limits for MW-26			Prediction Limits for MW-29			Prediction Limits for MW-34		
		Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit	Transformation Used	Lower Prediction Limit	Upper Prediction Limit
pH (Field)	(std. Units)	Normal	6.60	8.62	Cubed Transform	6.98	8.18	Squared Transform	6.69	7.87	Not Normal	6.94	7.77	Not Normal	7.07	9.20	Not Normal	6.65	7.80	Log Transform	6.47	7.46
Conductance (Field)	(µmhos/cm)	Not Normal		242.1	Not Normal		194.2	Not Normal		170.8	Not Normal		230.0	Not Normal		200.0	Not Normal		265.0	Not Normal		210
Alkalinity, Total ($CaCO_3$)	(mg/L)	Not Normal		94.9	Not Normal		100	Fifth Power Transform		67.20	Not Normal		110.0	Not Normal		86.0	Not Normal		140	Not Normal		80.2
Ammonia	(mg/L)	Log Transform		0.0	Normal		0.32	<=50% Detected		0.036	Not Normal		0.093	Cubed Transform		0.30	<=50% Detected		0.03	<=50% Detected		0.059
Chloride	(mg/L)	Not Normal		4.09	Not Normal		3.93	Not Normal		4.07	Not Normal		37.6	Not Normal		9.11	Not Normal		4.3	Squared Transform		5.40
Nitrate (NO3 as N)	(mg/L)	<=50% Detected		0.05	<=50% Detected		0.13	Normal		0.82	<=50% Detected		0.12	Not Normal		0.23	<=50% Detected		0.082	Normal		2.84
Sulfate	(mg/L)	Normal		18.54	Squared Transform		11.80	Normal		11.43	Fifth Power Transform		18.91	Fourth Power Transform		14.5	Normal		18.41	Normal		14.44
Total Dissolved Solids	(mg/L)	Normal		159.27	Fifth Power Transform		141.44	Squared Transform		128	Fifth Power Transform		168.0	Not Normal		210	Normal		168.5	Normal		150.03
Total Organic Carbon	(mg/L)	<=50% Detected		2.33	<=50% Detected		1.83	<=50% Detected		1.36	<=50% Detected		18.4	<=50% Detected		1.6	<=50% Detected		2.43	<=50% Detected		1
Total Solids	(mg/L)	Not Normal		286	Fifth Power Transform		145.17	Not Normal		150	Not Normal		221.0	Log Transform		207.2	Not Normal		207	Not Normal		183.00
Total Suspended Solids	(mg/L)	Not Normal		9.7	<=50% Detected		2.0	<=50% Detected		12.6	<=50% Detected		8	Not Normal		117	Not Normal		24.8	<=50% Detected		41.7
Antimony, Total	(mg/L)	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001
Arsenic, Total	(mg/L)	Log Transform		0.00461	Log Transform		0.0057	Normal		0.00228	Log Transform		0.00206	Not Normal		0.0108	Log Transform		0.01960	Not Normal		0.002
Barium, Total	(mg/L)	Not Normal		0.0384	Normal		0.01730	Not Normal		0.0101	Not Normal		0.0233	Not Normal		0.0636	Not Normal		0.0189	Not Normal		0.010
Beryllium, Total	(mg/L)	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001
Cadmium, Total	(mg/L)	Not Detected		0.002	Not Detected		0.002	Not Detected		0.002	<=50% Detected		0.002	<=50% Detected		0.002	Not Detected		0.002	Not Detected		0.002
Calcium, Total	(mg/L)	Normal		15.27	Normal		17.8	Normal		13.6310	Normal		17.0	Squared Transform		19.85	Normal		22.67	Normal		15.39
Chromium, Total	(mg/L)	<=50% Detected		0.0111	<=50% Detected		0.005	<=50% Detected		0.005	Not Detected		0.005	Not Normal		0.012	<=50% Detected		0.005	Not Normal		0.00316
Cobalt, Total	(mg/L)	<=50% Detected		0.003	<=50% Detected		0.003	Not Detected		0.003	Not Detected		0.003	Not Normal		0.00379	<=50% Detected		0.003	<=50% Detected		0.003
Copper, Total	(mg/L)	<=50% Detected		0.0114	<=50% Detected		0.002	<=50% Detected		0.00476	<=50% Detected		0.002	Not Normal		0.0202	<=50% Detected		0.00279	<=50% Detected		0.002
Iron, Dissolved	(mg/L)	Not Normal		0.39	<=50% Detected		0.0590	<=50% Detected		0.07	Not Normal		0.191	Normal		0.2	Normal		0.97	Not Detected		0.01
Lead, Total	(mg/L)	<=50% Detected		0.00188	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	<=50% Detected		0.00513	Not Detected		0.001	<=50% Detected		0.001
Magnesium, Total	(mg/L)	Normal		16.92	Normal		11.63	Normal		11.25	Normal		16.44	Normal		9.21	Normal		16.42	Normal		13.58
Manganese, Dissovled	(mg/L)	Not Normal		0.55	Not Normal		0.255	<=50% Detected		0.140	Not Normal		1.350	Normal		0.0805	Not Normal		0.123	Not Normal		0.016
Mercury, Total	(mg/L)	Not Detected		0.0001	Not Detected		0.0001	Not Detected		0.0001	Not Detected		0.0001	Not Detected		0.0001	Not Detected		0.0001	Not Detected		0.0001
Nickel, Total	(mg/L)	Not Normal		0.0119	<=50% Detected		0.01	<=50% Detected		0.01	<=50% Detected		0.01	Not Normal		0.0179	<=50% Detected		0.01	Not Normal		0.005
Potassium, Total	(mg/L)	Normal		2.52	Cubed Transform		3.02	Normal		2.08	Normal		2.77	Normal		3.45	Normal		2.44	Normal		1.79
Selenium, Total	(mg/L)	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001
Silver, Total	(mg/L)	Not Detected		0.003	Not Detected		0.003	<=50% Detected		0.003	Not Detected		0.003	Not Detected		0.003	Not Detected		0.003	Not Detected		0.003
Sodium, Total	(mg/L)	Normal		7.48	Normal		7.19	Normal		6.96	Normal		7.97	Normal		10.52	Cubed Transform		7.38	Normal		7.60
Thallium, Total	(mg/L)	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001	Not Detected		0.001
Vanadium, Total	(mg/L)	<=50% Detected		0.00767	<=50% Detected		0.002	Not Normal		0.00651	<=50% Detected		0.002	Not Normal		0.0142	<=50% Detected		0.00313	Not Normal		0.0047
Zinc, Dissolved	(mg/L)	<=50% Detected		0.004	<=50% Detected		0.00400	<=50% Detected		0.0048	<=50% Detected		0.0049	<=50% Detected		0.052	<=50% Detected		0.023	Not Normal		0.00217
Vinyl Chloride	(ug/L)	Not Detected		0.02	Not Detected		0.02	Not Detected		0.02	<=50% Detected		0.02	Not Detected		0.02	Not Detected		0.02	Not Detected		0.02

Appendix B

Exceedance Reports

Summary of Groundwater Quality Criteria Exceedances

Summary of Groundwater Prediction Limit Exceedances

Summary of Groundwater Volatile Organic Compound Detections Exceedances

Summary of Surface Water Monitoring Location Exceedances vs. Surface Water Quality Standards

Table B-1

Channel Cc1: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-3	2/23/2021	5.6	MCL2; SGWC2	< 6.5
		MW-3	5/24/2021	5.58		
		MW-3	11/15/2021	5.68		
Arsenic, Total[1]	mg/L	MW-3	2/23/2021	0.000163	SGWC1	0.00005
		MW-3	11/15/2021	0.000059		
		MW-4	2/25/2021	0.000363		
		MW-4	5/18/2021	0.000398		
		MW-4	8/10/2021	0.000391		
		MW-10	2/22/2021	0.00168		
		MW-10	5/18/2021	0.00166		
		MW-10	8/10/2021	0.00168		
		MW-10	11/16/2021	0.00171		
		MW-13	2/22/2021	0.00194		
		MW-13	5/17/2021	0.00228 D		
		MW-13	8/12/2021	0.00212		
		MW-13	11/16/2021	0.00223		

[1] Natural Background for arsenic in the Puget Sound Basin is 0.008 mg/L (Ecology, 2016)

MCL2 = National Secondary Drinking Water Regulation Maximum Contaminant Level

SGWC1 = Washington State Primary Groundwater Quality Criterion

SGWC2 = Washington State Secondary Groundwater Quality Criterion

See Analytical Data Qualifier Page for Data Qualifier Information (Page B-1, Appendix B)

Table B-2

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-35	5/24/2021	6.38	MCL2; SGWC2	< 6.5
		MW-35	11/18/2021	6.39		
Arsenic, Total[1]	mg/L	MW-2	2/25/2021	0.000836	SGWC1	0.00005
		MW-2	5/24/2021	0.00095		
		MW-2	8/18/2021	0.000915		
		MW-2	11/18/2021	0.000929		
		MW-9	2/22/2021	0.00237		
		MW-9	5/19/2021	0.00234		
		MW-9	8/12/2021	0.00221		
		MW-9	11/17/2021	0.00234		
		MW-20	2/25/2021	0.00221		
		MW-20	5/24/2021	0.00219		
		MW-20	8/18/2021	0.00203		
		MW-20	11/18/2021	0.00222		
		MW-21	2/25/2021	0.00272		
		MW-21	5/24/2021	0.00161		
		MW-21	8/18/2021	0.00171		
		MW-21	11/18/2021	0.00166		
		MW-33	2/25/2021	0.0381	MCL1; SGWC1	0.01; 0.00005
		MW-33	5/24/2021	0.0389		
		MW-33	8/18/2021	0.038		
		MW-33	11/18/2021	0.0431		
		MW-35	2/25/2021	0.0435		
		MW-35	5/24/2021	0.0373		
		MW-35	8/19/2021	0.0284		
		MW-35	11/18/2021	0.0371		

Table B-2 *(continued)*

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
Iron, Dissolved	mg/L	MW-21	2/25/2021	0.398	MCL2; SGWC2	0.3; 0.3
		MW-21	5/24/2021	0.405		
		MW-21	8/18/2021	0.558		
		MW-21	11/18/2021	0.564		
		MW-33	2/25/2021	5.78		
		MW-33	5/24/2021	5.83		
		MW-33	8/18/2021	5.77		
		MW-33	11/18/2021	5.77		
		MW-35	2/25/2021	14.8		
		MW-35	5/24/2021	14.6		
		MW-35	8/19/2021	13.4		
		MW-35	11/18/2021	13.2		
Manganese, Dissolved	mg/L	MW-2	8/18/2021	0.0574	MCL2; SGWC2	0.05; 0.05
		MW-20	2/25/2021	0.133		
		MW-20	5/24/2021	0.127		
		MW-20	8/18/2021	0.135		
		MW-20	11/18/2021	0.14		
		MW-21	2/25/2021	0.374		
		MW-21	5/24/2021	0.505		
		MW-21	8/18/2021	0.494		
		MW-21	11/18/2021	0.397		
		MW-33	2/25/2021	0.888		
		MW-33	5/24/2021	0.878		
		MW-33	8/18/2021	0.887		
		MW-33	11/18/2021	0.927		
		MW-35	2/25/2021	2.55		
		MW-35	5/24/2021	2.46		
		MW-35	8/19/2021	2.46		
		MW-35	11/18/2021	2.32		
1,1-Dichloroethane	µg/L	MW-33	2/25/2021	2.02	SGWC1	1
		MW-33	5/24/2021	2.06		
		MW-33	8/18/2021	1.3		
		MW-33	11/18/2021	1.75		

Table B-2 *(continued)*

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
1,2-Dichloropropane	µg/L	MW-33	2/25/2021	8.31	MCL1; SGWC1	5; 0.6
		MW-33	5/24/2021	7.94		
		MW-33	8/18/2021	5.69		
		MW-33	11/18/2021	7.73		
Bis(2-Chloroethyl)Ether	ug/L	MW-21	8/18/2021	0.266 JT	SGWC1	0.07
		MW-33	2/25/2021	5.39		
		MW-33	5/24/2021	1.44		
		MW-33	8/18/2021	4.78		
		MW-33	11/18/2021	2.91		
		MW-35	2/25/2021	1.28		
		MW-35	5/24/2021	0.363 JT		
		MW-35	8/19/2021	1.2		
		MW-35	11/18/2021	1.14		
Bis(2-Ethylhexyl)Phthalate	ug/L	MW-33	2/25/2021	18.4 BJ	MCL1; SGWC1	6
		MW-33	11/18/2021	25.4 J		
		MW-35	2/25/2021	20.2 B		
		MW-35	11/18/2021	14		
Vinyl Chloride	µg/L	MW-2	8/18/2021	0.0265	SGWC1	0.02
		MW-21	2/25/2021	0.074		
		MW-21	5/24/2021	0.0511		
		MW-21	8/18/2021	0.042		
		MW-21	11/18/2021	0.32		
		MW-33	2/25/2021	19.6	MCL1; SGWC1	2; 0.02
		MW-33	5/24/2021	17.8		
		MW-33	8/18/2021	11.5		
		MW-33	11/18/2021	14.6		
		MW-35	2/25/2021	5.86		
		MW-35	5/24/2021	5.14		
		MW-35	8/19/2021	3.97		
		MW-35	11/18/2021	1.62	SGWC1	0.02

[1] Natural Background for arsenic in the Puget Sound Basin is 0.008 mg/L (Ecology, 2016)

MCL1 = National Primary Drinking Water Regulation Maximum Contaminant Level

MCL2 = National Secondary Drinking Water Regulation Maximum Contaminant Level

SGWC1 = Washington State Primary Groundwater Quality Criterion

SGWC2 = Washington State Secondary Groundwater Quality Criterion

See Analytical Data Qualifier Page for Data Qualifier Information (Page B-1, Appendix B)

Table B-3

Channel Cc3: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-8	2/22/2021	6.37	MCL2; SGWC2	< 6.5
		MW-8	5/18/2021	6.36		
		MW-8	8/10/2021	6.29		
		MW-8	11/16/2021	6.33		
Arsenic, Total[1]	mg/L	MW-8	2/22/2021	0.000503	SGWC1	0.00005
		MW-8	5/18/2021	0.000497		
		MW-8	8/10/2021	0.000504		
		MW-8	11/16/2021	0.000522		
		MW-36	2/22/2021	0.00173		
		MW-36	5/18/2021	0.00182		
		MW-36	8/11/2021	0.00169		
		MW-36	11/16/2021	0.00194		

[1] Natural Background for arsenic in the Puget Sound Basin is 0.008 mg/L (Ecology, 2016)

MCL2 = National Secondary Drinking Water Regulation Maximum Contaminant Level

SGWC1 = Washington State Primary Groundwater Quality Criterion

SGWC2 = Washington State Secondary Groundwater Quality Criterion

See Analytical Data Qualifier Page for Data Qualifier Information (Page B-1, Appendix B)

Table B-4

Unit D Aquifer: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-34	5/19/2021	6.47	MCL2; SGWC2	< 6.5
Arsenic, Total[1]	mg/L	MW-7	2/23/2021	0.00523	SGWC1	0.00005
		MW-7	5/19/2021	0.00497		
		MW-7	8/12/2021	0.00531		
		MW-7	11/16/2021	0.00534		
		MW-12	2/22/2021	0.00205		
		MW-12	5/17/2021	0.00208 D		
		MW-12	8/10/2021	0.00206		
		MW-12	11/15/2021	0.00206		
		MW-19	2/22/2021	0.00133		
		MW-19	5/25/2021	0.00154		
		MW-19	8/12/2021	0.00107		
		MW-19	11/16/2021	0.00102		
		MW-26	2/23/2021	0.00343		
		MW-26	5/19/2021	0.00362		
		MW-26	8/11/2021	0.00334		
		MW-26	11/17/2021	0.00352		
		MW-29	2/23/2021	0.0181	MCL1; SGWC1	0.01; 0.00005
		MW-29	5/19/2021	0.0119		
		MW-29	8/11/2021	0.0065	SGWC1	0.00005
		MW-29	11/17/2021	0.00747		
		MW-34	2/23/2021	0.00128		
		MW-34	5/19/2021	0.00128		
		MW-34	8/12/2021	0.00129		
		MW-34	11/17/2021	0.00138		

Table B-4 *(continued)*

Unit D Aquifer: Summary of groundwater quality criteria exceedances

January 1, 2021 - December 31, 2021

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
Iron, Dissolved	mg/L	MW-29	2/23/2021	0.729	MCL2; SGWC2	0.3; 0.3
		MW-29	5/19/2021	0.703		
		MW-29	8/11/2021	0.774		
		MW-29	11/17/2021	0.742		
Manganese, Dissolved	mg/L	MW-7	2/23/2021	0.149	MCL2; SGWC2	0.05; 0.05
		MW-7	5/19/2021	0.134		
		MW-7	8/12/2021	0.136		
		MW-7	11/16/2021	0.144		
		MW-19	2/22/2021	0.487		
		MW-19	5/25/2021	0.317		
		MW-19	8/12/2021	0.533		
		MW-19	11/16/2021	0.499		
		MW-26	2/23/2021	0.0591		
		MW-26	5/19/2021	0.0577		
		MW-26	8/11/2021	0.0643		
		MW-26	11/17/2021	0.0627		
		MW-29	2/23/2021	0.0867		
		MW-29	5/19/2021	0.101		
		MW-29	8/11/2021	0.0965		
		MW-29	11/17/2021	0.0919		

[1] Natural Background for arsenic in the Puget Sound Basin is 0.008 mg/L (Ecology, 2016)

MCL1 = National Primary Drinking Water Regulation Maximum Contaminant Level

MCL2 = National Secondary Drinking Water Regulation Maximum Contaminant Level

SGWC1 = Washington State Primary Groundwater Quality Criterion

SGWC2 = Washington State Secondary Groundwater Quality Criterion

See Analytical Data Qualifier Page for Data Qualifier Information (Page B-1, Appendix B)

Table B-5

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
pH (Field)	std. pH Units	MW-2	8/18/2021	6.57	< 6.60
		MW-21	5/24/2021	6.55	
		MW-33	5/24/2021	6.58	
		MW-33	8/18/2021	6.58	
		MW-35	2/25/2021	6.54	
		MW-35	5/24/2021	6.38	
		MW-35	8/19/2021	6.56	
		MW-35	11/18/2021	6.39	
Specific Conductance (Field)	umhos/cm	MW-2	2/25/2021	284.8	242.1
		MW-2	5/24/2021	286.3	
		MW-2	8/18/2021	272.1	
		MW-2	11/18/2021	273.10	
		MW-21	2/25/2021	274.00	
		MW-21	5/24/2021	299.00	
		MW-21	8/18/2021	281.70	
		MW-21	11/18/2021	267.60	
		MW-33	2/25/2021	576.00	
		MW-33	5/24/2021	589.40	
		MW-33	8/18/2021	588.00	
		MW-33	11/18/2021	548.30	
		MW-35	2/25/2021	585.00	
		MW-35	5/24/2021	620.00	
		MW-35	8/19/2021	597.00	
		MW-35	11/18/2021	542.10	
Alkalinity	mg/L	MW-2	2/25/2021	143	94.9
		MW-2	5/24/2021	142	
		MW-2	8/18/2021	140	
		MW-2	11/18/2021	134	
		MW-21	2/25/2021	144	
		MW-21	5/24/2021	146	
		MW-21	8/18/2021	142	
		MW-21	11/18/2021	141	
		MW-33	2/25/2021	332.0	
		MW-33	5/24/2021	349.0	
		MW-33	8/18/2021	342.0	
		MW-33	11/18/2021	319.0	
		MW-35	2/25/2021	325	
		MW-35	5/24/2021	345	
		MW-35	8/19/2021	332	
		MW-35	11/18/2021	321	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Ammonia	mg/L	MW-35	2/25/2021	0.0715	0.0337
		MW-35	5/24/2021	0.0681	
		MW-35	8/19/2021	0.0654	
		MW-35	11/18/2021	0.0638	
Chloride	mg/L	MW-9	2/22/2021	4.58	4.09
		MW-9	5/19/2021	4.33	
		MW-9	8/12/2021	5.84	
		MW-9	11/17/2021	4.8	
		MW-35	2/25/2021	4.26	
		MW-35	8/19/2021	4.11	
Nitrate	mg/L	MW-2	2/25/2021	0.76	0.05
		MW-2	5/24/2021	0.80	
		MW-2	8/18/2021	0.73	
		MW-2	11/18/2021	1.08	
		MW-9	2/22/2021	0.38	
		MW-9	5/19/2021	0.40	
		MW-9	8/12/2021	0.75	
		MW-9	11/17/2021	0.51	
		MW-21	2/25/2021	0.28	
		MW-21	5/24/2021	0.23	
		MW-21	8/18/2021	0.27	
		MW-21	11/18/2021	0.34	
		MW-35	2/25/2021	0.1	
Sulfate	mg/L	MW-35	2/25/2021	27.2	18.54
		MW-35	5/24/2021	24.7	
		MW-35	8/19/2021	27	
		MW-35	11/18/2021	29.9	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Total Dissolved Solids	mg/L	MW-2	2/25/2021	195.00	159.27
		MW-2	5/24/2021	182.00	
		MW-2	8/18/2021	187.00	
		MW-2	11/18/2021	162.00	
		MW-21	2/25/2021	193.00	
		MW-21	5/24/2021	195.00	
		MW-21	8/18/2021	189.00	
		MW-21	11/18/2021	173.00	
		MW-33	2/25/2021	375.00	
		MW-33	5/24/2021	391.00	
		MW-33	8/18/2021	383.00	
		MW-33	11/18/2021	363.00	
		MW-35	2/25/2021	434.00	
		MW-35	5/24/2021	433.00	
		MW-35	8/19/2021	421.00	
		MW-35	11/18/2021	406.00	
Total Organic Carbon	mg/L	MW-35	2/25/2021	3.15	2.33
		MW-35	5/24/2021	3.78	
		MW-35	8/19/2021	3.36	
		MW-35	11/18/2021	3.74	
Total Solids	mg/L	MW-33	2/25/2021	397	286.00
		MW-33	5/24/2021	409	
		MW-33	8/18/2021	405	
		MW-33	11/18/2021	350	
		MW-35	2/25/2021	495	
		MW-35	5/24/2021	572	
		MW-35	8/19/2021	481	
		MW-35	11/18/2021	609	
Total Suspended Solids	mg/L	MW-35	2/25/2021	159	9.70
		MW-35	5/24/2021	237	
		MW-35	8/19/2021	195	
		MW-35	11/18/2021	385	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Arsenic, Total	mg/L	MW-33	2/25/2021	0.0381	0.0046
		MW-33	5/24/2021	0.0389	
		MW-33	8/18/2021	0.0380	
		MW-33	11/18/2021	0.0431	
		MW-35	2/25/2021	0.0435	
		MW-35	5/24/2021	0.0373	
		MW-35	8/19/2021	0.0284	
		MW-35	11/18/2021	0.0371	
Barium, Total	mg/L	MW-35	11/18/2021	0.0495	0.0384
Calcium, Total	mg/L	MW-2	2/25/2021	21.8	15.3
		MW-2	5/24/2021	19.8	
		MW-2	8/18/2021	20.4	
		MW-2	11/18/2021	20.7	
		MW-21	2/25/2021	21.2	
		MW-21	5/24/2021	22.2	
		MW-21	8/18/2021	21.1	
		MW-21	11/18/2021	20.5	
		MW-33	2/25/2021	55.9	
		MW-33	5/24/2021	59.2	
		MW-33	8/18/2021	58.2	
		MW-33	11/18/2021	55.3	
		MW-35	2/25/2021	65.4	
		MW-35	5/24/2021	64.2	
		MW-35	8/19/2021	60.5	
		MW-35	11/18/2021	59.4	
Cobalt, Total	mg/L	MW-35	5/24/2021	0.0031	0.0030
		MW-35	11/18/2021	0.0039	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Iron, Dissolved	mg/L	MW-21	2/25/2021	0.40	0.39
		MW-21	5/24/2021	0.41	
		MW-21	8/18/2021	0.56	
		MW-21	11/18/2021	0.56	
		MW-33	2/25/2021	5.78	
		MW-33	5/24/2021	5.83	
		MW-33	8/18/2021	5.77	
		MW-33	11/18/2021	5.77	
		MW-35	2/25/2021	14.80	
		MW-35	5/24/2021	14.60	
		MW-35	8/19/2021	13.4	
		MW-35	11/18/2021	13.2	
Magnesium, Total	mg/L	MW-2	2/25/2021	23.20	16.92
		MW-2	5/24/2021	22.80	
		MW-2	8/18/2021	22.60	
		MW-2	11/18/2021	21.50	
		MW-21	2/25/2021	22.20	
		MW-21	5/24/2021	21.60	
		MW-21	8/18/2021	21.80	
		MW-21	11/18/2021	21.50	
		MW-33	2/25/2021	44.70	
		MW-33	5/24/2021	46.10	
		MW-33	8/18/2021	45.50	
		MW-33	11/18/2021	42.30	
		MW-35	2/25/2021	47.50	
		MW-35	5/24/2021	46.10	
		MW-35	8/19/2021	44.60	
		MW-35	11/18/2021	42.90	
Manganese, Dissolved	mg/L	MW-33	2/25/2021	0.89	0.548
		MW-33	5/24/2021	0.88	
		MW-33	8/18/2021	0.89	
		MW-33	11/18/2021	0.93	
		MW-35	2/25/2021	2.55	
		MW-35	5/24/2021	2.46	
		MW-35	8/19/2021	2.46	
		MW-35	11/18/2021	2.32	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Potassium, Total	mg/L	MW-33	2/25/2021	3.01	2.52
		MW-33	5/24/2021	3.38	
		MW-33	8/18/2021	3.12	
		MW-33	11/18/2021	3.00	
		MW-35	2/25/2021	3.16	
		MW-35	5/24/2021	3.43	
		MW-35	8/19/2021	3.14	
		MW-35	11/18/2021	3.27	
Sodium, Total	mg/L	MW-2	2/25/2021	9.23	7.48
		MW-2	5/24/2021	9.11	
		MW-2	8/18/2021	9.08	
		MW-2	11/18/2021	8.58	
		MW-21	2/25/2021	10.60	
		MW-21	5/24/2021	10.80	
		MW-21	8/18/2021	10.70	
		MW-21	11/18/2021	9.66	
		MW-33	2/25/2021	17.30	
		MW-33	5/24/2021	17.20	
		MW-33	8/18/2021	17.30	
		MW-33	11/18/2021	16.30	
		MW-35	2/25/2021	17.50	
		MW-35	5/24/2021	17.80	
		MW-35	8/19/2021	17.10	
		MW-35	11/18/2021	16.30	
Vinyl Chloride	ug/L	MW-2	8/18/2021	0.027	0.02
		MW-21	2/25/2021	0.074	
		MW-21	5/24/2021	0.051	
		MW-21	8/18/2021	0.042	
		MW-21	11/18/2021	0.320	
		MW-33	2/25/2021	19.60	
		MW-33	5/24/2021	17.80	
		MW-33	8/18/2021	11.50	
		MW-33	11/18/2021	14.60	
		MW-35	2/25/2021	5.86	
		MW-35	5/24/2021	5.14	
		MW-35	8/19/2021	3.97	
		MW-35	11/18/2021	1.62	

Table B-6

Unit D Aquifer: Summary of groundwater prediction limit exceedances

Intrawell

January 1, 2021 - December 31, 2021

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
pH (Field)	std. pH Units	MW-34	5/19/2021	6.47	6.47
Chloride	mg/L	MW-29	5/19/2021	17.4	4.30
Sulfate	mg/L	MW-29	5/19/2021	33.2	18.41
Total Dissolved Solids	mg/L	MW-19	5/25/2021	12.6	8.0
		MW-29	2/23/2021	30.2	24.8

Table B-7

Channel Cc1: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
Acetone	ug/L	MW-4	5/18/2021	3.19 JT
		MW-4	8/10/2021	3.28 JT
cis-1,2-Dichloroethene	ug/L	MW-4	2/25/2021	2.3
		MW-4	5/18/2021	1.44
		MW-4	8/10/2021	1.5
Trichlorofluoromethane	ug/L	MW-3	2/23/2021	0.159 JT
		MW-4	2/25/2021	0.157 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-8

Channel Cc2: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
1,1-Dichloroethane	ug/L	MW-33	2/25/2021	2.02
		MW-33	5/24/2021	2.06
		MW-33	8/18/2021	1.3
		MW-33	11/18/2021	1.75
		MW-35	2/25/2021	0.292
		MW-35	5/24/2021	0.302
		MW-35	8/19/2021	0.234
		MW-35	11/18/2021	0.202
1,1-Dichloroethene	ug/L	MW-33	2/25/2021	0.189 JT
		MW-33	5/24/2021	0.18 JT
		MW-33	8/18/2021	0.13 JT
		MW-33	11/18/2021	0.202
1,2-Dichloroethane	ug/L	MW-33	5/24/2021	0.14 JT
		MW-33	8/18/2021	0.116 JT
1,2-Dichloropropane	ug/L	MW-33	2/25/2021	8.31
		MW-33	5/24/2021	7.94
		MW-33	8/18/2021	5.69
		MW-33	11/18/2021	7.73
		MW-35	2/25/2021	0.517
		MW-35	5/24/2021	0.546
		MW-35	8/19/2021	0.494
		MW-35	11/18/2021	0.374
Acetone	ug/L	MW-35	2/25/2021	2.54 JT
		MW-35	11/18/2021	3.8 JT
Benzene	ug/L	MW-33	2/25/2021	0.964
		MW-33	5/24/2021	0.949
		MW-33	8/18/2021	0.707
		MW-33	11/18/2021	0.958
		MW-35	2/25/2021	0.58
		MW-35	5/24/2021	0.594
		MW-35	8/19/2021	0.582
		MW-35	11/18/2021	0.509
Chloroethane	ug/L	MW-33	5/24/2021	0.435
		MW-35	5/24/2021	0.101 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-8 *(continued)*

Channel Cc2: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
cis-1,2-Dichloroethene	ug/L	MW-2	5/24/2021	0.119 JT
		MW-2	8/18/2021	0.127 JT
		MW-21	2/25/2021	0.586
		MW-21	5/24/2021	0.595
		MW-21	8/18/2021	0.542
		MW-21	11/18/2021	0.496
		MW-33	2/25/2021	39.4
		MW-33	5/24/2021	32.8
		MW-33	8/18/2021	23.9
		MW-33	11/18/2021	33.1
		MW-35	2/25/2021	3.71
		MW-35	5/24/2021	3.49
		MW-35	8/19/2021	3.58
		MW-35	11/18/2021	3
Dichlorodifluoromethane	ug/L	MW-2	2/25/2021	3.81
		MW-2	5/24/2021	1.85
		MW-2	8/18/2021	2.63
		MW-2	11/18/2021	2.23
		MW-20	2/25/2021	0.249
		MW-20	5/24/2021	0.147 JT
		MW-20	8/18/2021	0.174 JT
		MW-20	11/18/2021	0.756 JT
		MW-21	2/25/2021	2.34
		MW-21	5/24/2021	1.45
		MW-21	8/18/2021	1.56
		MW-21	11/18/2021	1.41
		MW-33	2/25/2021	4.2
		MW-33	5/24/2021	3.31
		MW-33	8/18/2021	2.68
		MW-33	11/18/2021	3.11
		MW-35	2/25/2021	0.808
		MW-35	5/24/2021	0.678
		MW-35	8/19/2021	0.705
		MW-35	11/18/2021	0.509
O-xylene	ug/L	MW-35	5/24/2021	0.103 JT
Toluene	ug/L	MW-33	5/24/2021	0.103 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-8 *(continued)*

Channel Cc2: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
tran s-1,2-Dichloroethene	ug/L	MW-33	2/25/2021	0.897
		MW-33	5/24/2021	0.884
		MW-33	8/18/2021	0.715
		MW-33	11/18/2021	0.966
		MW-35	2/25/2021	0.259
		MW-35	5/24/2021	0.235
		MW-35	8/19/2021	0.237
		MW-35	11/18/2021	0.24
Trichloroethene	ug/L	MW-33	5/24/2021	0.164 JT
		MW-33	8/18/2021	0.135 JT
		MW-33	11/18/2021	0.183 JT
		MW-35	2/25/2021	1.26
		MW-35	5/24/2021	1.24
		MW-35	8/19/2021	1.15
		MW-35	11/18/2021	1.21
Trichlorofluoromethane	ug/L	MW-2	2/25/2021	2.18
		MW-2	5/24/2021	1.16
		MW-2	8/18/2021	1.99
		MW-2	11/18/2021	1.91
		MW-21	2/25/2021	1.32
		MW-21	5/24/2021	0.823
		MW-21	8/18/2021	1.05
		MW-21	11/18/2021	1.12
Vinyl Chloride	ug/L	MW-2	5/24/2021	0.0162 JT
		MW-2	8/18/2021	0.0265
		MW-21	2/25/2021	0.074
		MW-21	5/24/2021	0.0511
		MW-21	8/18/2021	0.042
		MW-21	11/18/2021	0.32
		MW-33	2/25/2021	19.6
		MW-33	5/24/2021	17.8
		MW-33	8/18/2021	11.5
		MW-33	11/18/2021	14.6
		MW-35	2/25/2021	5.86
		MW-35	5/24/2021	5.14
		MW-35	8/19/2021	3.97
		MW-35	11/18/2021	1.62

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-9

Channel Cc3: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
There were no volatile organic compounds detected this year in Channel Cc3 samples.				

Table B-10

Unit D Aquifer: Summary of groundwater volatile organic compound detections

January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Date	Sample Value
Acetone	ug/L	MW-7	2/23/2021	4.59 JT
		MW-12	5/17/2021	4.8 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-11

Summary of Trip, Field, and Method Blanks Volatile Organic Compound Detections

January 1, 2021 - December 31, 2021

Summary of trip blank volatile organic compound detections

Compound	Units	Sample ID	Date	Sample Value
Acetone	ug/L	VTRP210222Z	2/18/2021	2.75 JT
		VTRP210223Y	2/22/2021	2.67 JT
		VTRP210519Y	5/13/2021	2.54 JT
		VTRP210519X	5/18/2021	2.89 JT
		VTRP210524X	5/18/2021	3.62 JT
		VTRP210810Y	8/5/2021	3.73 JT
		VTRP210811Y	8/9/2021	2.56 JT
		VTRP210920Z	9/16/2021	3.34 JT
		VTRP210811X3	8/9/2021	2.8 JT
		VTRP210812Y	8/9/2021	3.03 JT
		VTRP210809Y	8/5/2021	2.61 JT
Methylene Chloride	ug/L	VTRP210222X	2/18/2021	3.9 JT
		VTRP210524Z	5/20/2021	4.04 JT
Toluene	ug/L	VTRP210920Z	9/16/2021	4.61

See Data Qualifiers Section in Appendix B for Qualifier Information.

Summary of field blank volatile organic compound detections

Compound	**Units**	**Sample ID**	**Date**	**Sample Value**
Acetone	ug/L	WV20210818F	8/18/2021	10.5
2-Butanone	ug/L	WV20210818F	8/18/2021	5.49
		WV2-211118F	11/18/2021	1.19 JT
Chloroform	ug/L	WV20210818F	8/18/2021	0.107 JT
Styrene	ug/L	WV10210222F	2/22/2021	0.126 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-11 *(continued)*

Summary of Trip, Field, and Method Blanks Volatile Organic Compound Detections

January 1, 2021 - December 31, 2021

Summary of method blank volatile organic compound detections

Compound	Units	Workgroup ID	Date	Sample Value
Bis(2-Ethylhexyl) phthalate	ug/L	WV33210225-	3/9/2021	18.4 BJ
		WV35210225-	3/9/2021	20.2 B
		WV21210225-	3/9/2021	1 BJT
		WG174634-1	3/9/2021	3.03 B
		WG174634-2	3/9/2021	3.88 B
		WG174634-3	3/9/2021	15.3 BJ
		WG174634-4	3/9/2021	3.54 BJ
		WV33210818-	8/31/2021	2.69 B
		WG177504-1	8/31/2021	5.45 B
		WG177504-2	8/31/2021	3.64 B
		WG177504-3	8/31/2021	3.05 B
		WG177504-4	8/31/2021	4.17 B
Total Solids	mg/L	WV3-210223-	3/4/2021	62 B
		WVPA210224-	3/4/2021	127 B
		WV85210224-	3/4/2021	101 B
		WG174606-1	3/8/2021	13 BT
		WG174606-2	3/4/2021	209 B
		WG174606-4	3/4/2021	62.7 B

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-12

Summary of surface water monitoring location exceedances vs. SW quality standard

West Hillslope Seeps & Site Surface Water Discharge

Vashon Island Closed Landfill
January 1, 2021 - December 31, 2021

Compound	Units	Site ID	Sample Date	Sample Value	Reg. Limit	Standard(s) Exceeded
Turbidity	mg/L	SW-W3	5/20/2021	120	25	SSWC; FA; FC
Iron, Total	mg/L	SW-W1	5/20/2021	1.60	1	FC
		SW-W1	11/17/2021	2.11		
		SW-W2	5/20/2021	5.25		
		SW-W2	8/11/2021	1.70		
		SW-W3	5/21/2021	6.03		
Silver, Total	mg/L	SW-W3	8/11/2021	0.000141	0.00012	FC

FC = Federal chronic surface water quality criteria

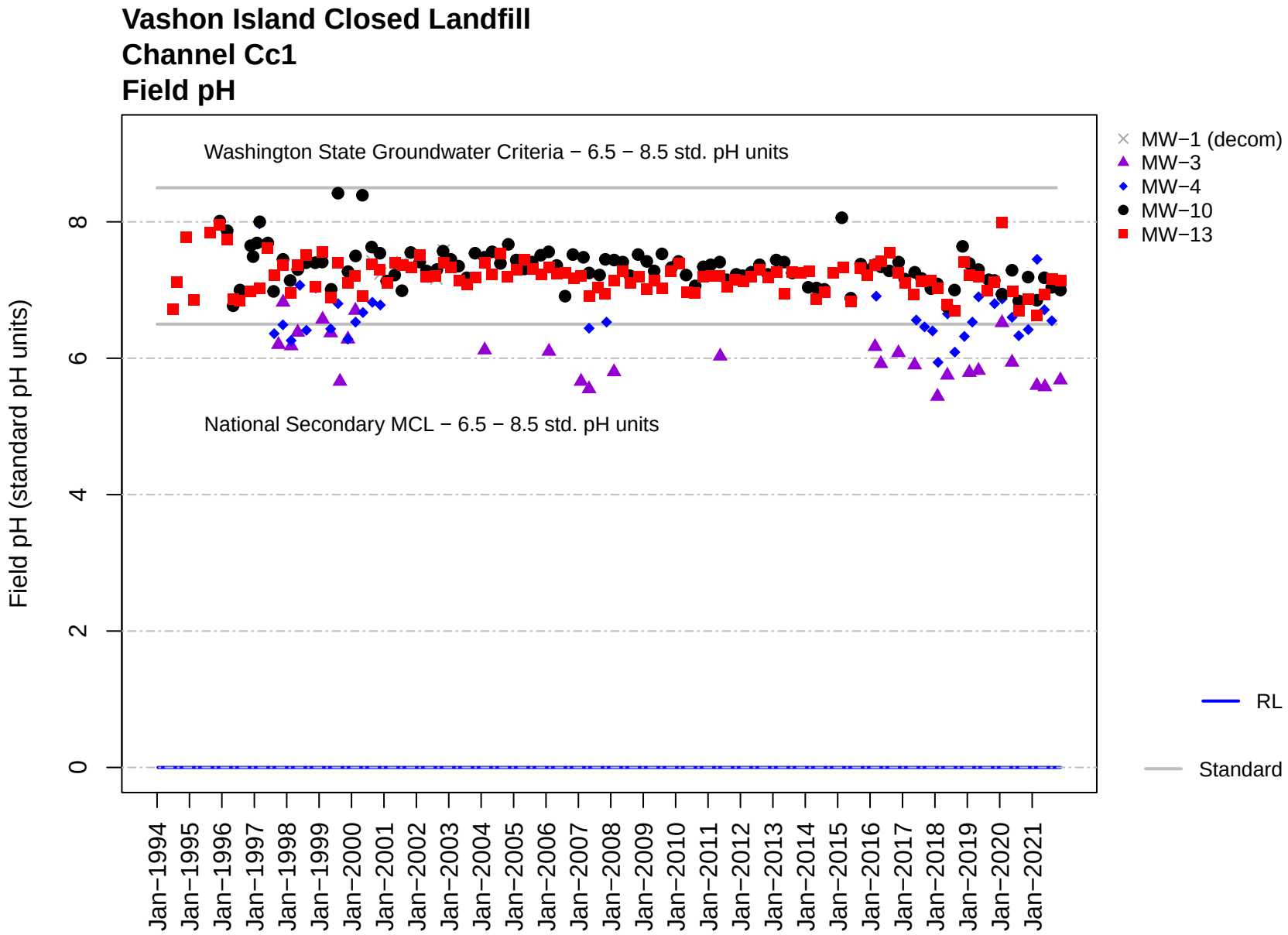
FA = Federal Acute Surface Water Criteria

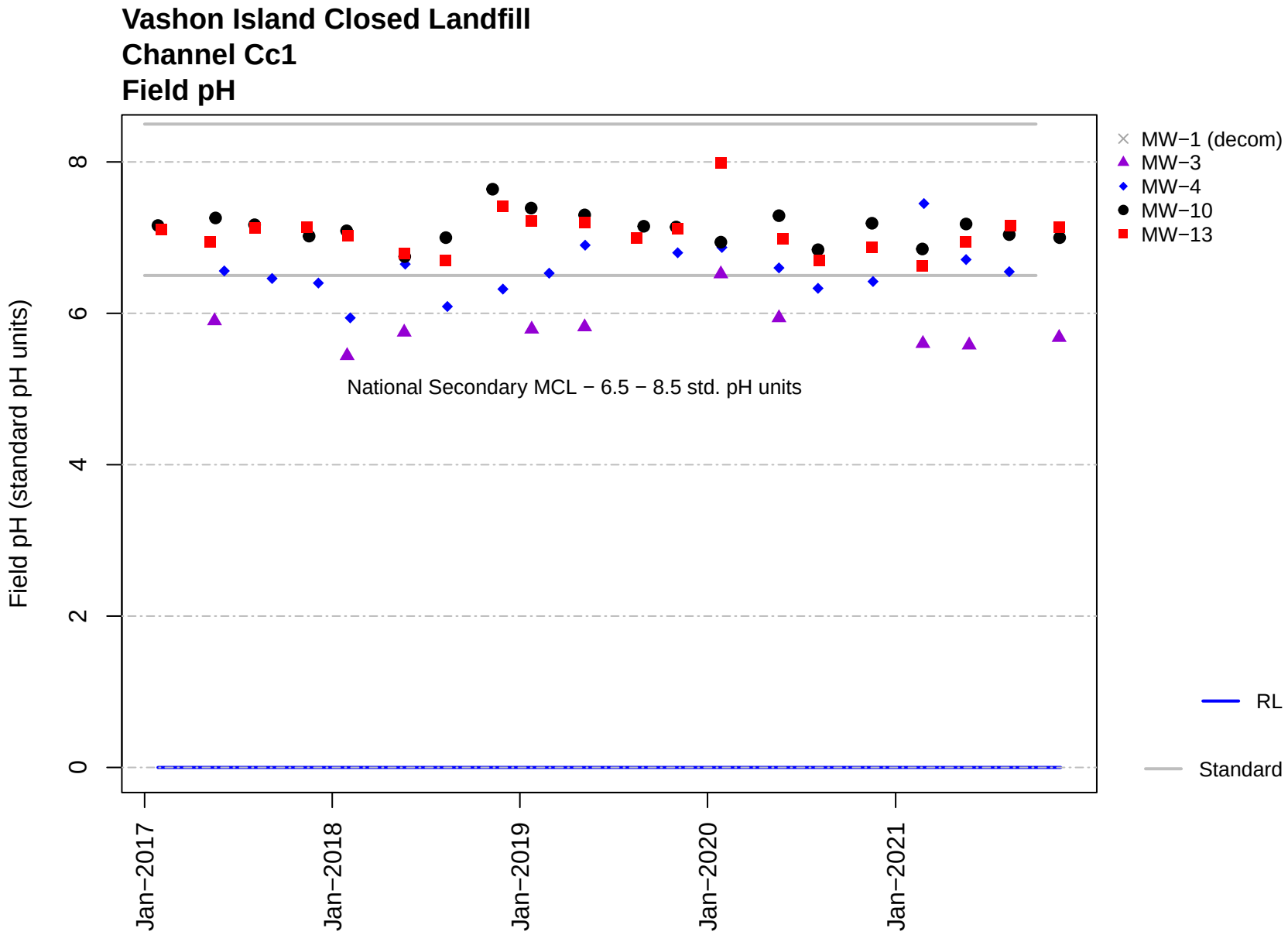
SSWC = Washington State chronic surface water quality criteria

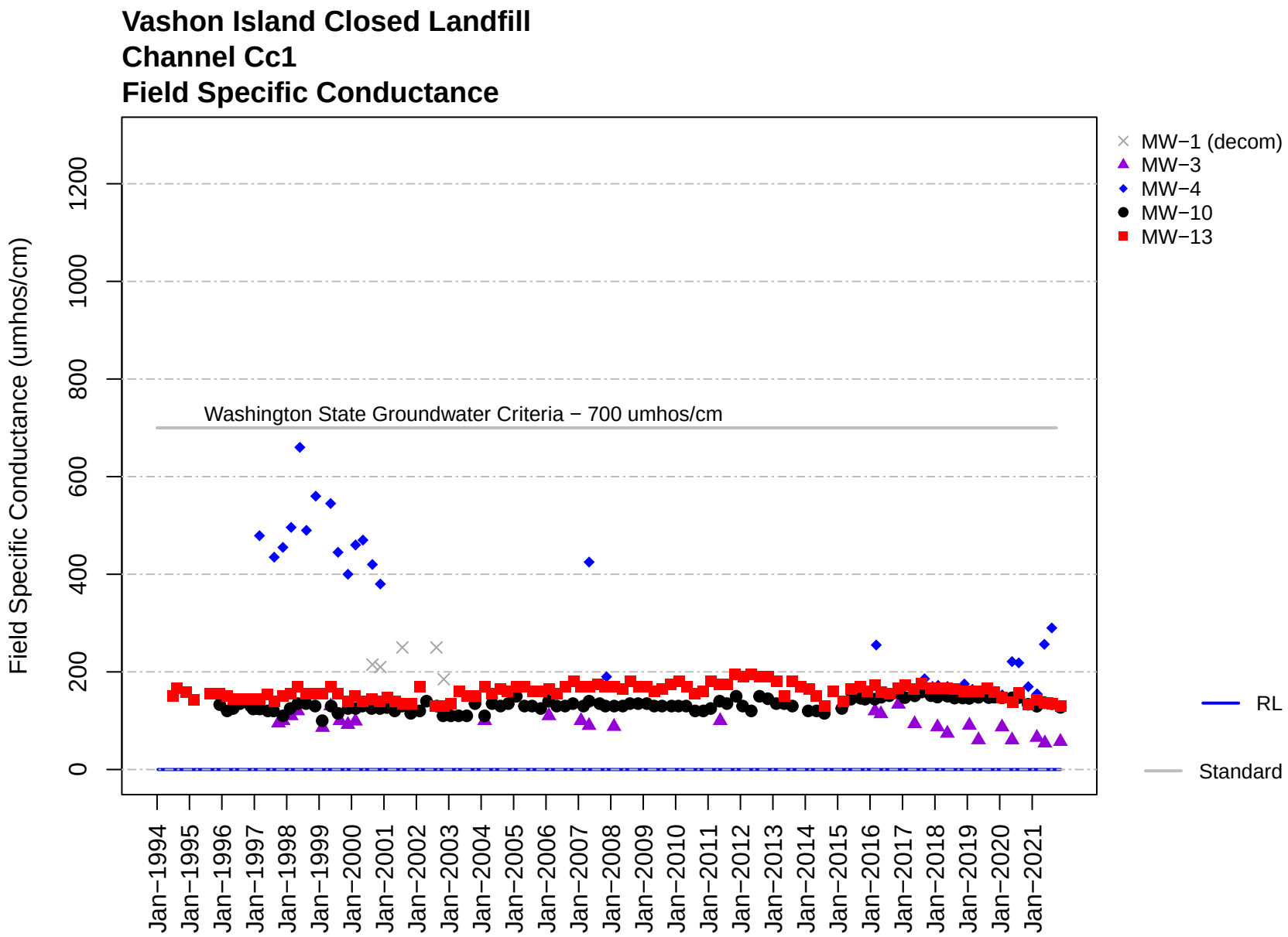
See Data Qualifiers Section in Appendix B for Qualifier Information.

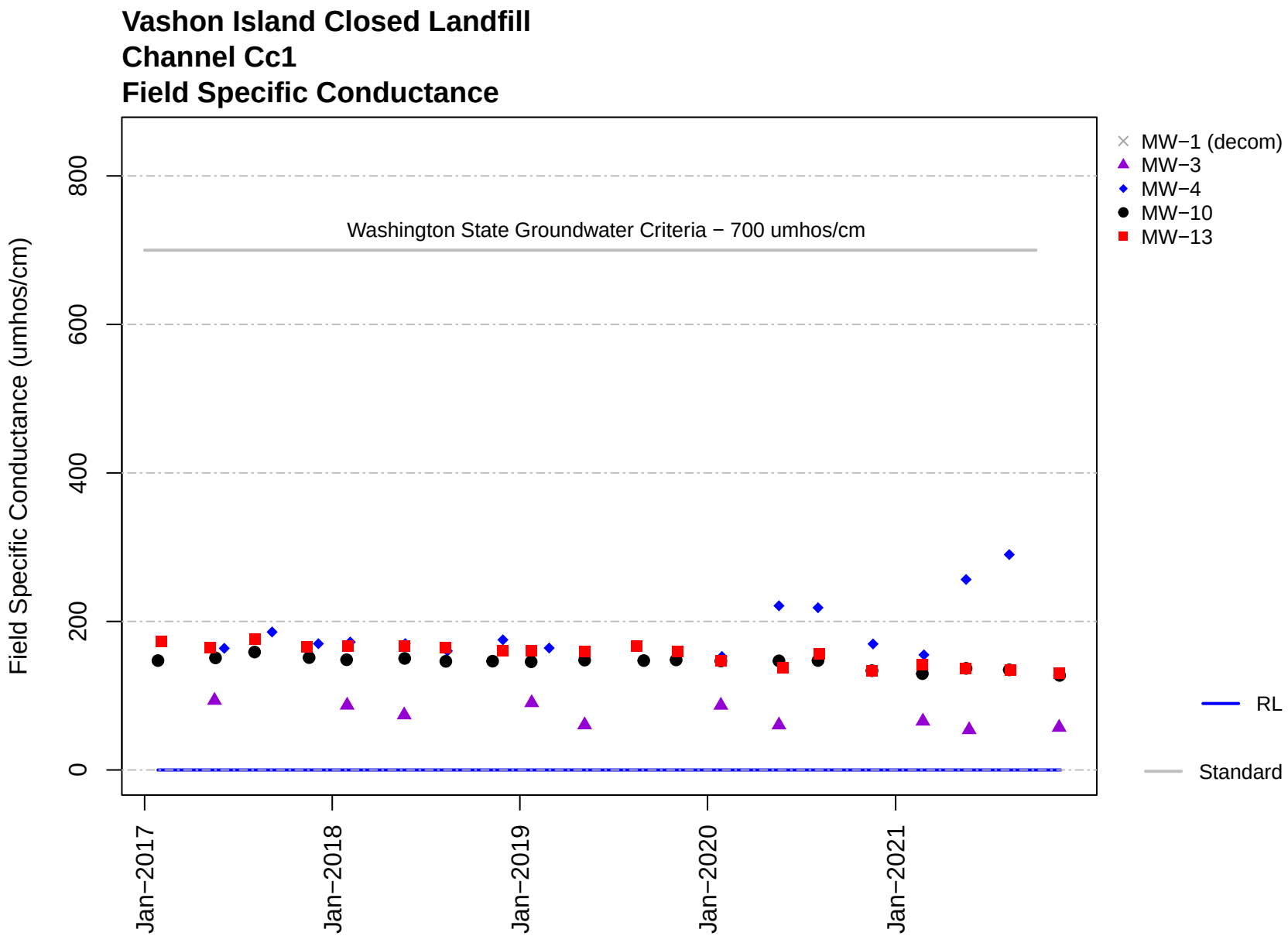
Appendix C

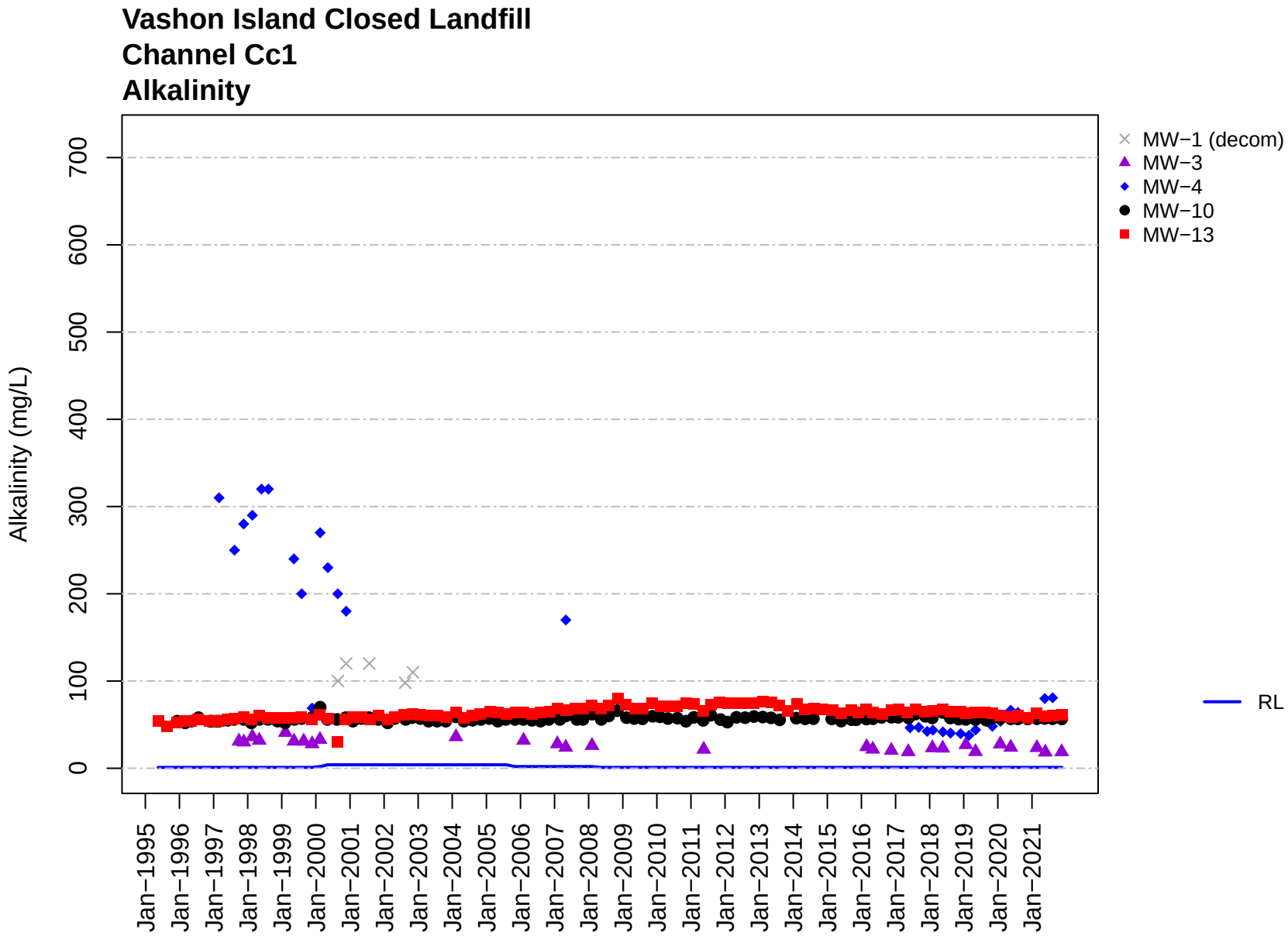
Time Concentration Plots for
Groundwater in Channel Cc1

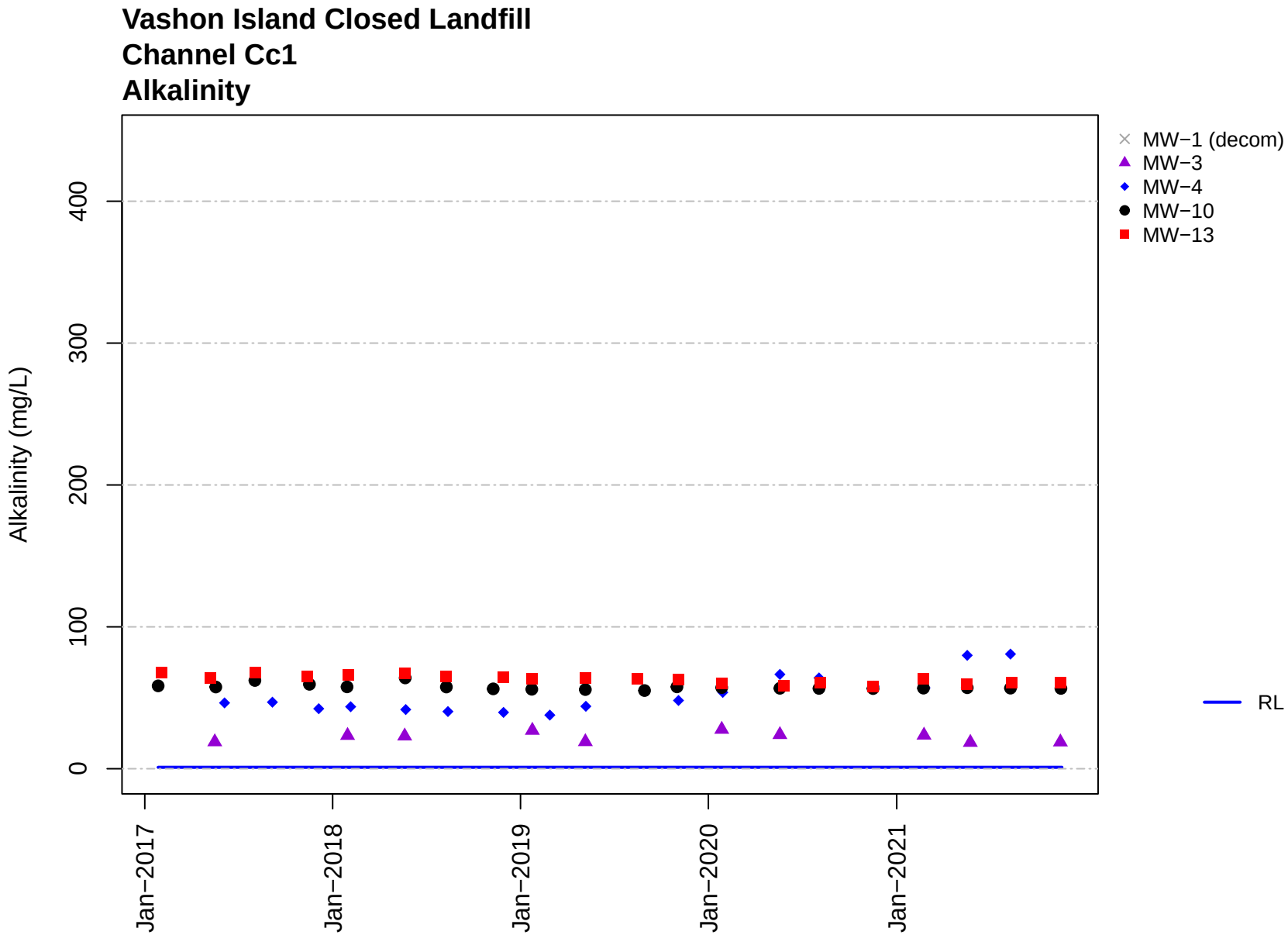

Vashon Island Closed Landfill
Channel Cc1
Field pH
Washington State Groundwater Criteria − 6.5 − 8.5 std. pH units
National Secondary MCL − 6.5 − 8.5 std. pH units
Field pH (standard pH units)
0
2
4
6
8
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

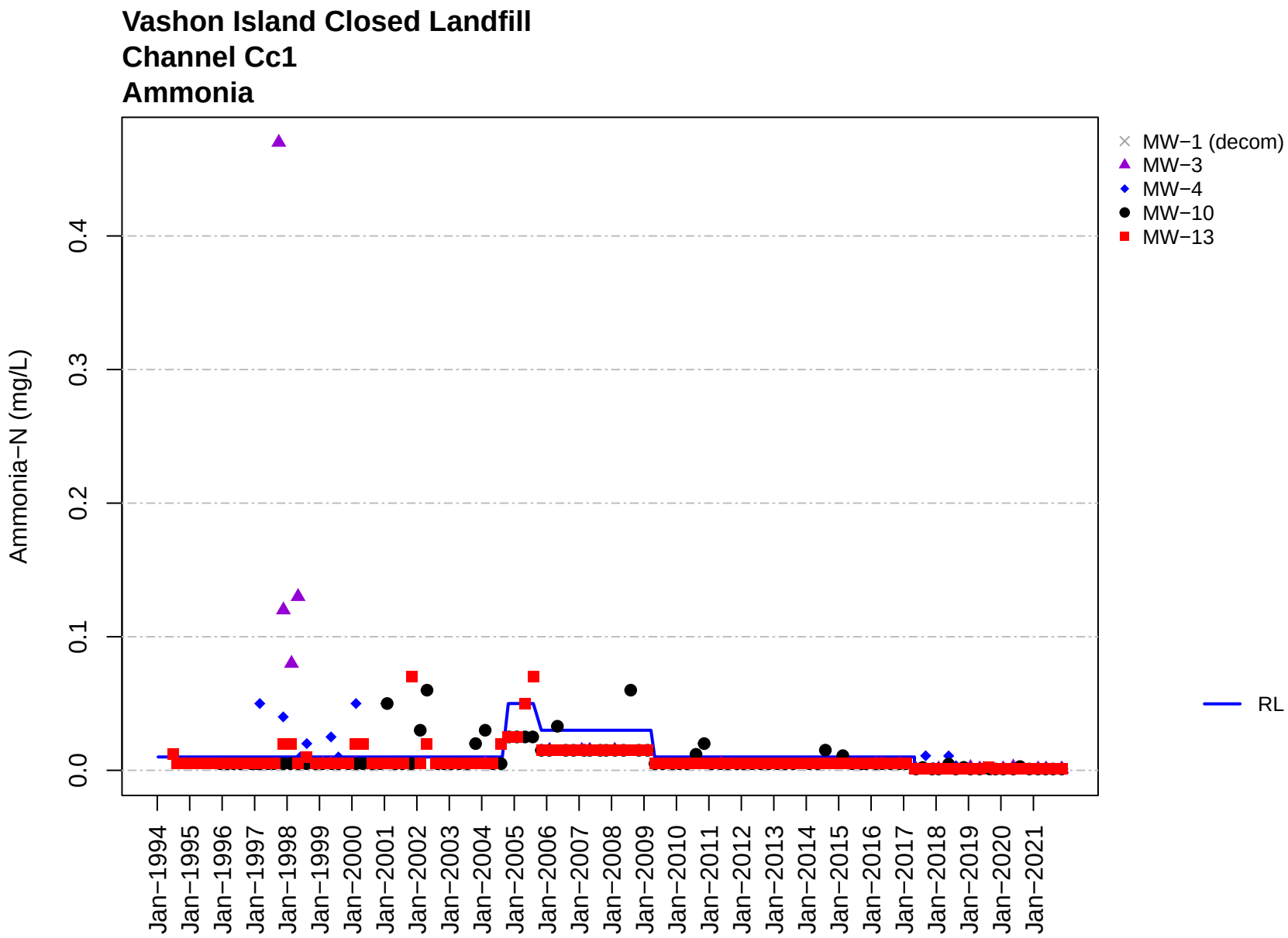

Vashon Island Closed Landfill
Channel Cc1
Field pH
Field pH (standard pH units)
0
2
4
6
8
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 6.5 − 8.5 std. pH units
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

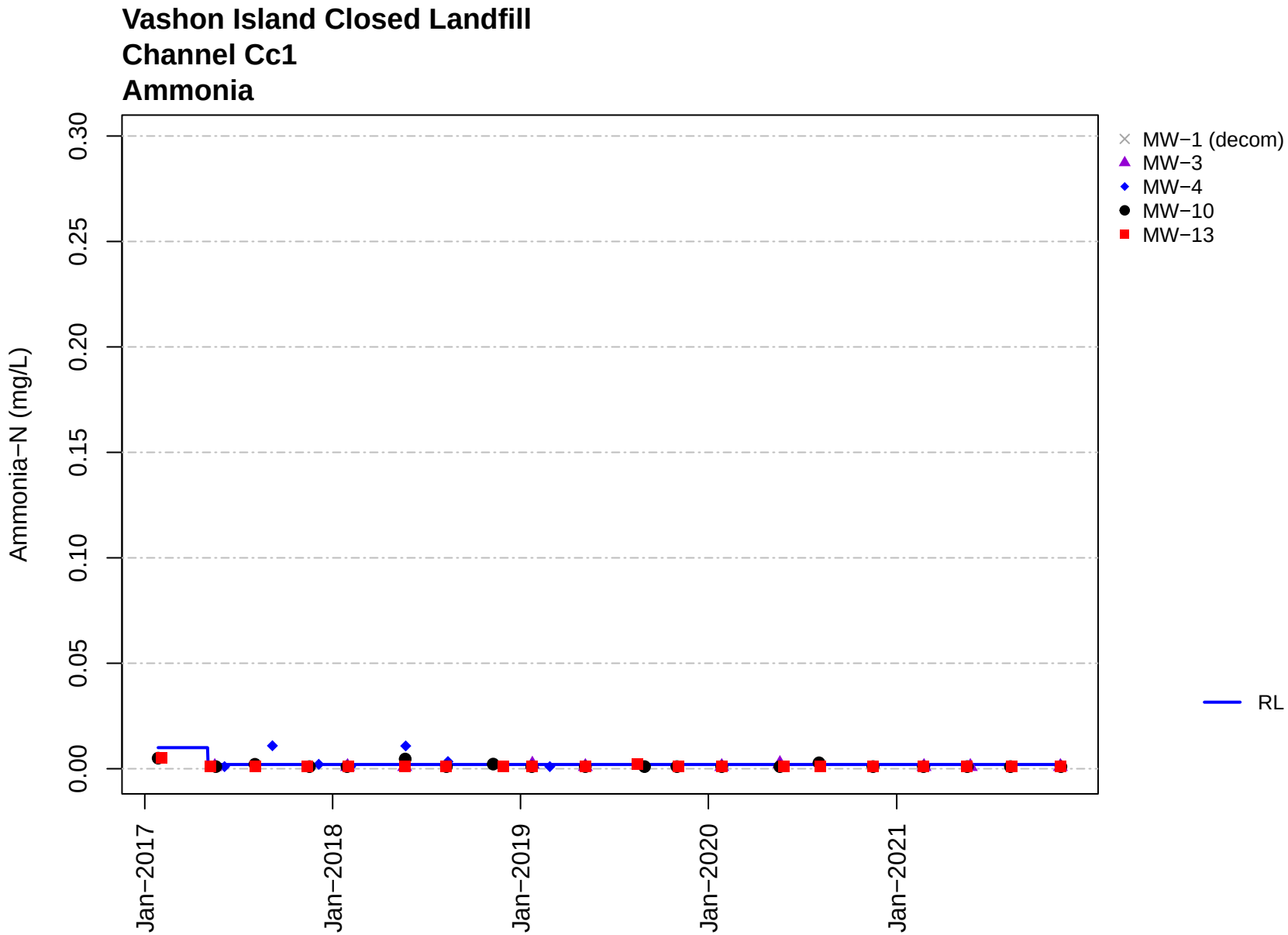

Vashon Island Closed Landfill
Channel Cc1
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
1000
1200
Washington State Groundwater Criteria − 700 umhos/cm
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

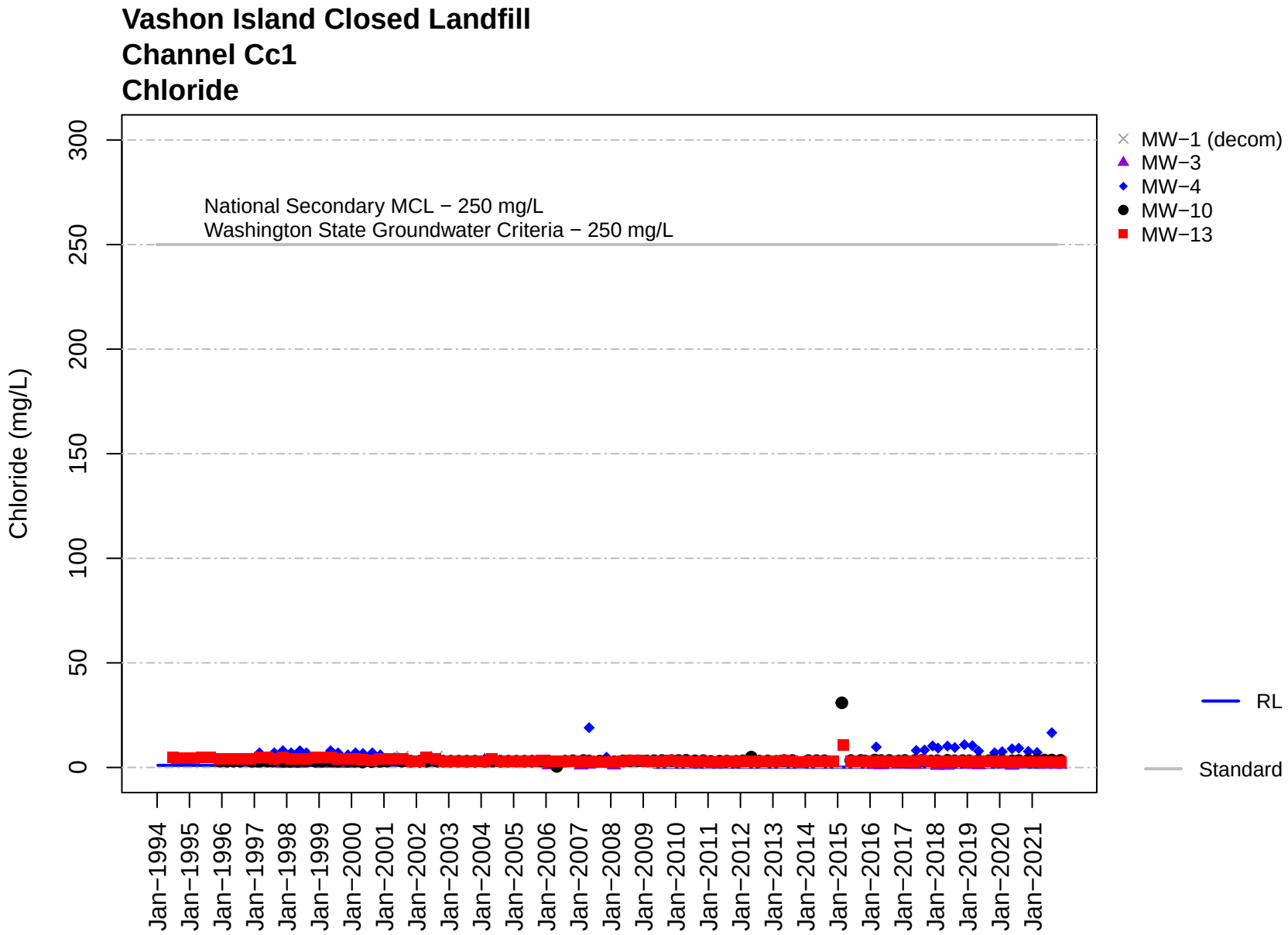

Vashon Island Closed Landfill
Channel Cc1
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
Washington State Groundwater Criteria − 700 umhos/cm
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

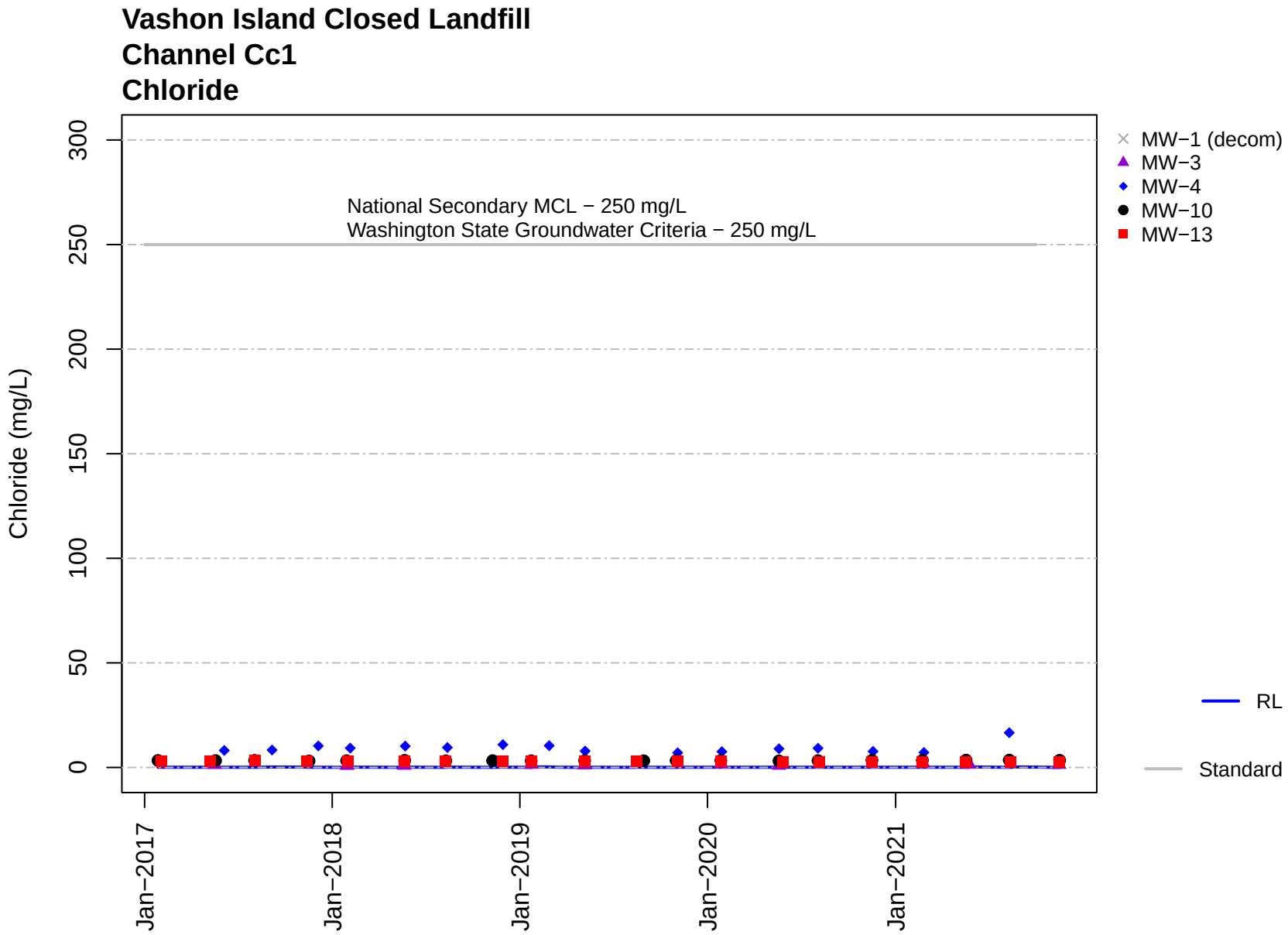

Vashon Island Closed Landfill
Channel Cc1
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
500
600
700
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

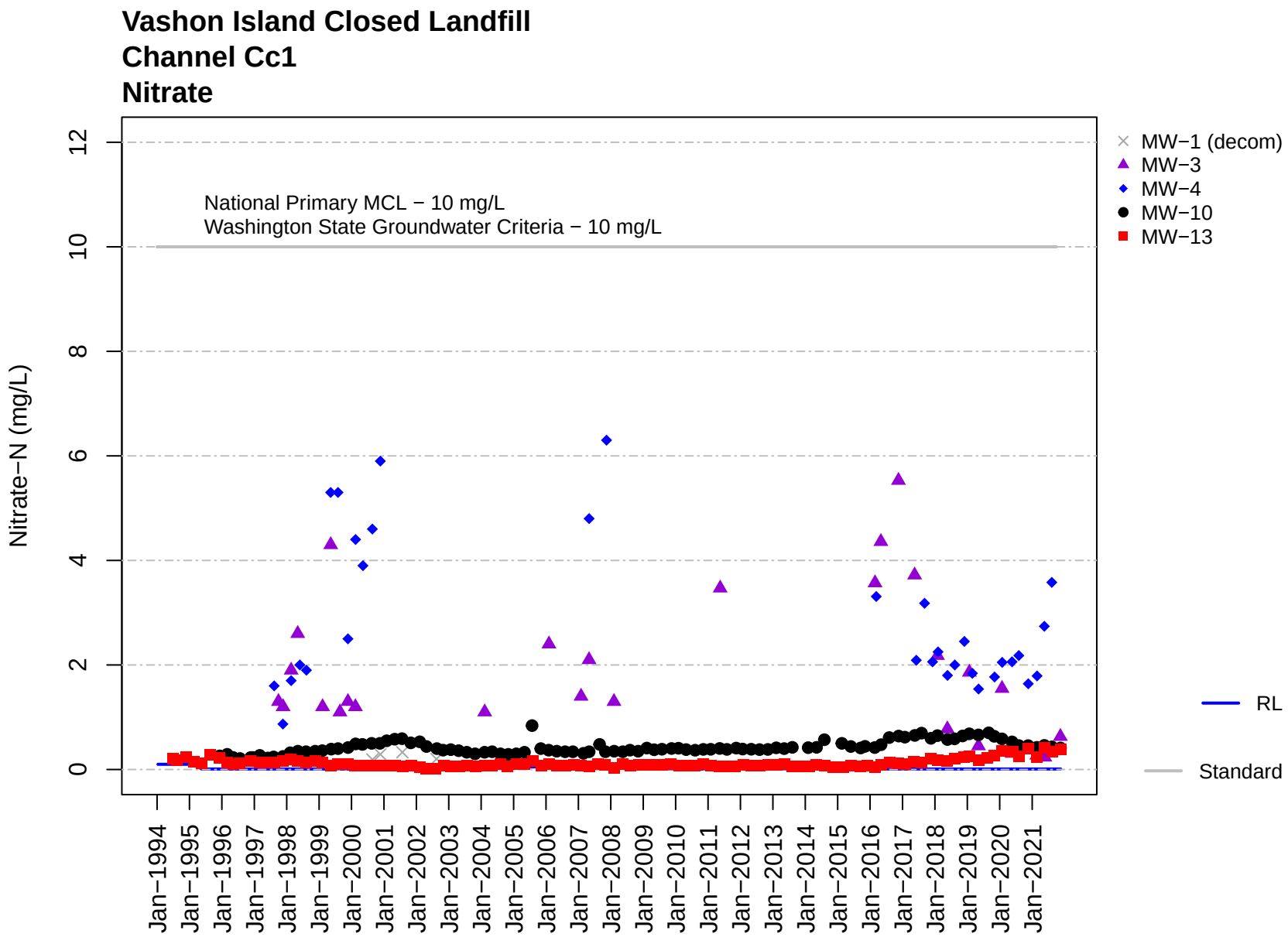

Vashon Island Closed Landfill
Channel Cc1
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

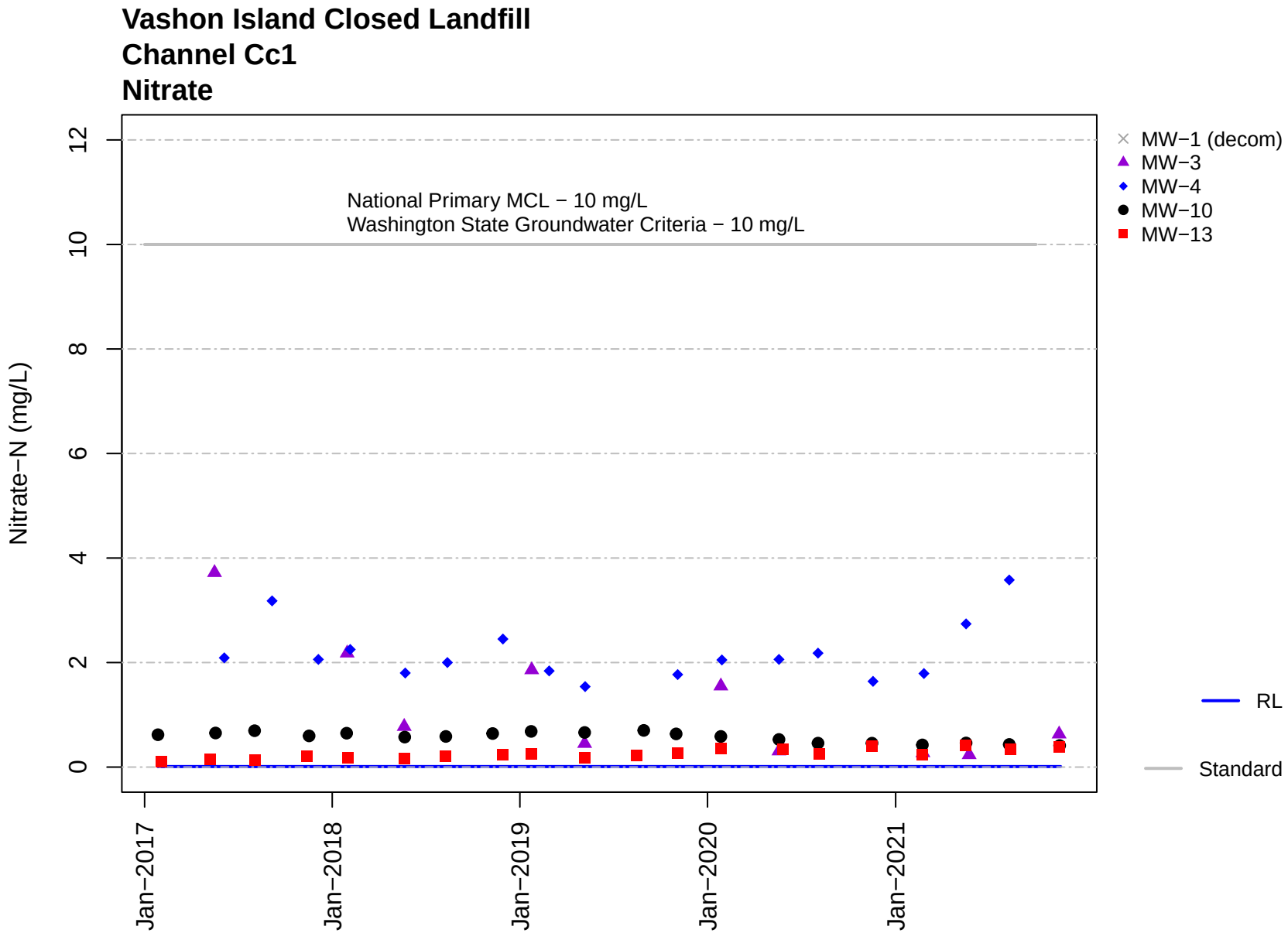

Vashon Island Closed Landfill
Channel Cc1
Ammonia
Ammonia−N (mg/L)
0.0
0.1
0.2
0.3
0.4
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

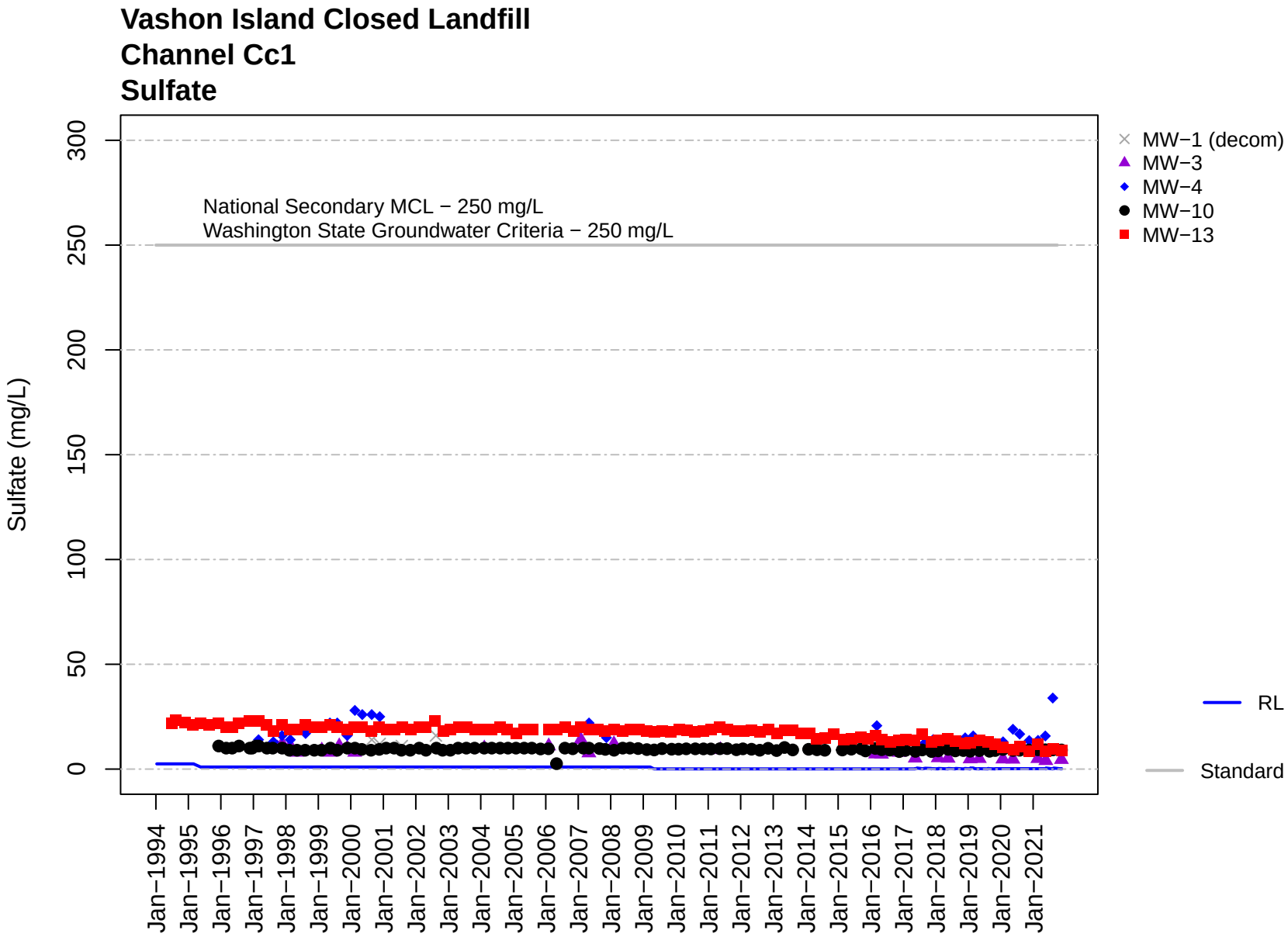

Vashon Island Closed Landfill
Channel Cc1
Ammonia
Ammonia−N (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

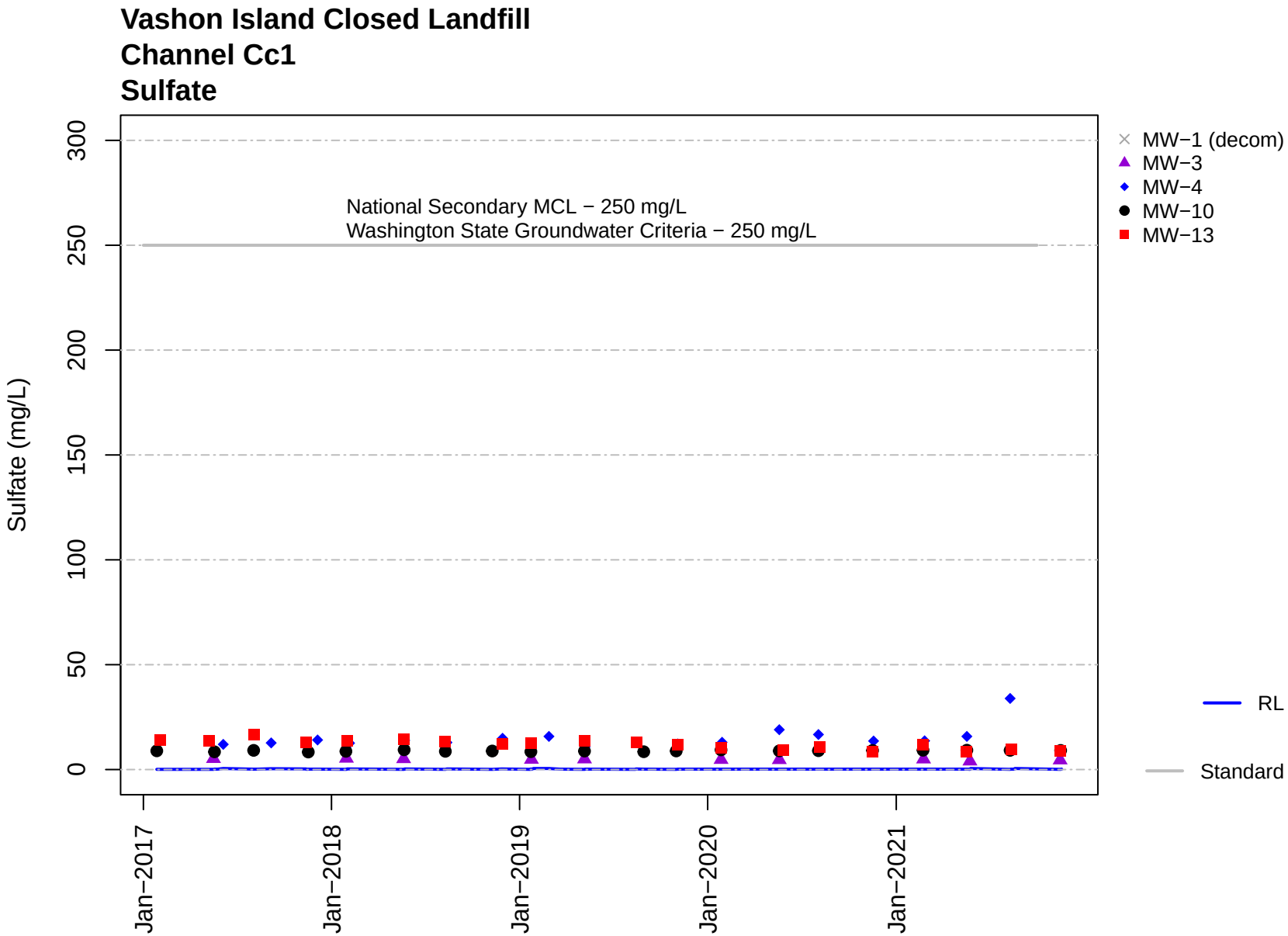

Vashon Island Closed Landfill
Channel Cc1
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

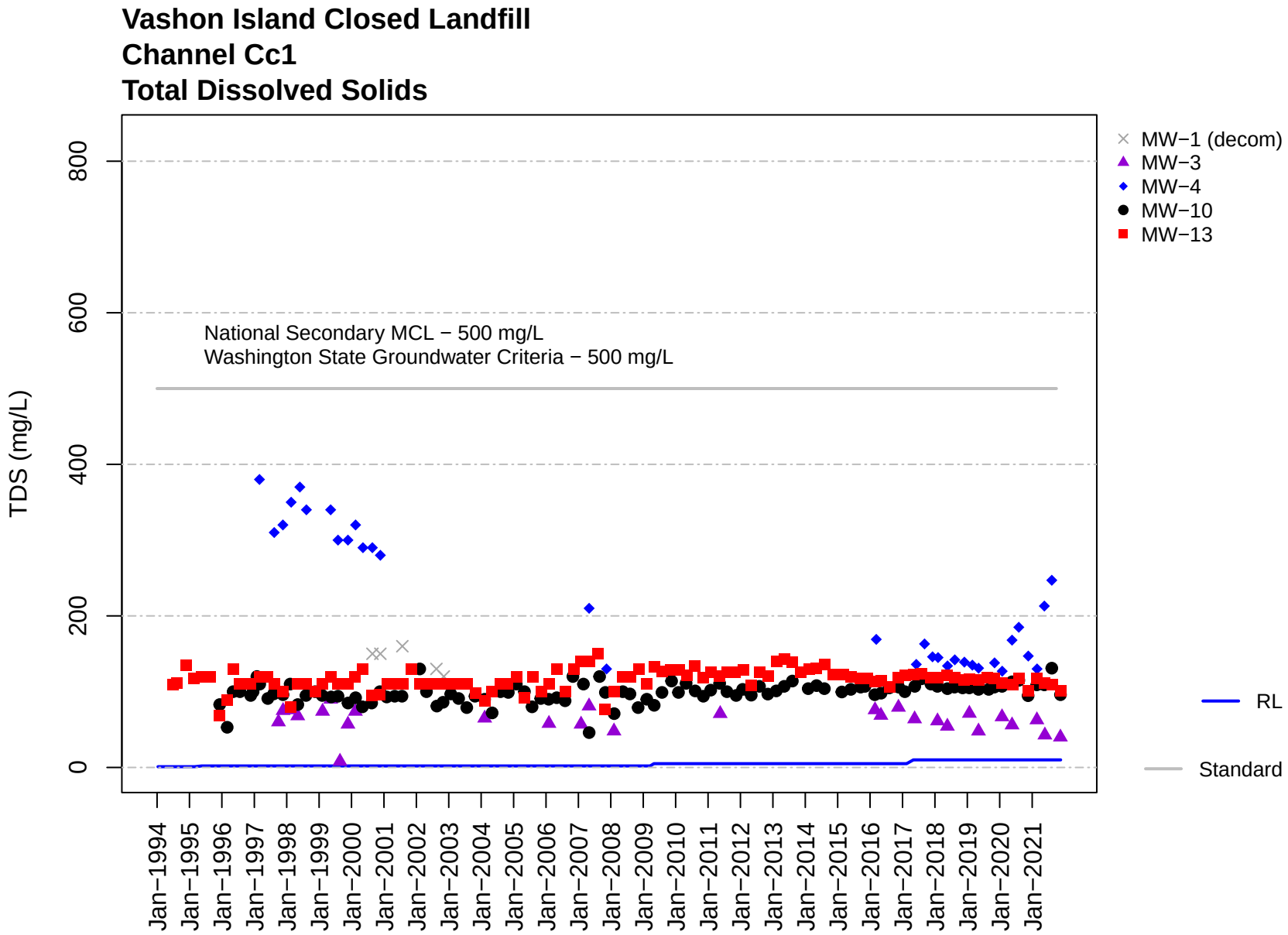

Vashon Island Closed Landfill
Channel Cc1
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

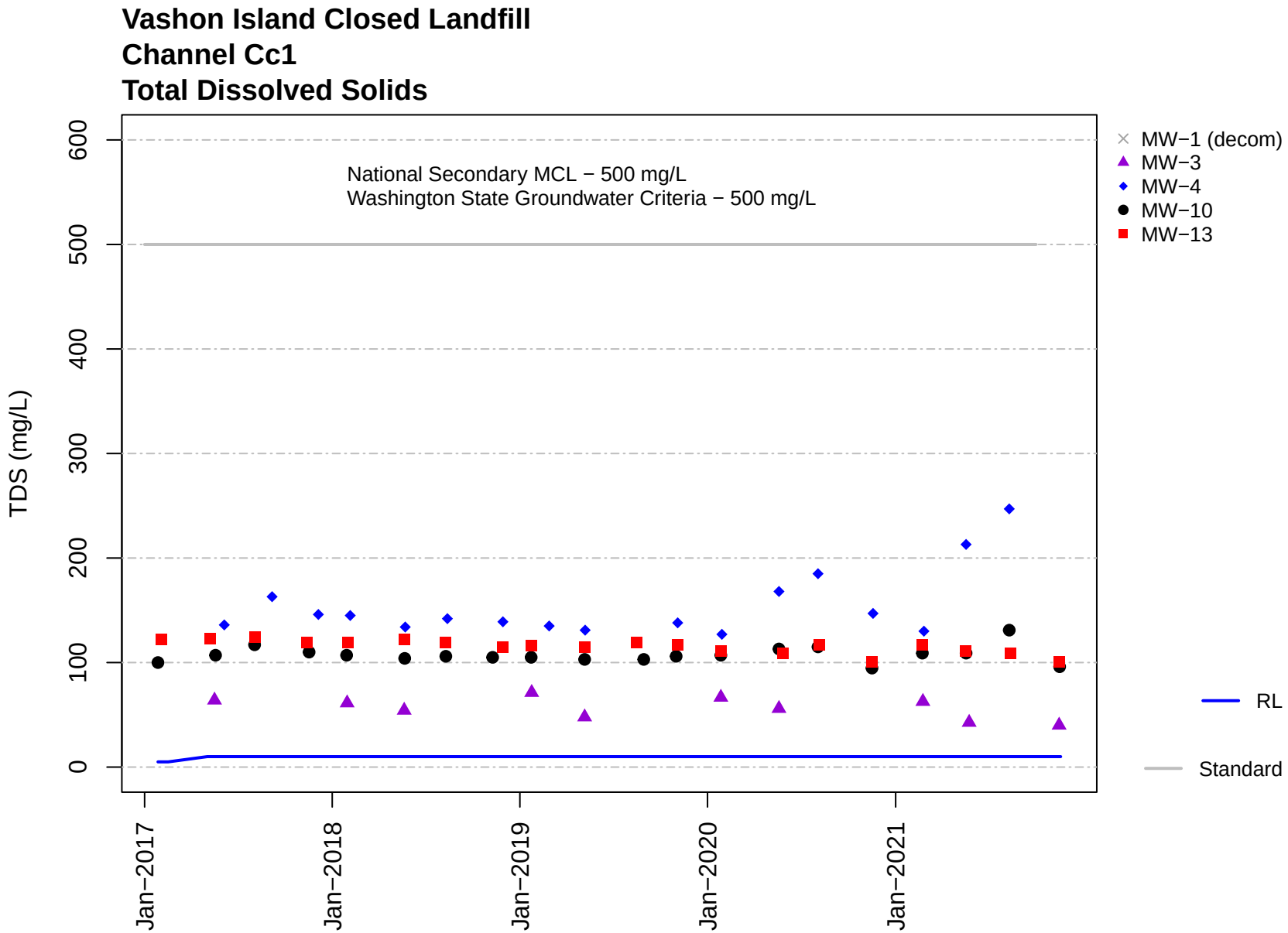

Vashon Island Closed Landfill
Channel Cc1
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

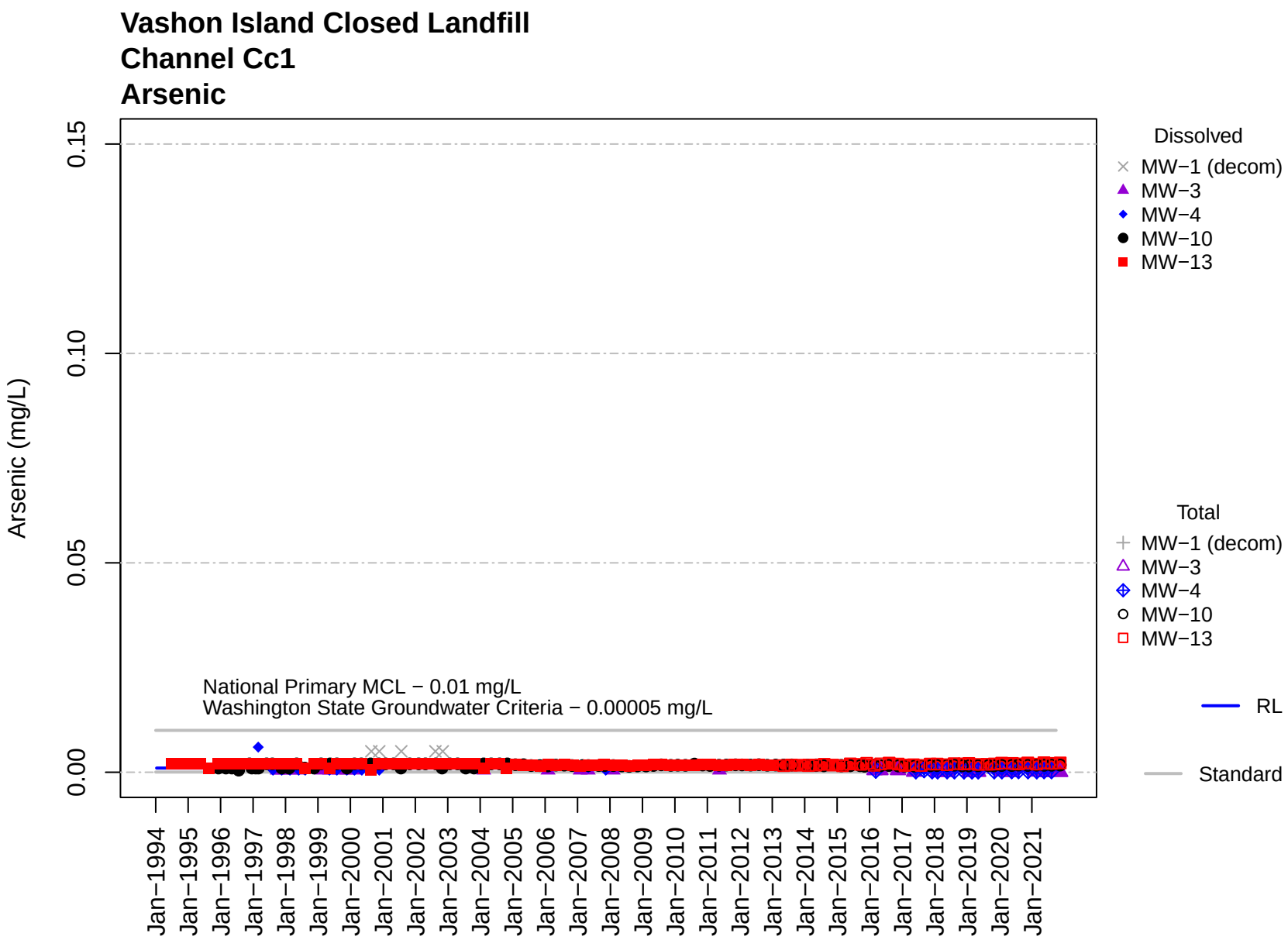

Vashon Island Closed Landfill
Channel Cc1
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

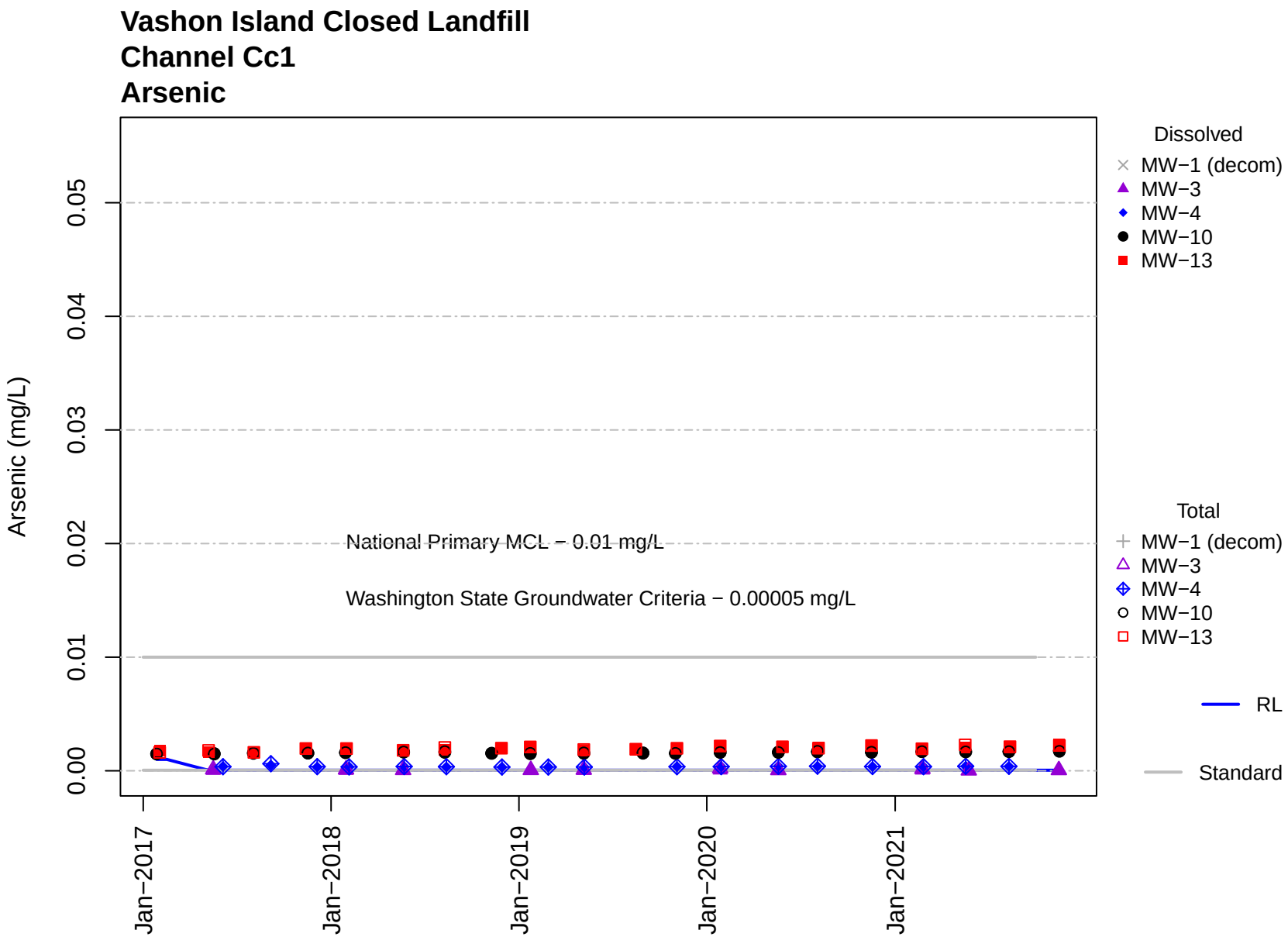

Vashon Island Closed Landfill
Channel Cc1
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

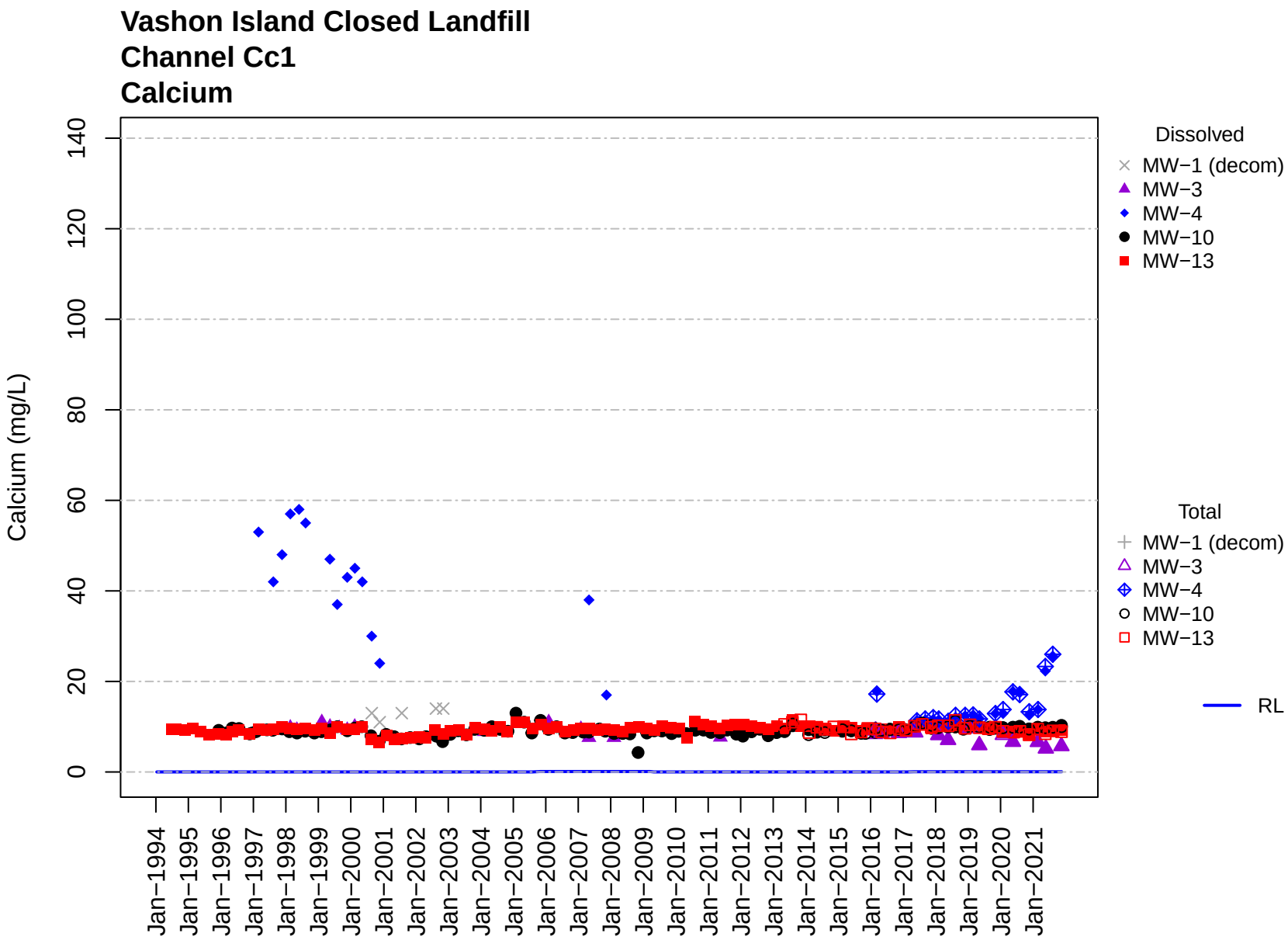

Vashon Island Closed Landfill
Channel Cc1
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

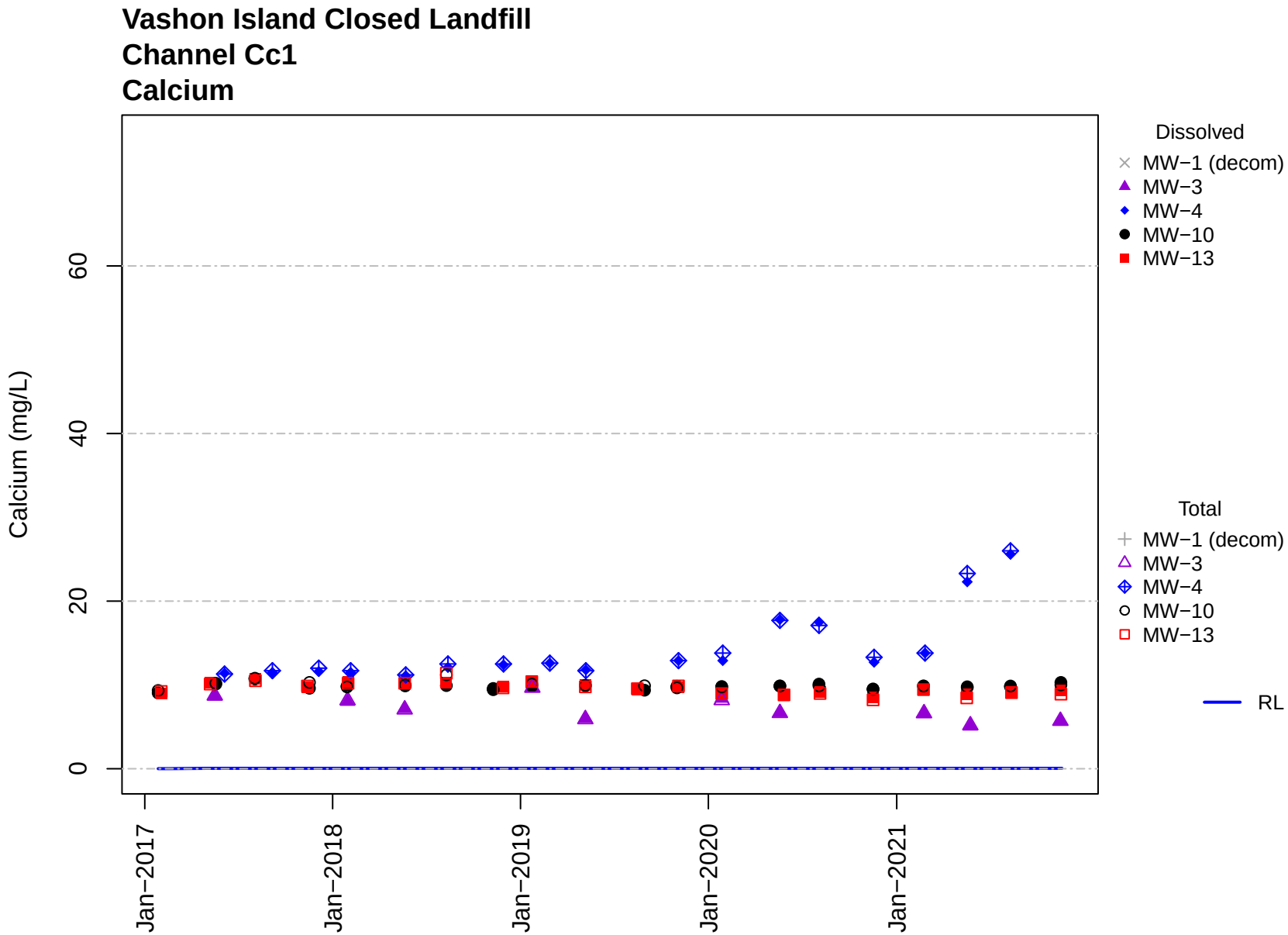

Vashon Island Closed Landfill
Channel Cc1
Total Dissolved Solids
TDS (mg/L)
0
200
400
600
800
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

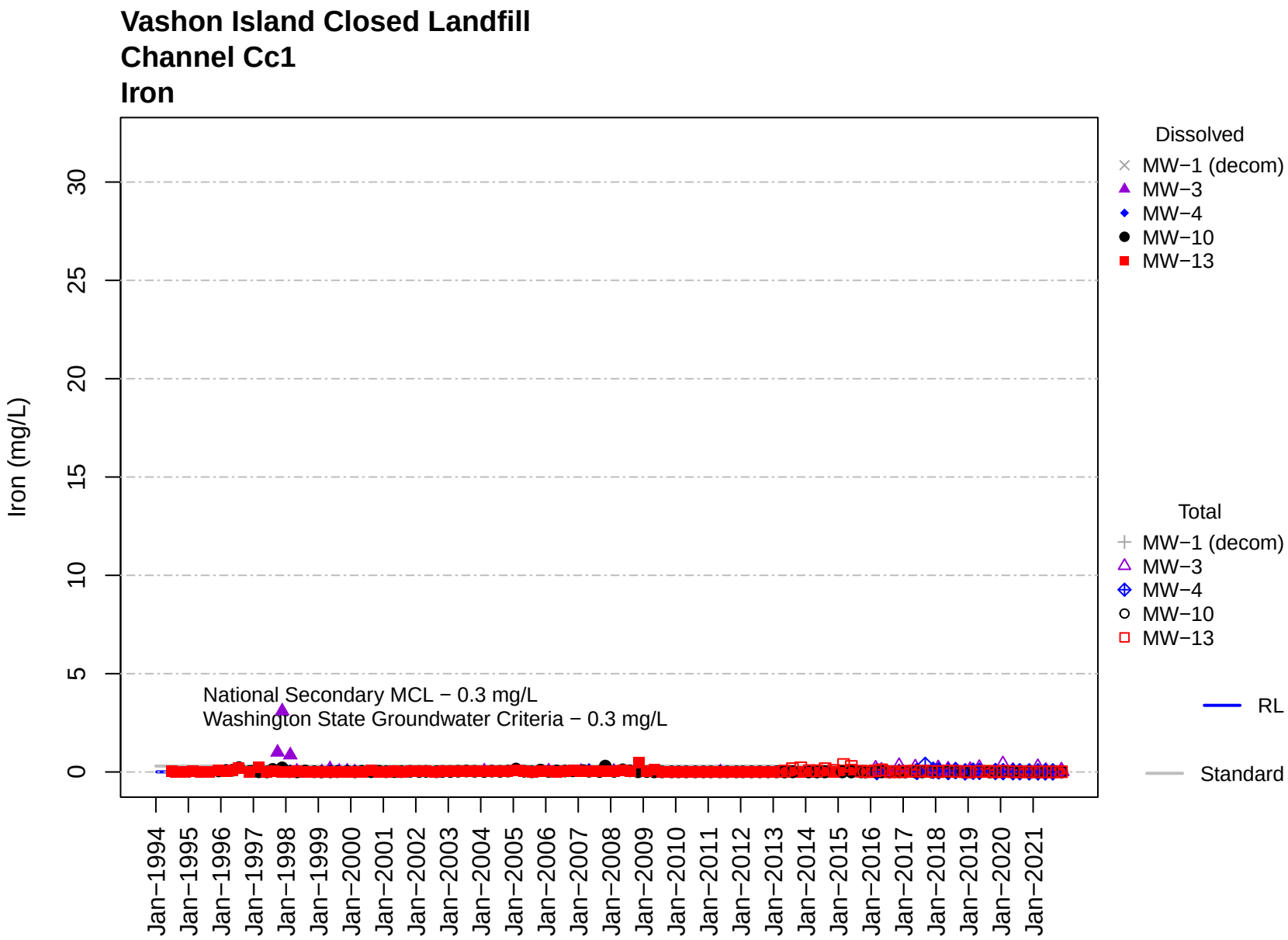

Vashon Island Closed Landfill
Channel Cc1
Total Dissolved Solids
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
TDS (mg/L)
0
100
200
300
400
500
600
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

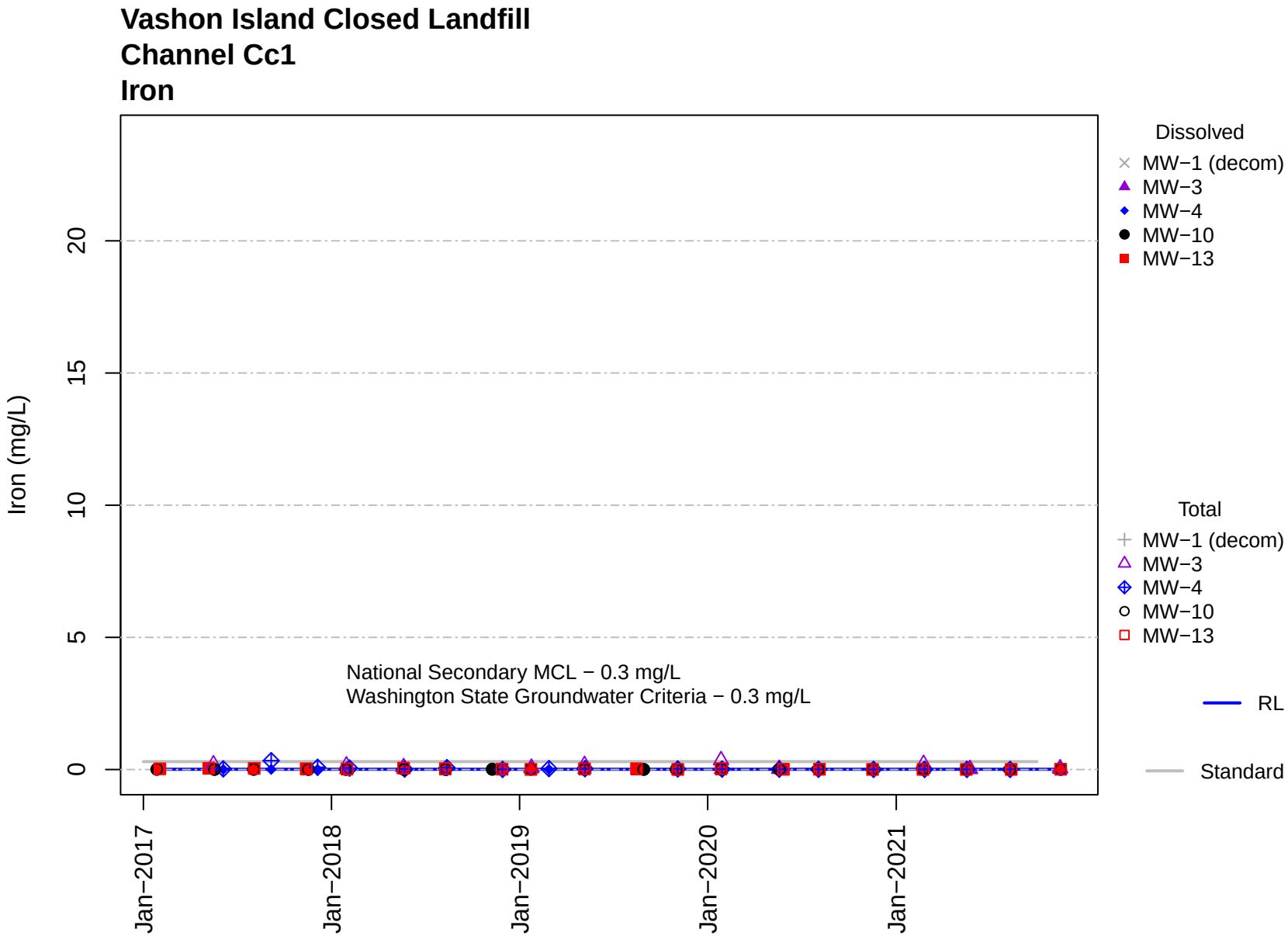

Vashon Island Closed Landfill
Channel Cc1
Arsenic
Arsenic (mg/L)
0.00
0.05
0.10
0.15
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

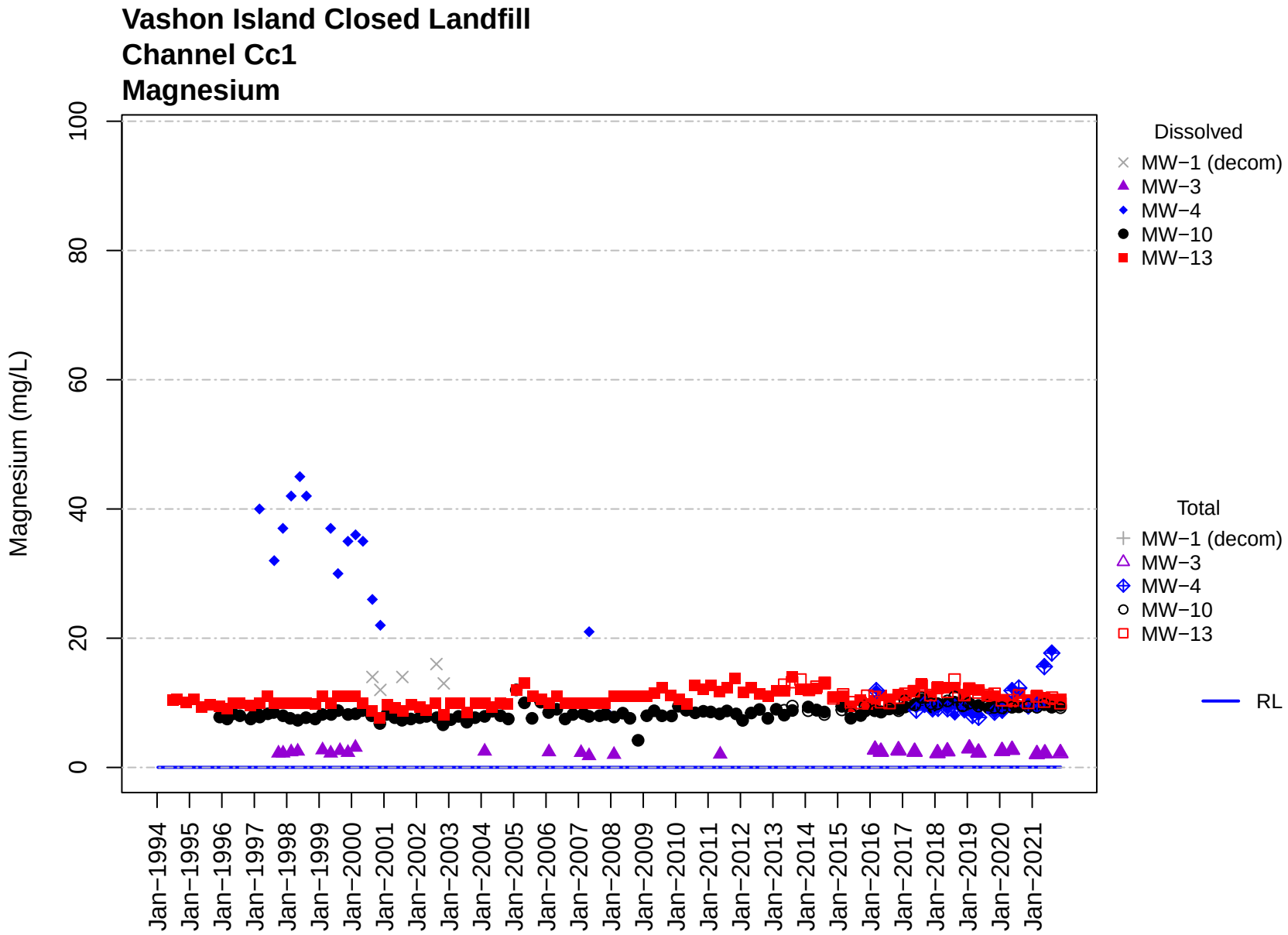

Vashon Island Closed Landfill
Channel Cc1
Arsenic
Arsenic (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

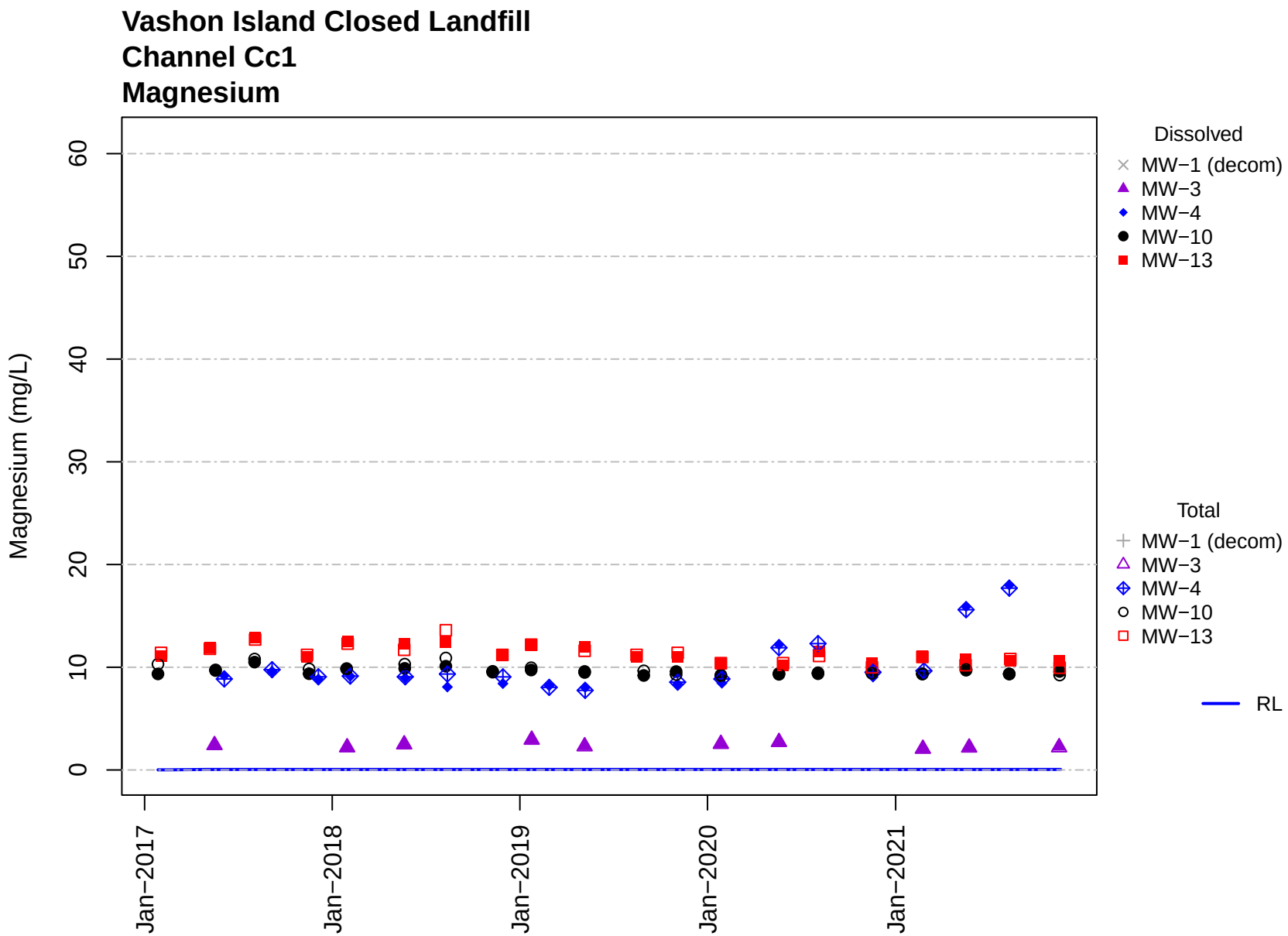

Vashon Island Closed Landfill
Channel Cc1
Calcium
Calcium (mg/L)
0
20
40
60
80
100
120
140
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

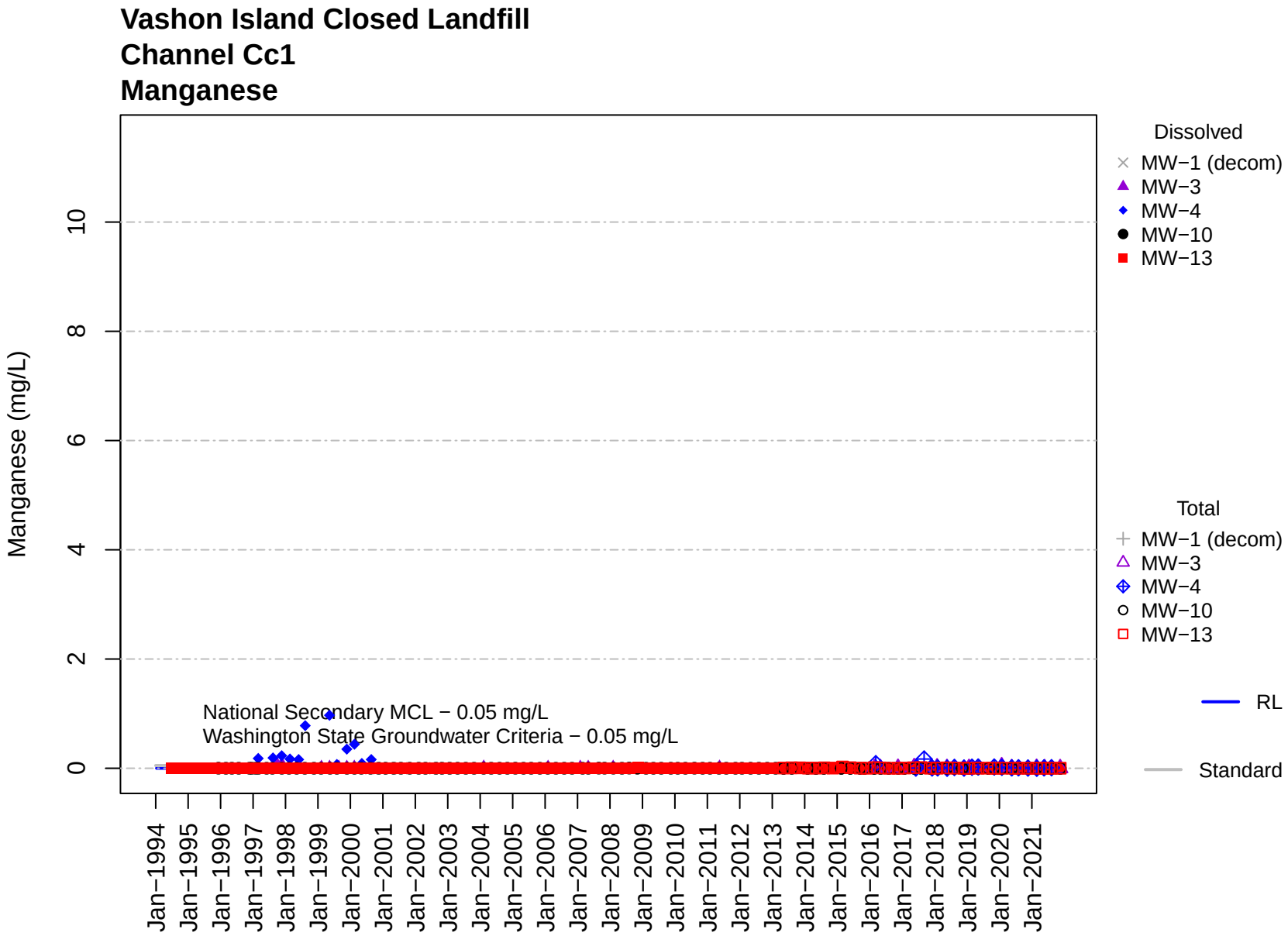

Vashon Island Closed Landfill
Channel Cc1
Calcium
Calcium (mg/L)
0
20
40
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

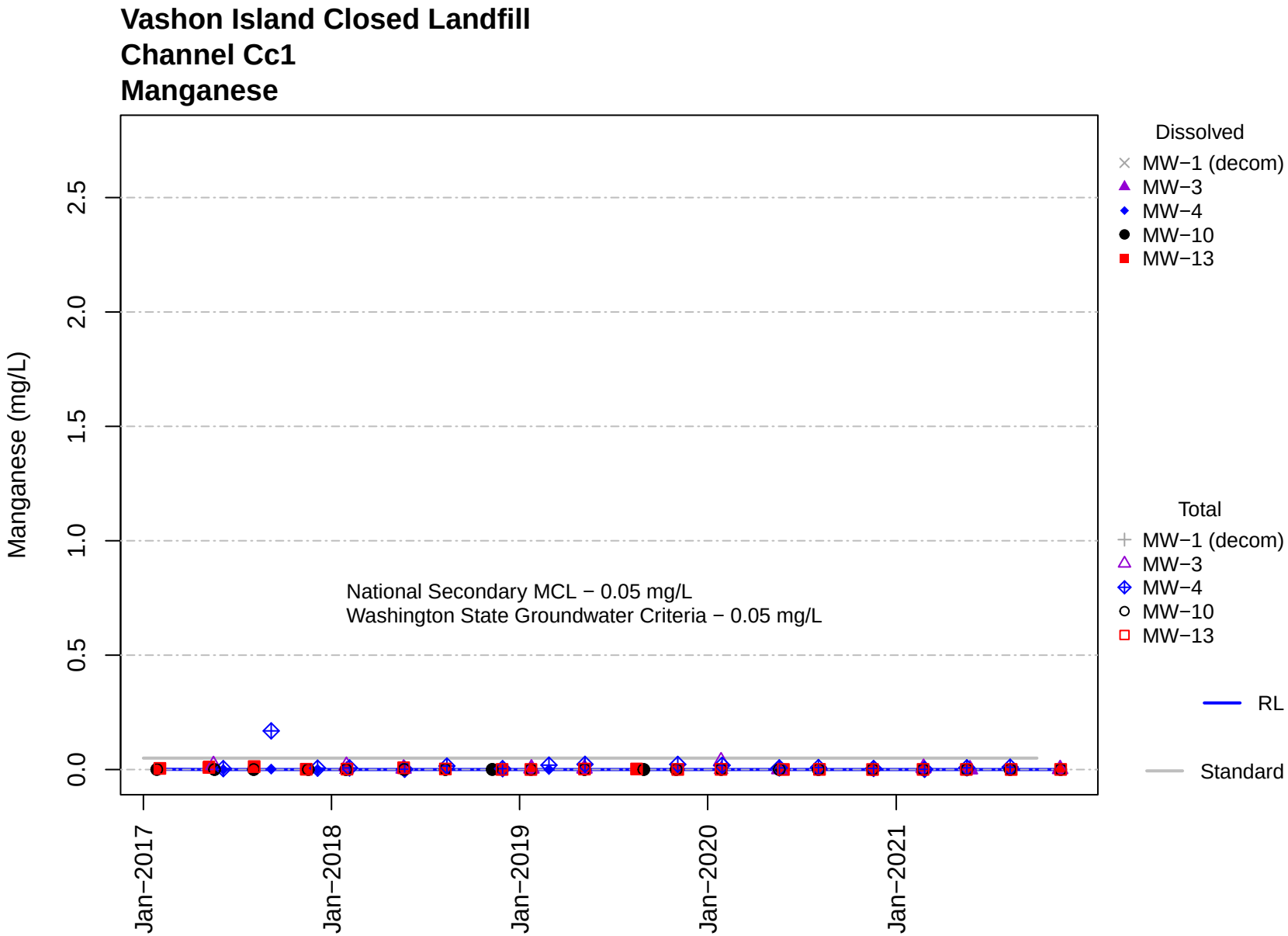

Vashon Island Closed Landfill
Channel Cc1
Iron
Iron (mg/L)
0
5
10
15
20
25
30
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

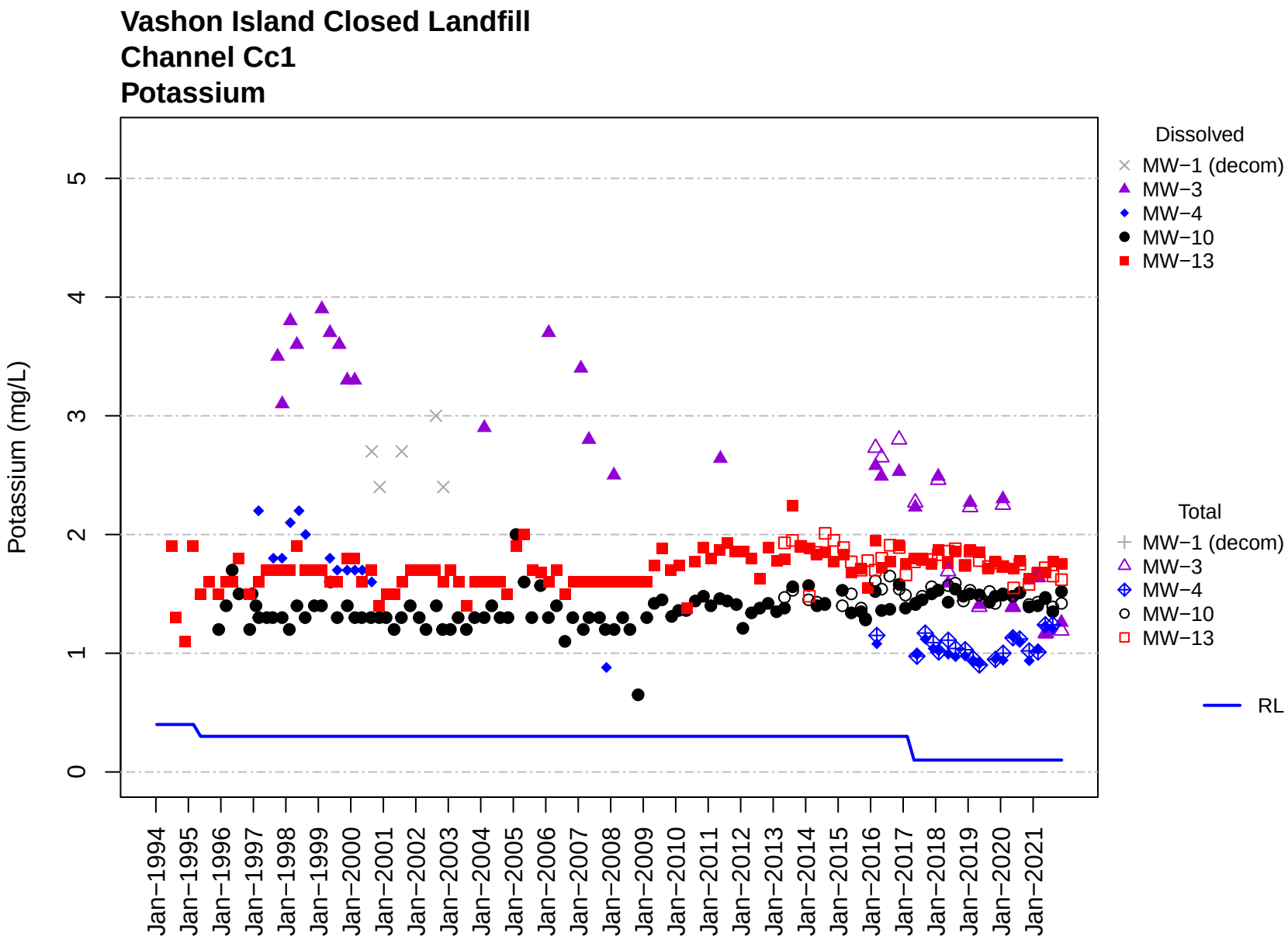

Vashon Island Closed Landfill
Channel Cc1
Iron
Iron (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

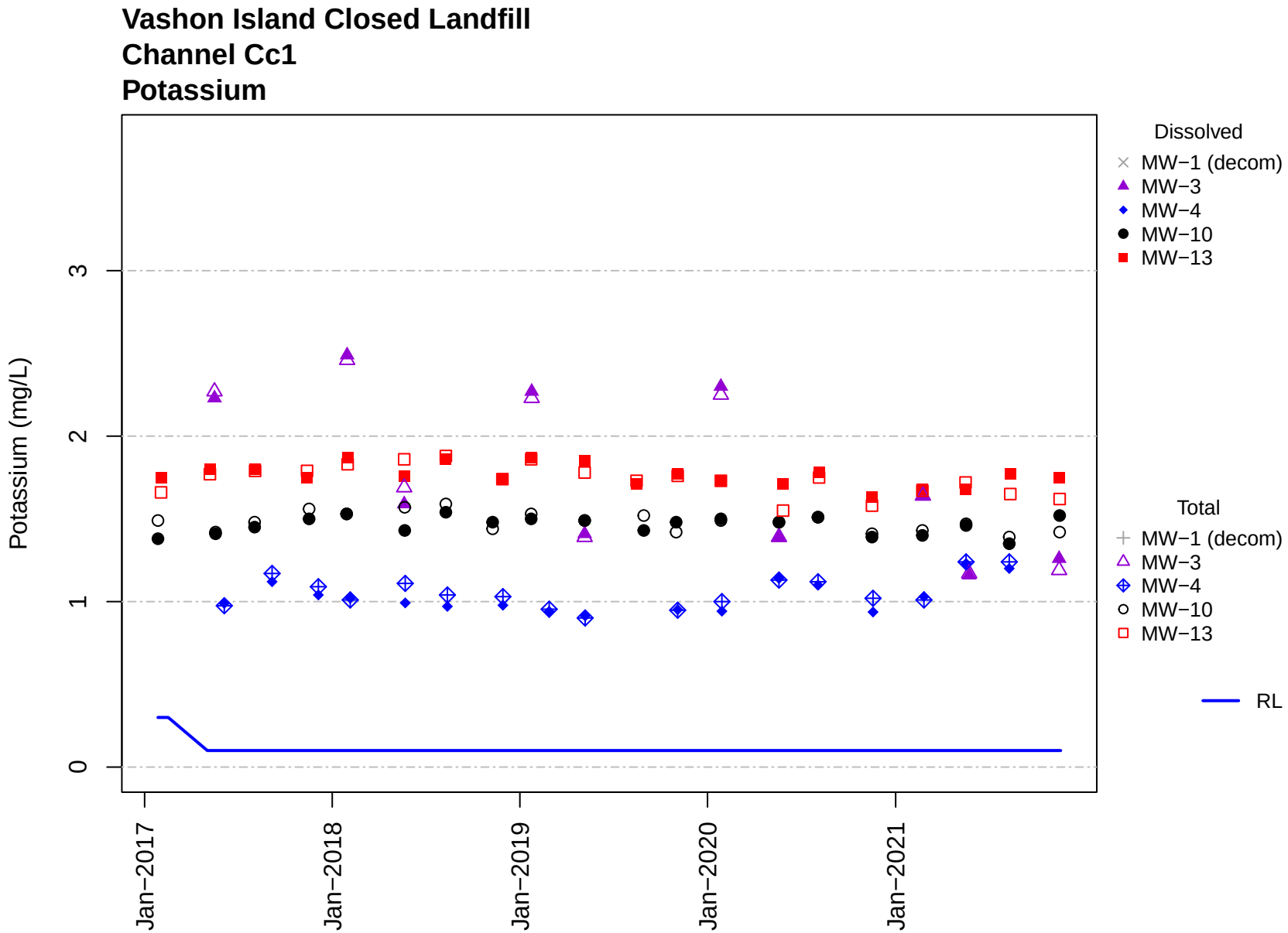

Vashon Island Closed Landfill
Channel Cc1
Magnesium
Magnesium (mg/L)
0
20
40
60
80
100
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

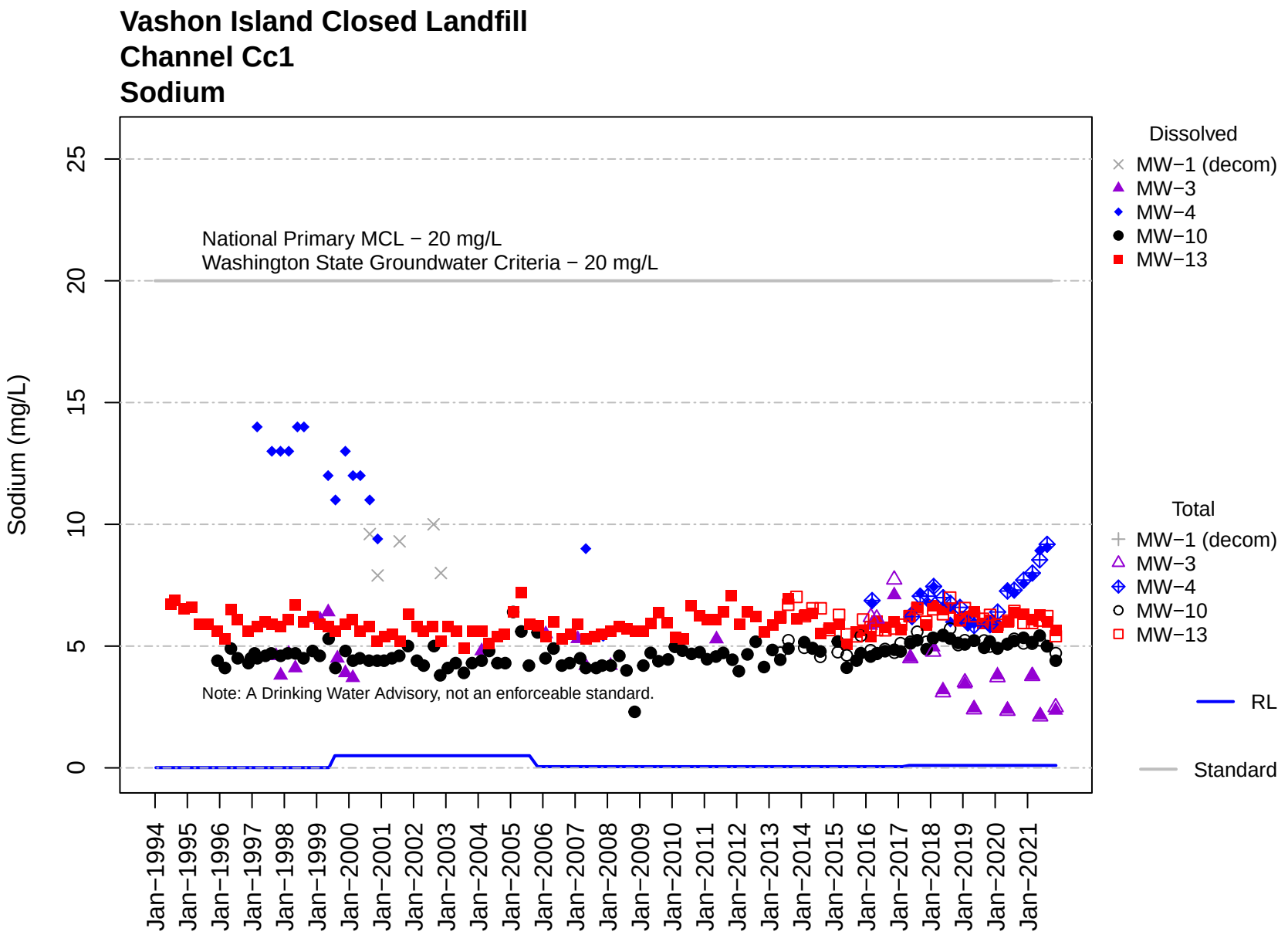

Vashon Island Closed Landfill
Channel Cc1
Magnesium
Magnesium (mg/L)
0
10
20
30
40
50
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

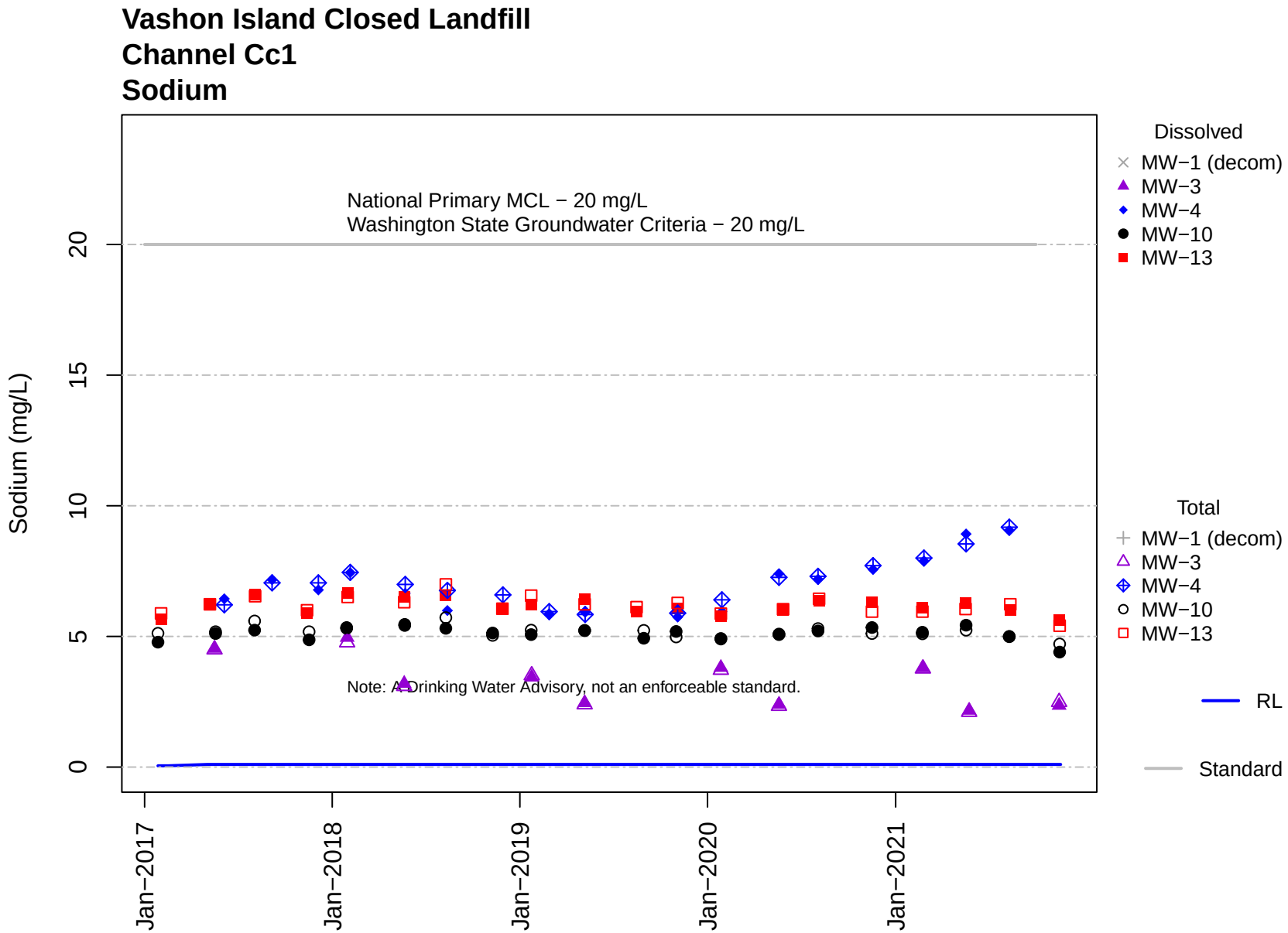

Vashon Island Closed Landfill
Channel Cc1
Manganese
Manganese (mg/L)
0
2
4
6
8
10
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

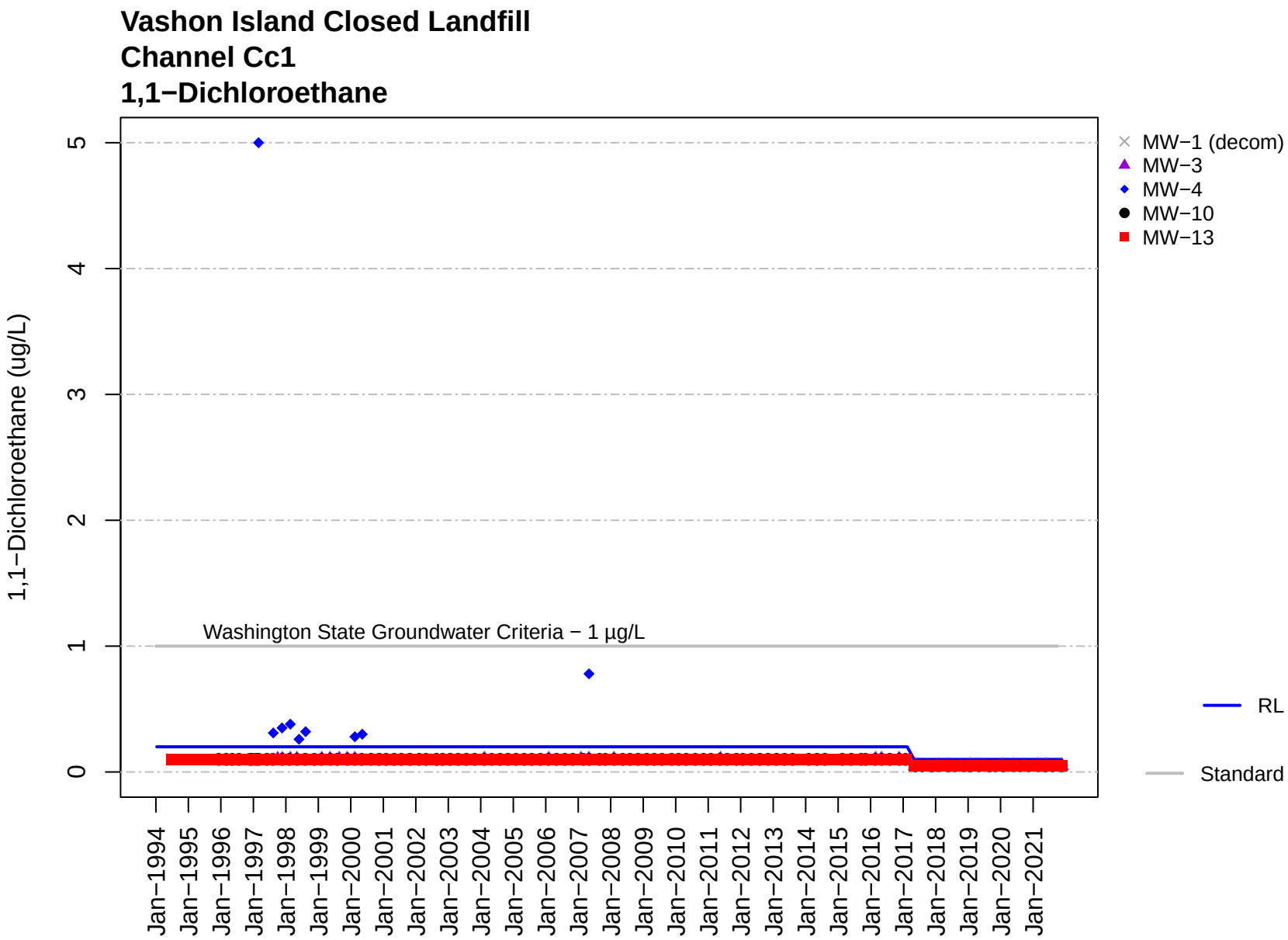

Vashon Island Closed Landfill
Channel Cc1
Manganese
Manganese (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

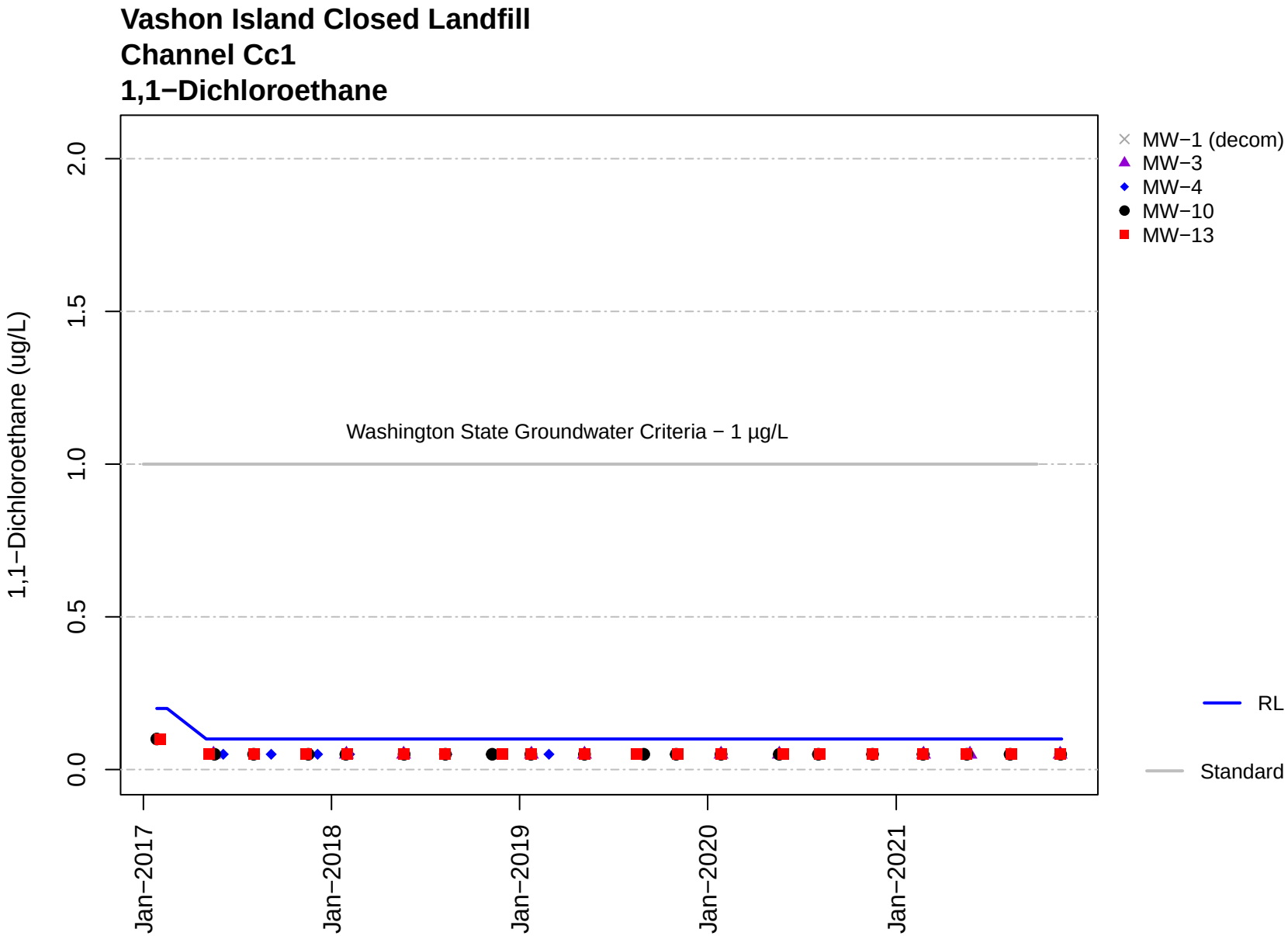

Vashon Island Closed Landfill
Channel Cc1
Potassium
Potassium (mg/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

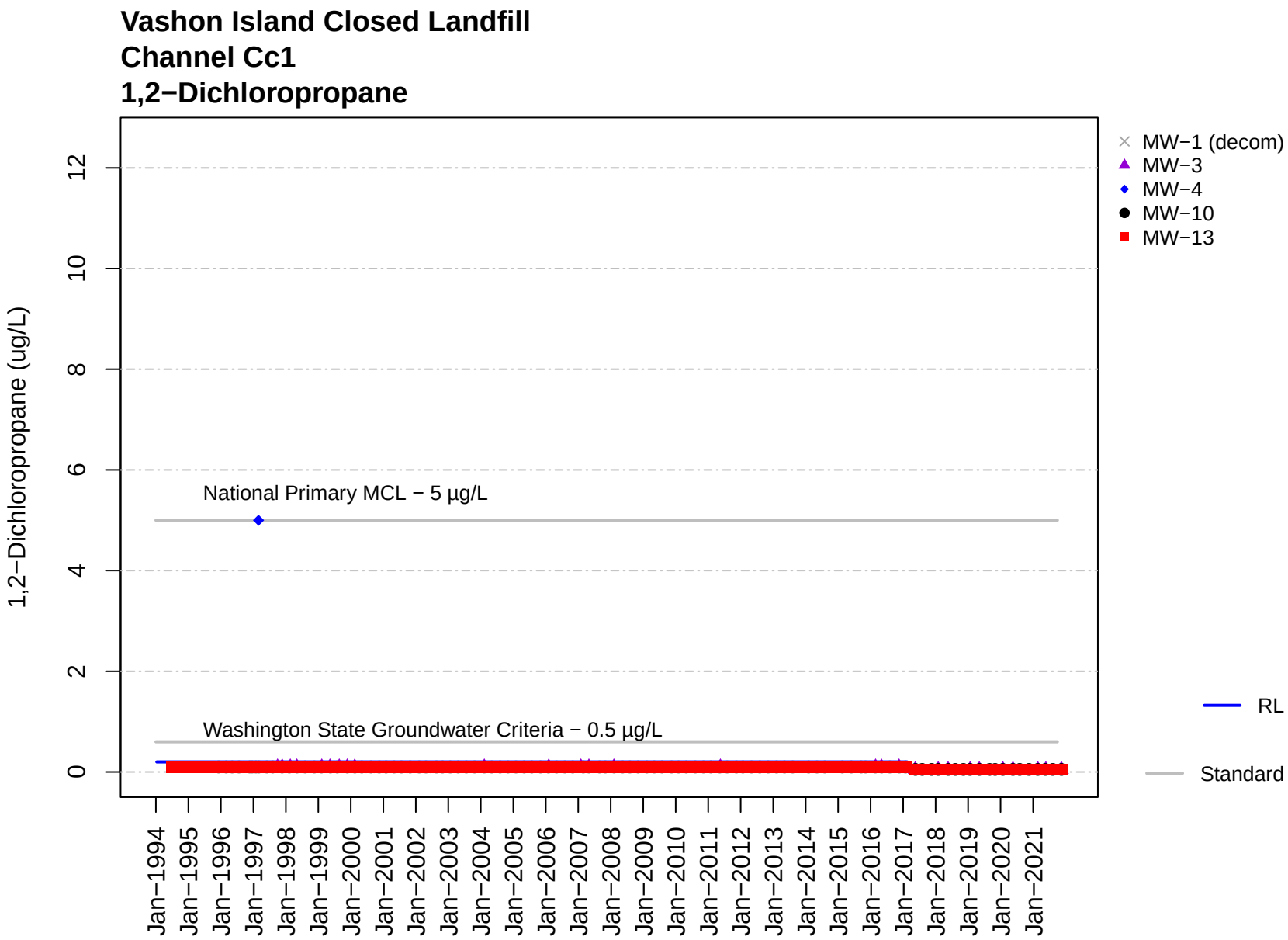

Vashon Island Closed Landfill
Channel Cc1
Potassium
Potassium (mg/L)
0
1
2
3
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

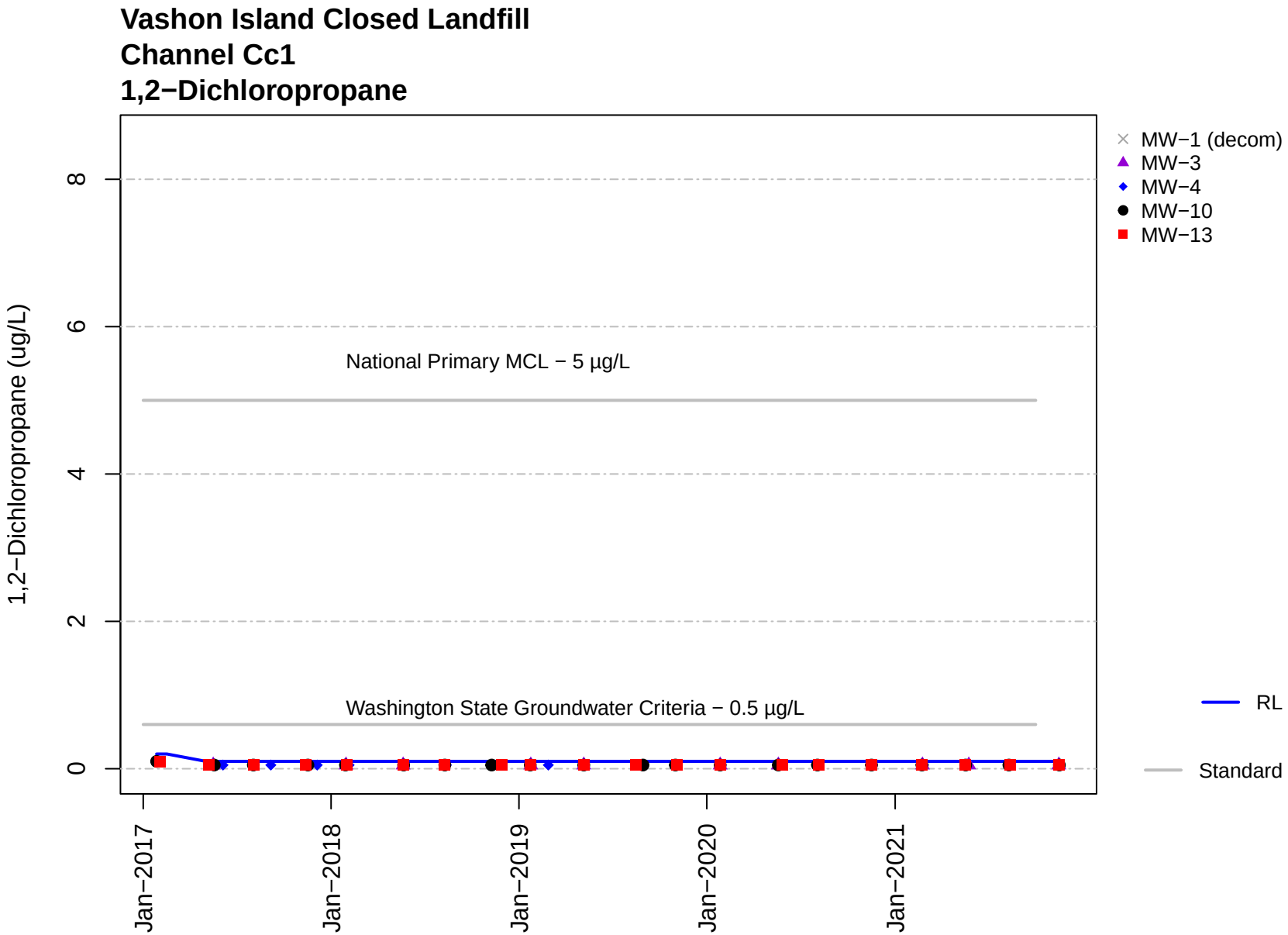

Vashon Island Closed Landfill
Channel Cc1
Sodium
Sodium (mg/L)
0
5
10
15
20
25
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

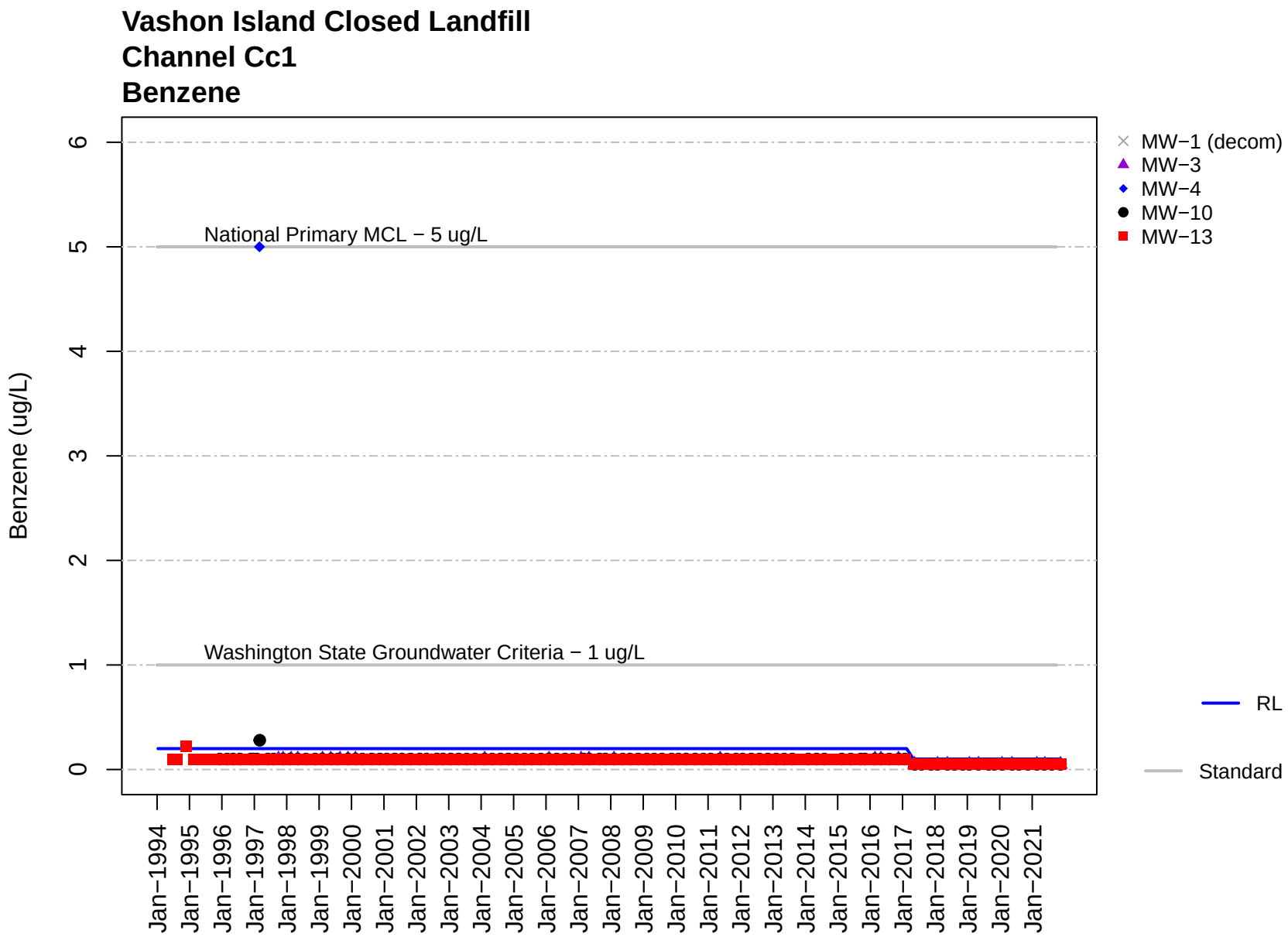

Vashon Island Closed Landfill
Channel Cc1
Sodium
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Sodium (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

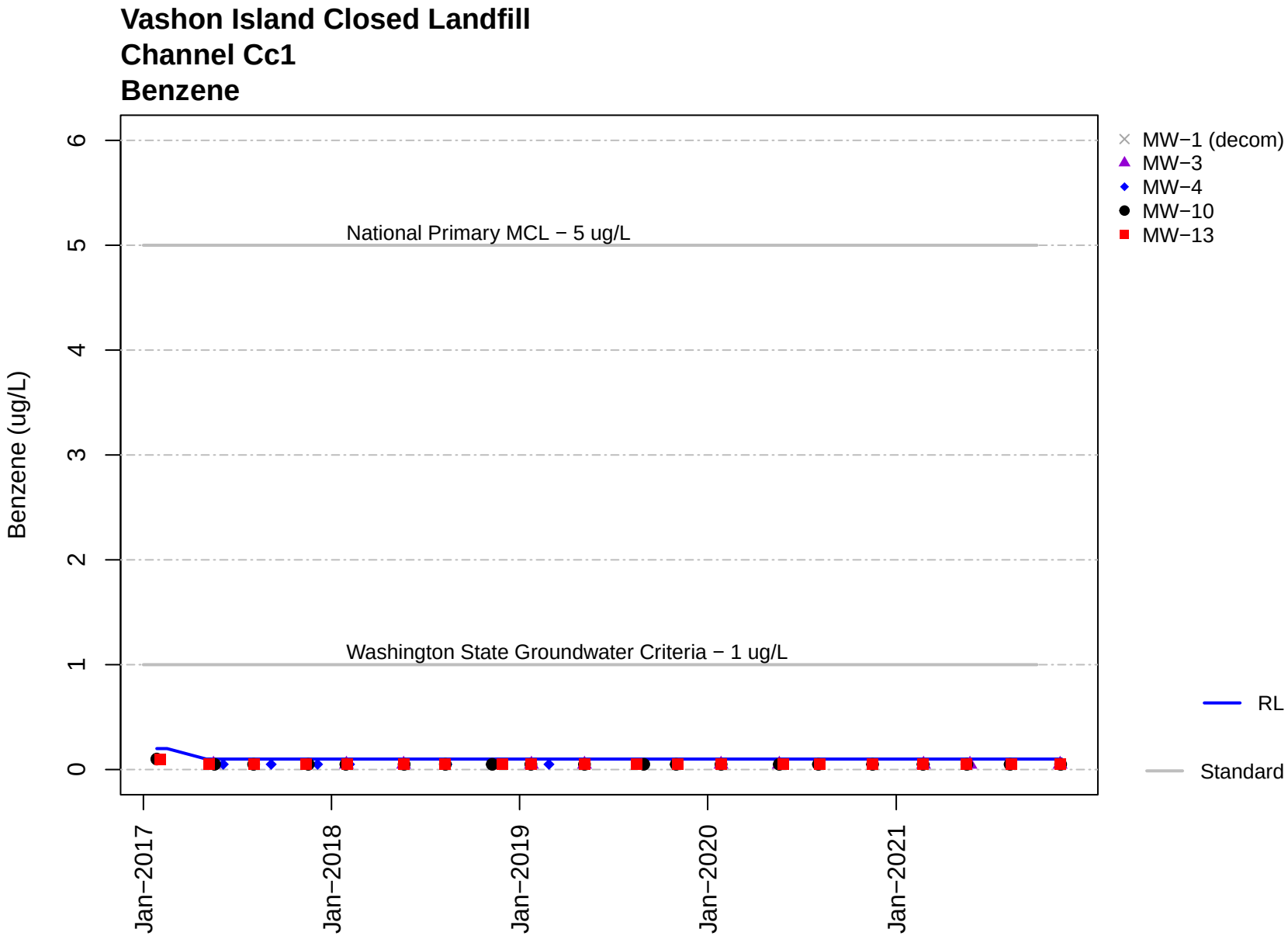

Vashon Island Closed Landfill
Channel Cc1
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0
1
2
3
4
5
Washington State Groundwater Criteria − 1 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

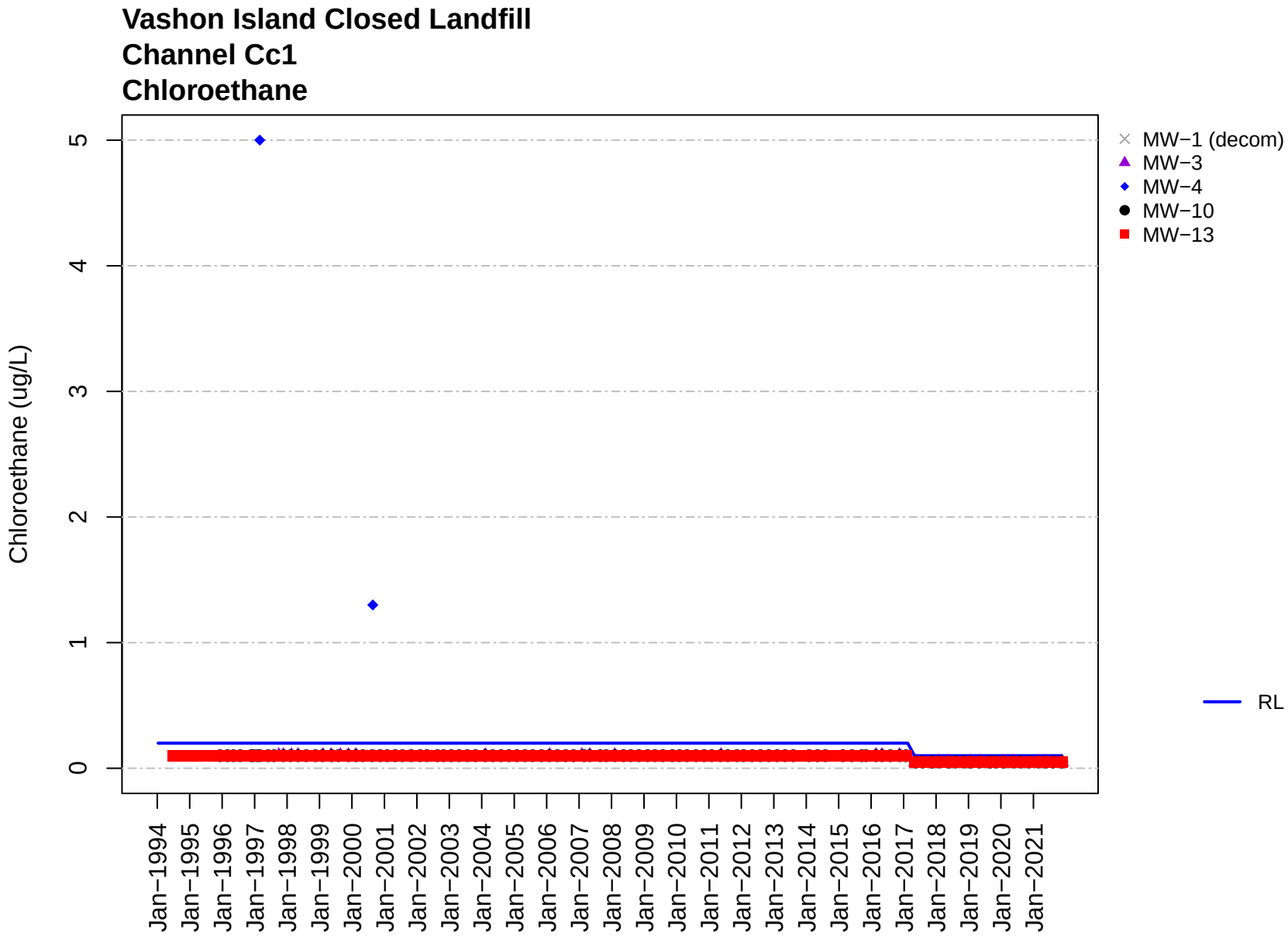

Vashon Island Closed Landfill
Channel Cc1
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Washington State Groundwater Criteria − 1 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

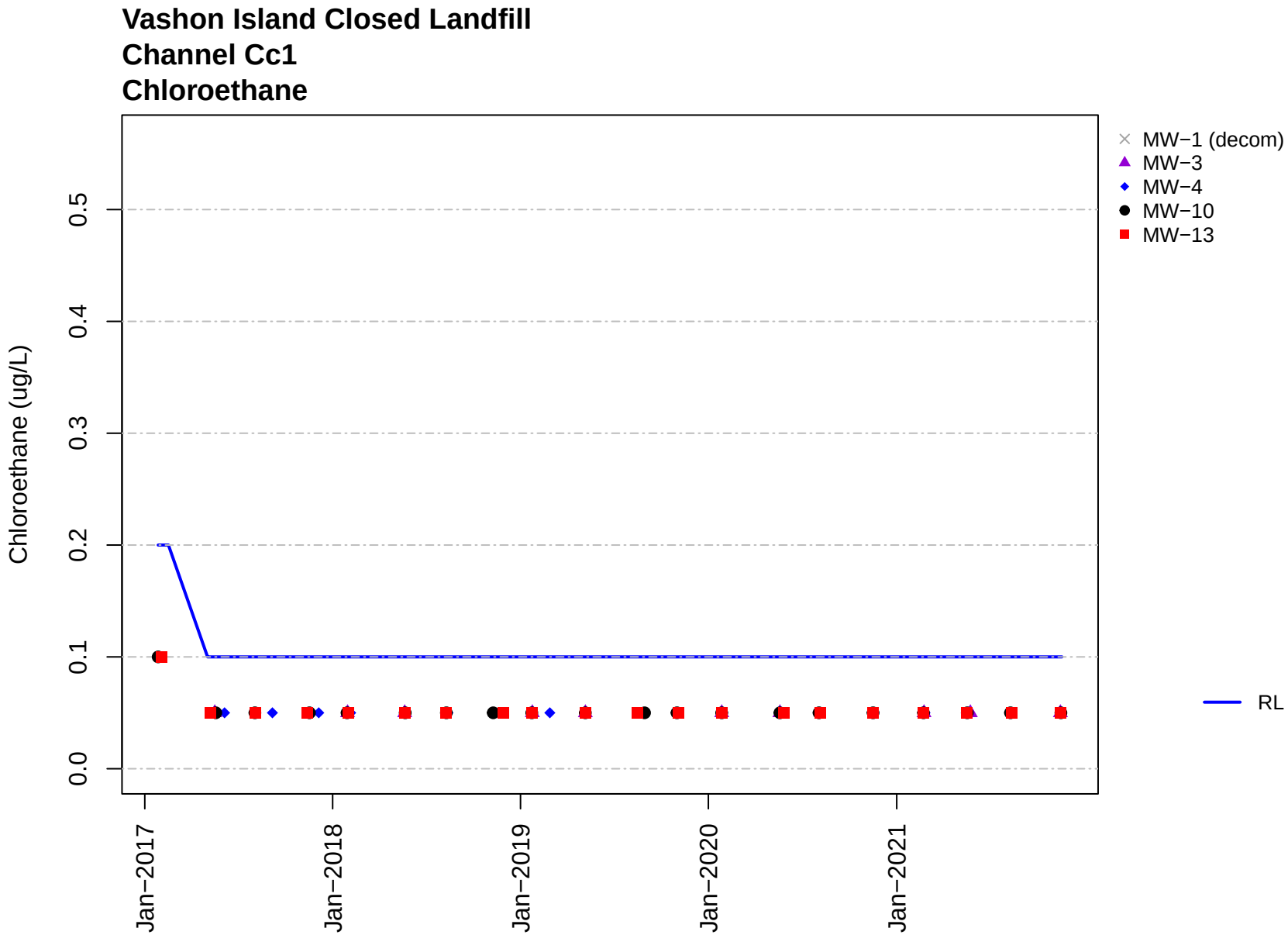

Vashon Island Closed Landfill
Channel Cc1
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
10
12
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

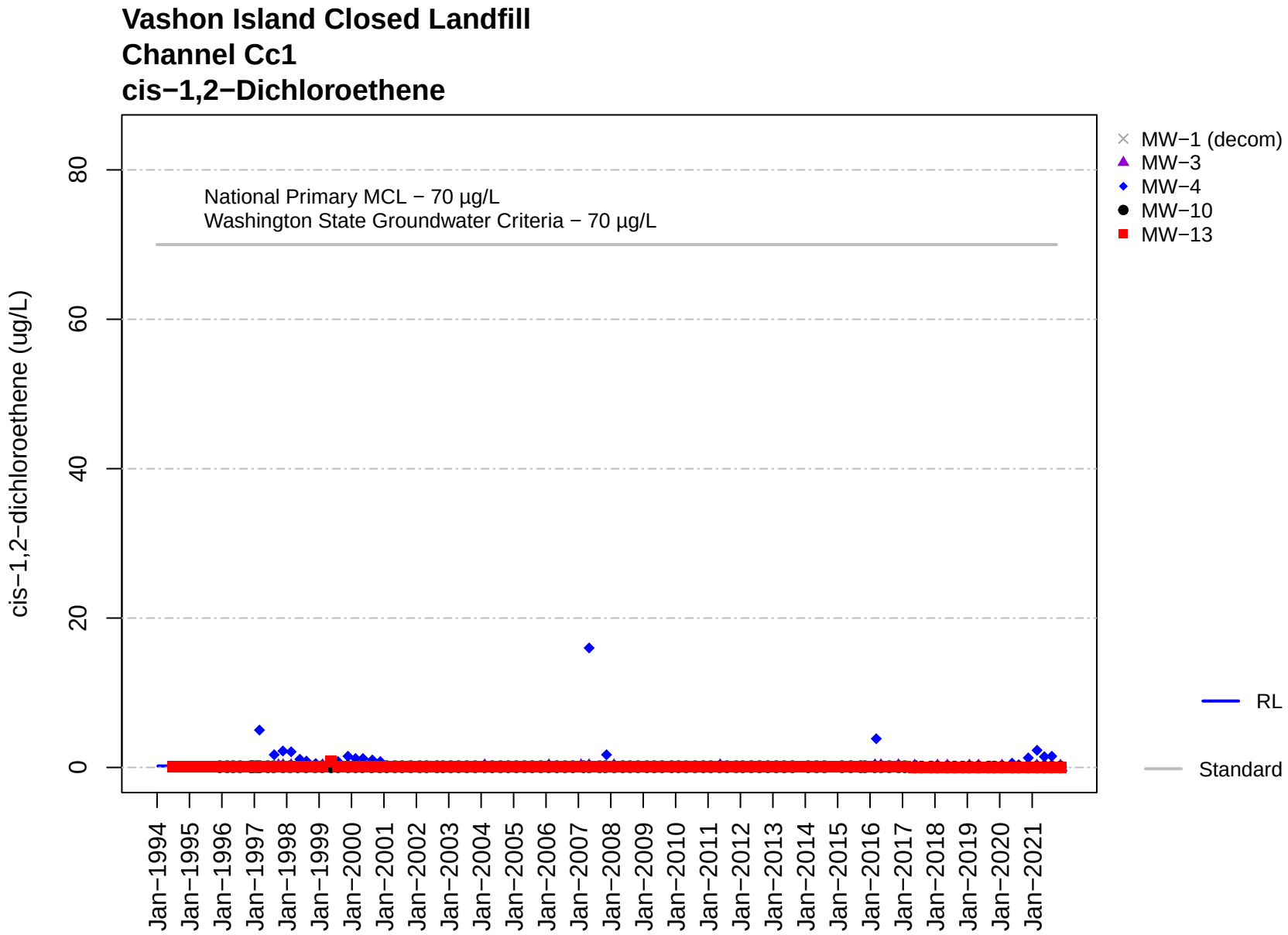

Vashon Island Closed Landfill
Channel Cc1
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

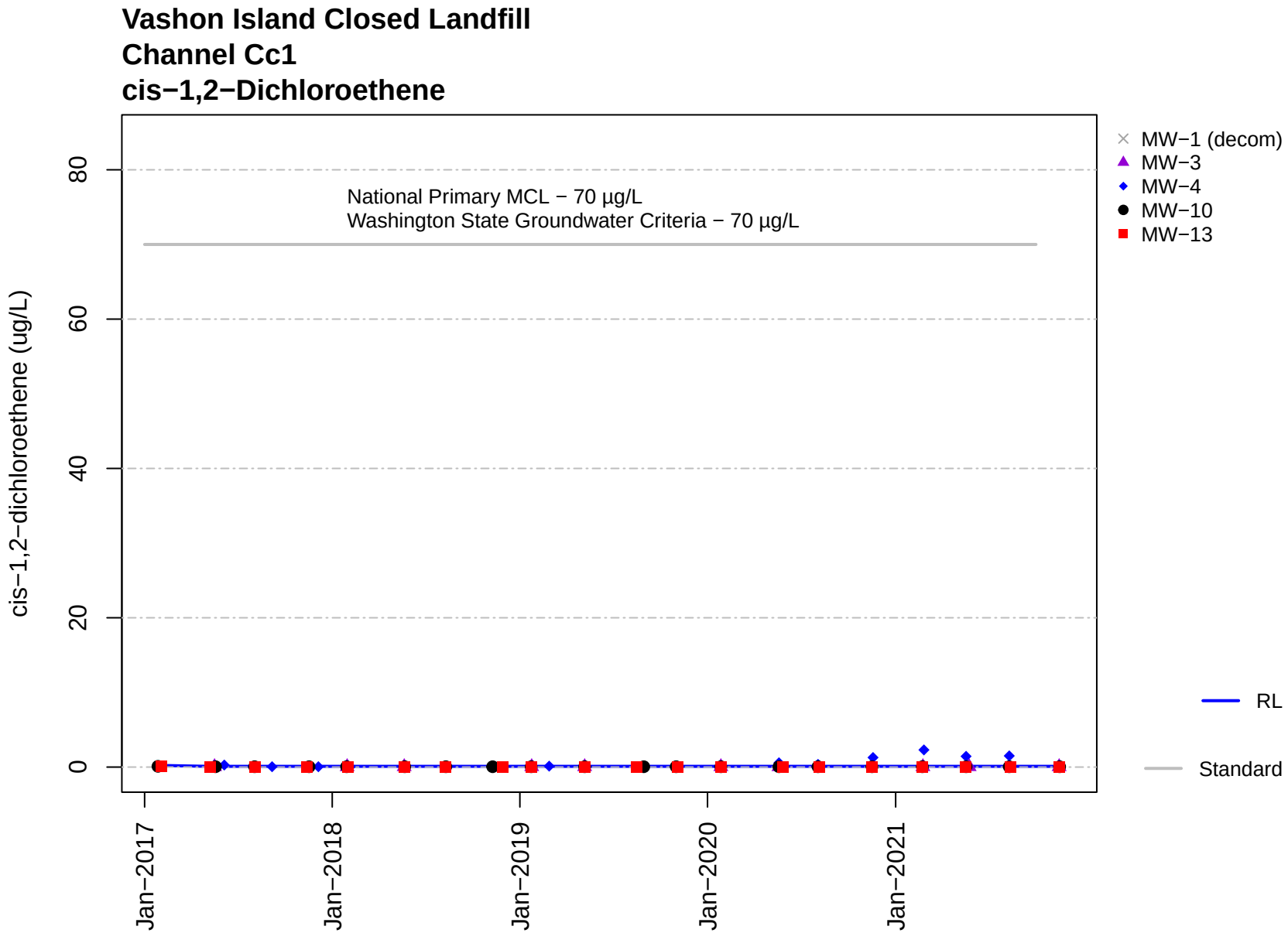

Vashon Island Closed Landfill
Channel Cc1
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

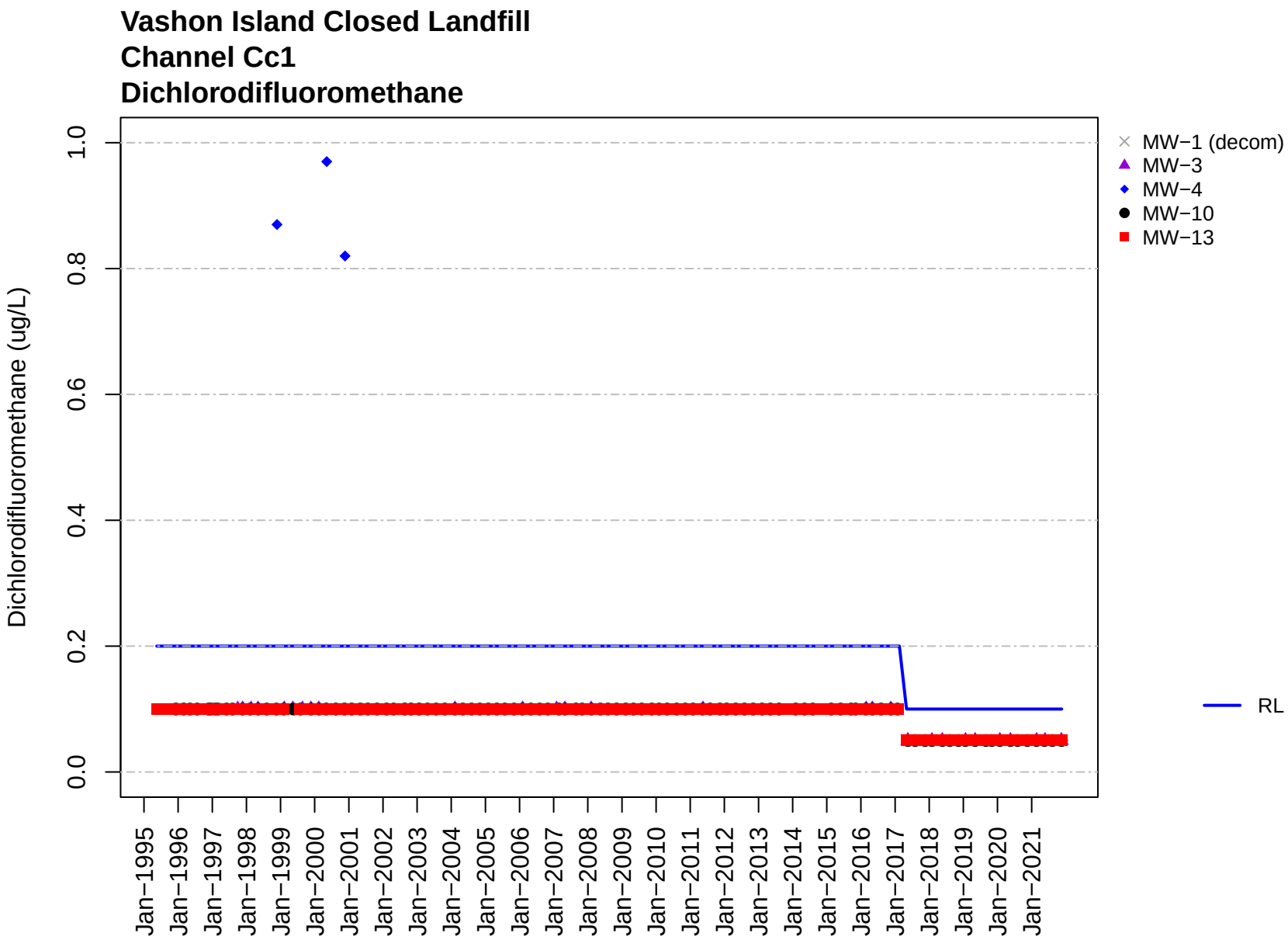

Vashon Island Closed Landfill
Channel Cc1
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

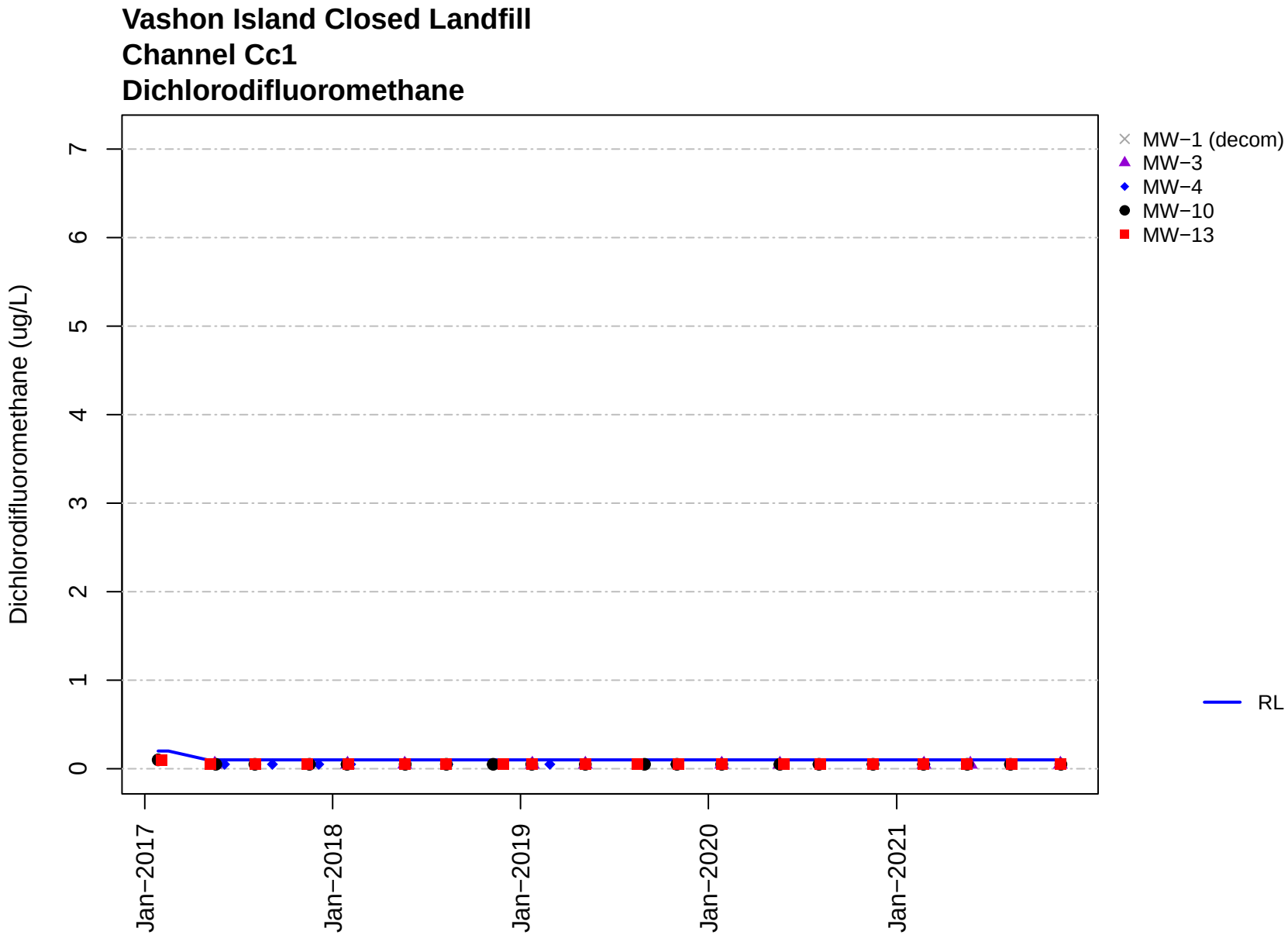

Vashon Island Closed Landfill
Channel Cc1
Chloroethane
Chloroethane (ug/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

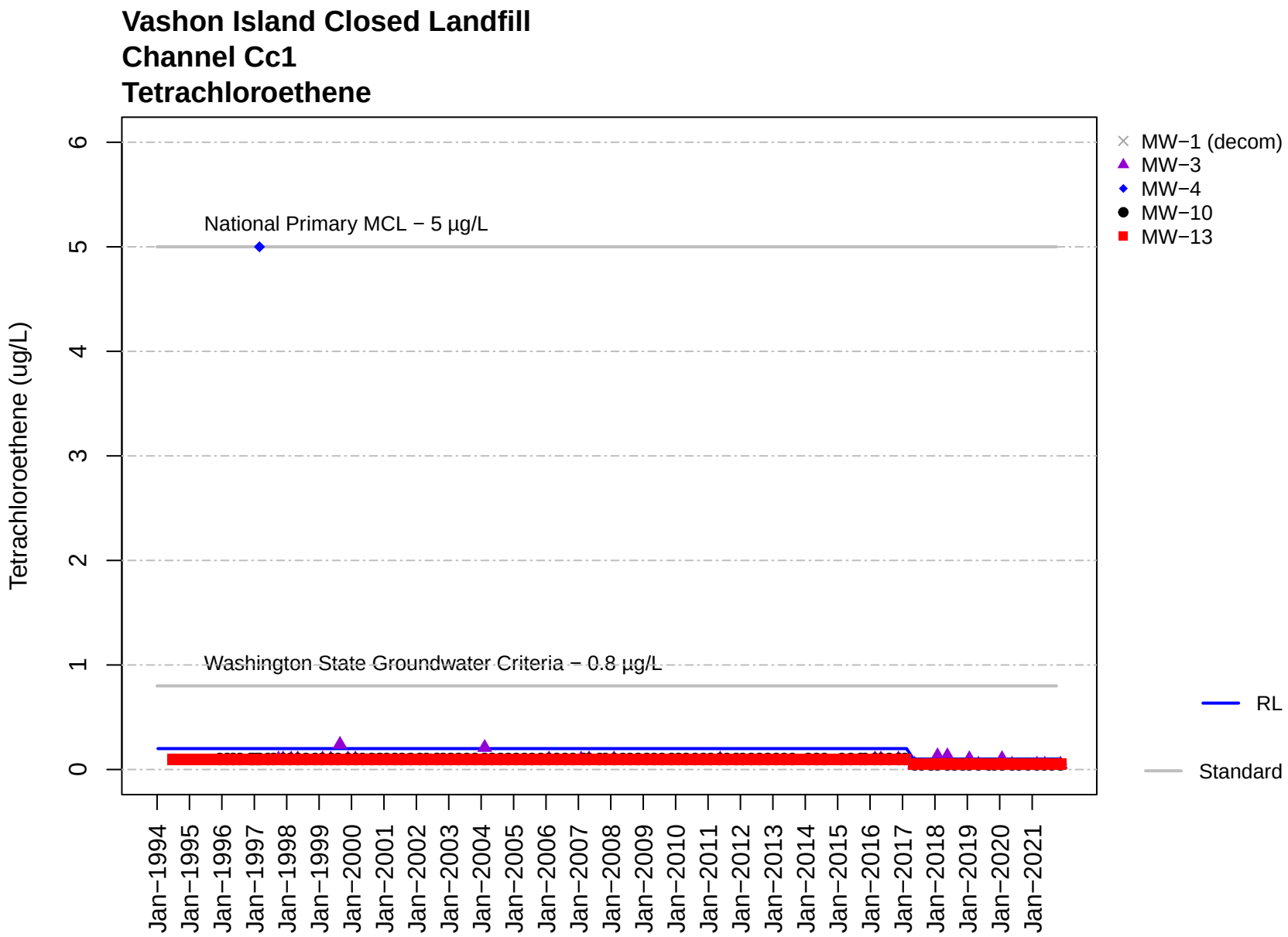

Vashon Island Closed Landfill
Channel Cc1
Chloroethane
Chloroethane (ug/L)
0.0
0.1
0.2
0.3
0.4
0.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

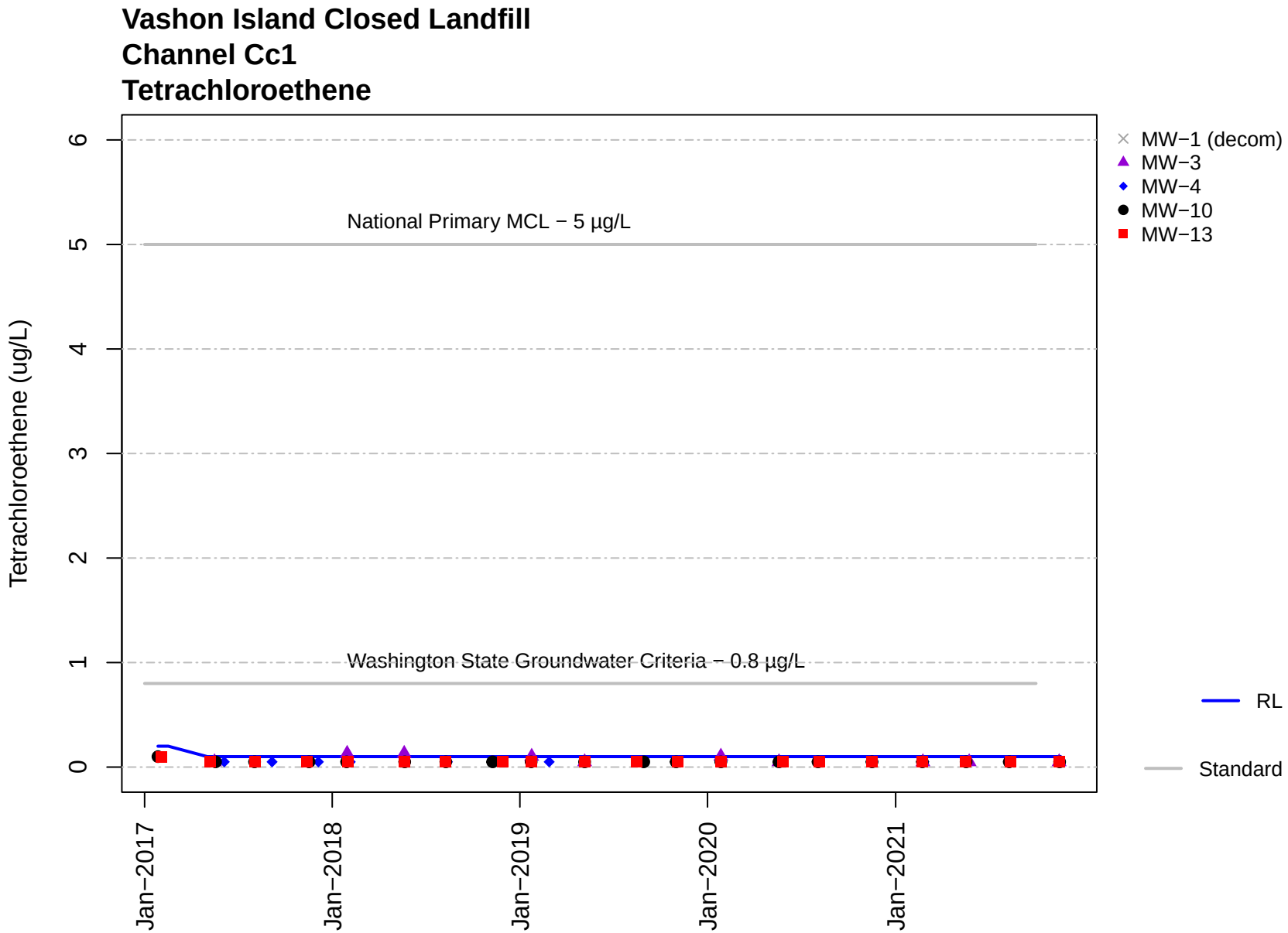

Vashon Island Closed Landfill
Channel Cc1
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

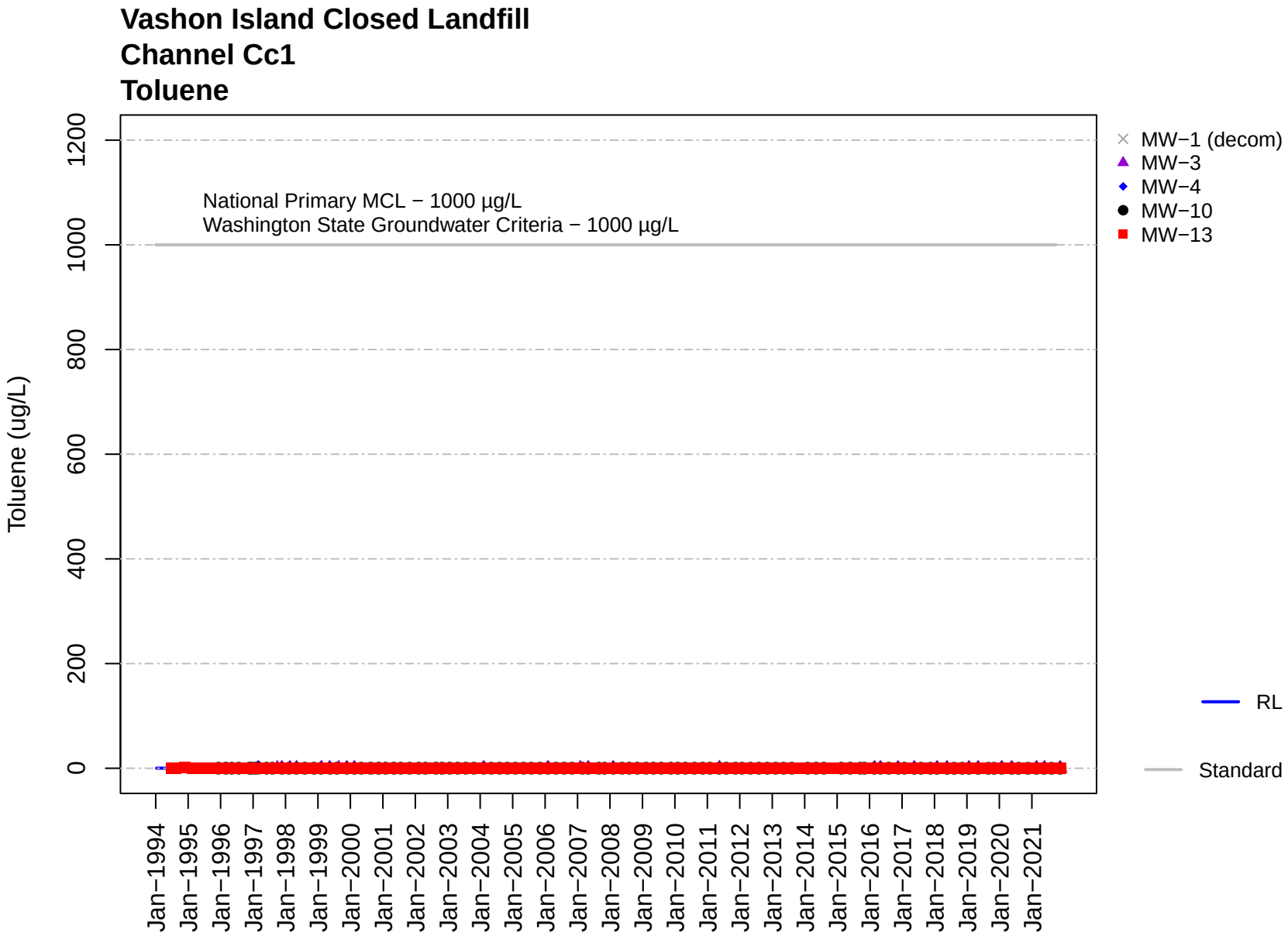

Vashon Island Closed Landfill
Channel Cc1
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

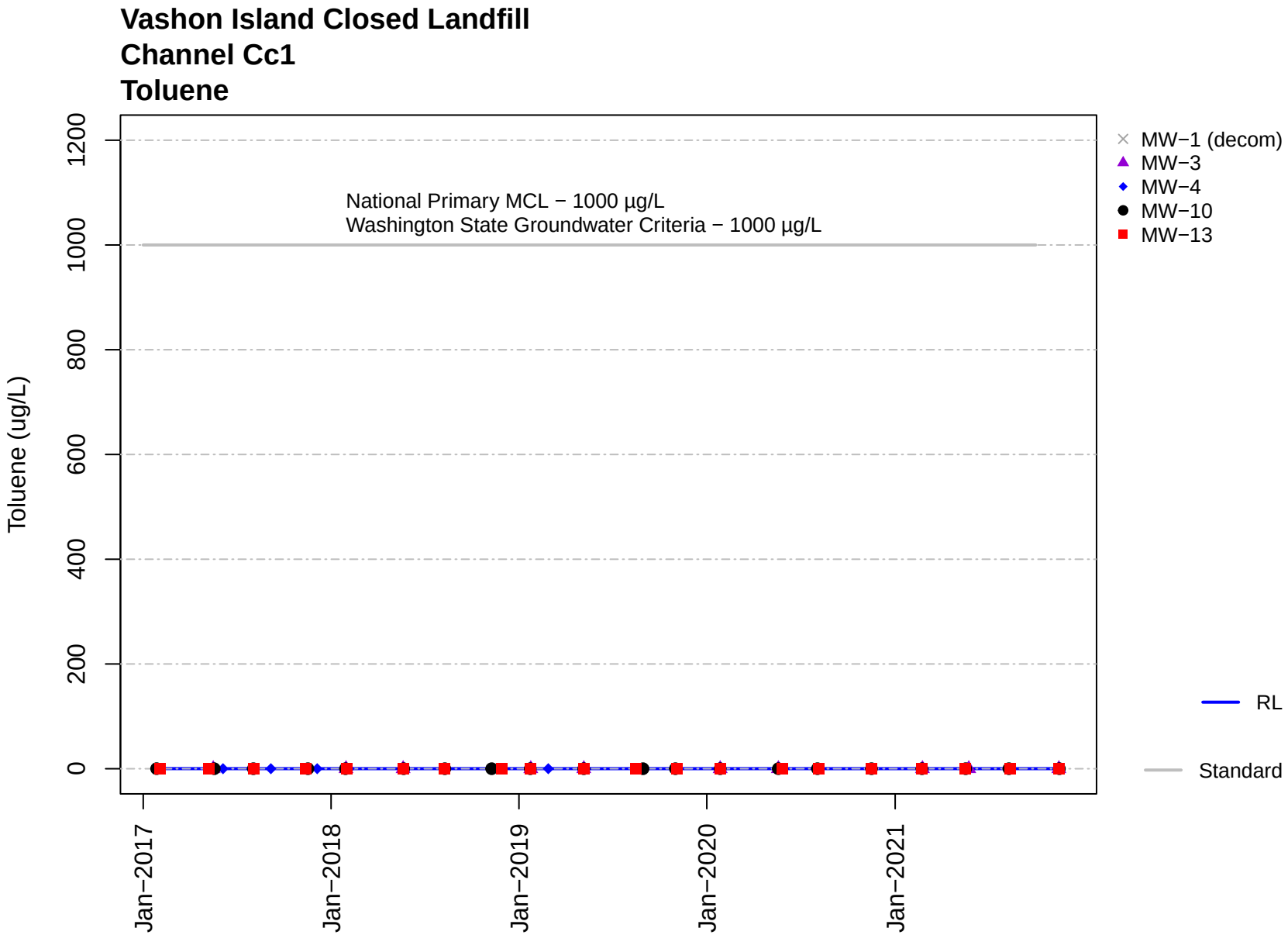

Vashon Island Closed Landfill
Channel Cc1
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0.0
0.2
0.4
0.6
0.8
1.0
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

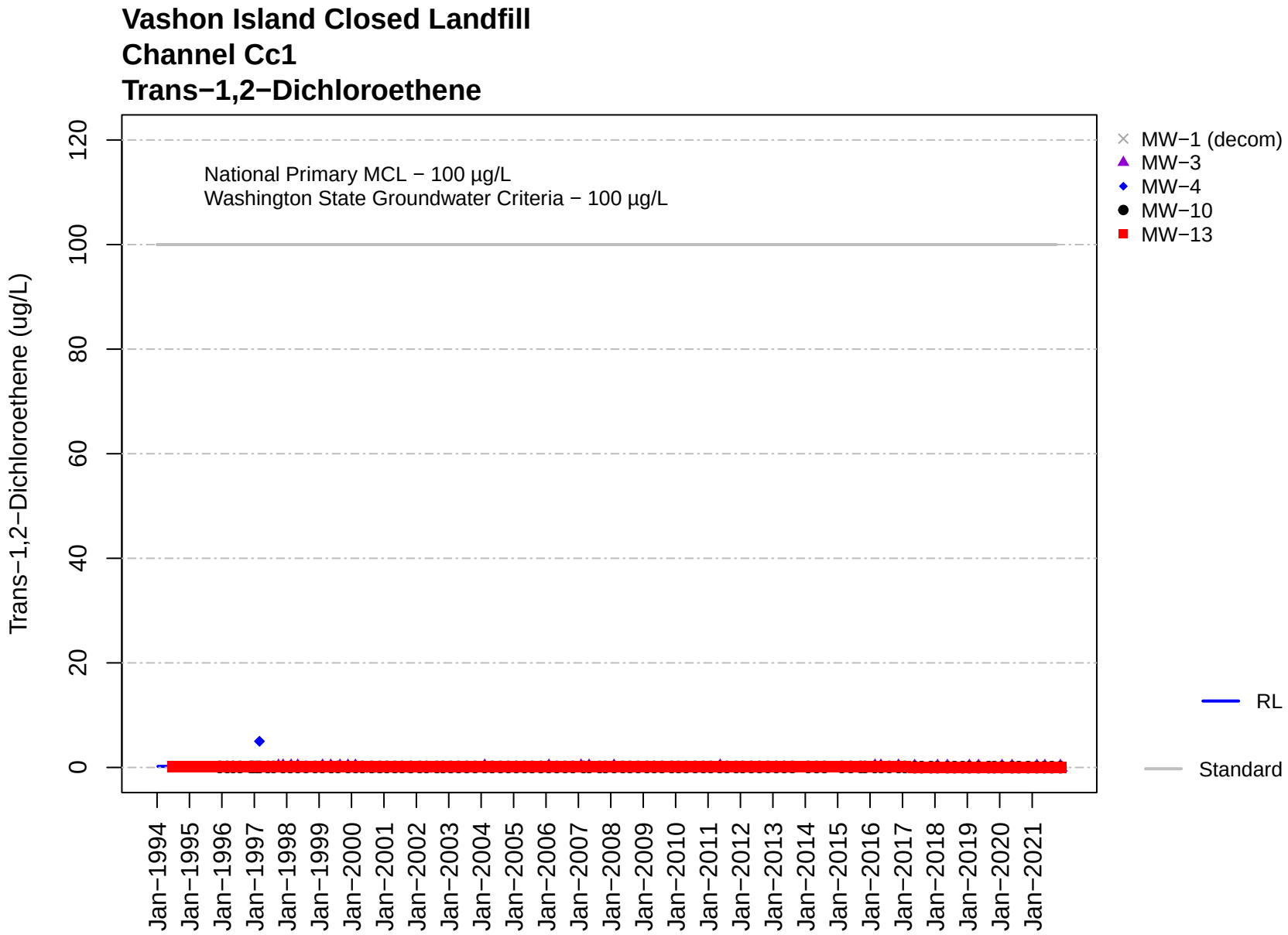

Vashon Island Closed Landfill
Channel Cc1
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0
1
2
3
4
5
6
7
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

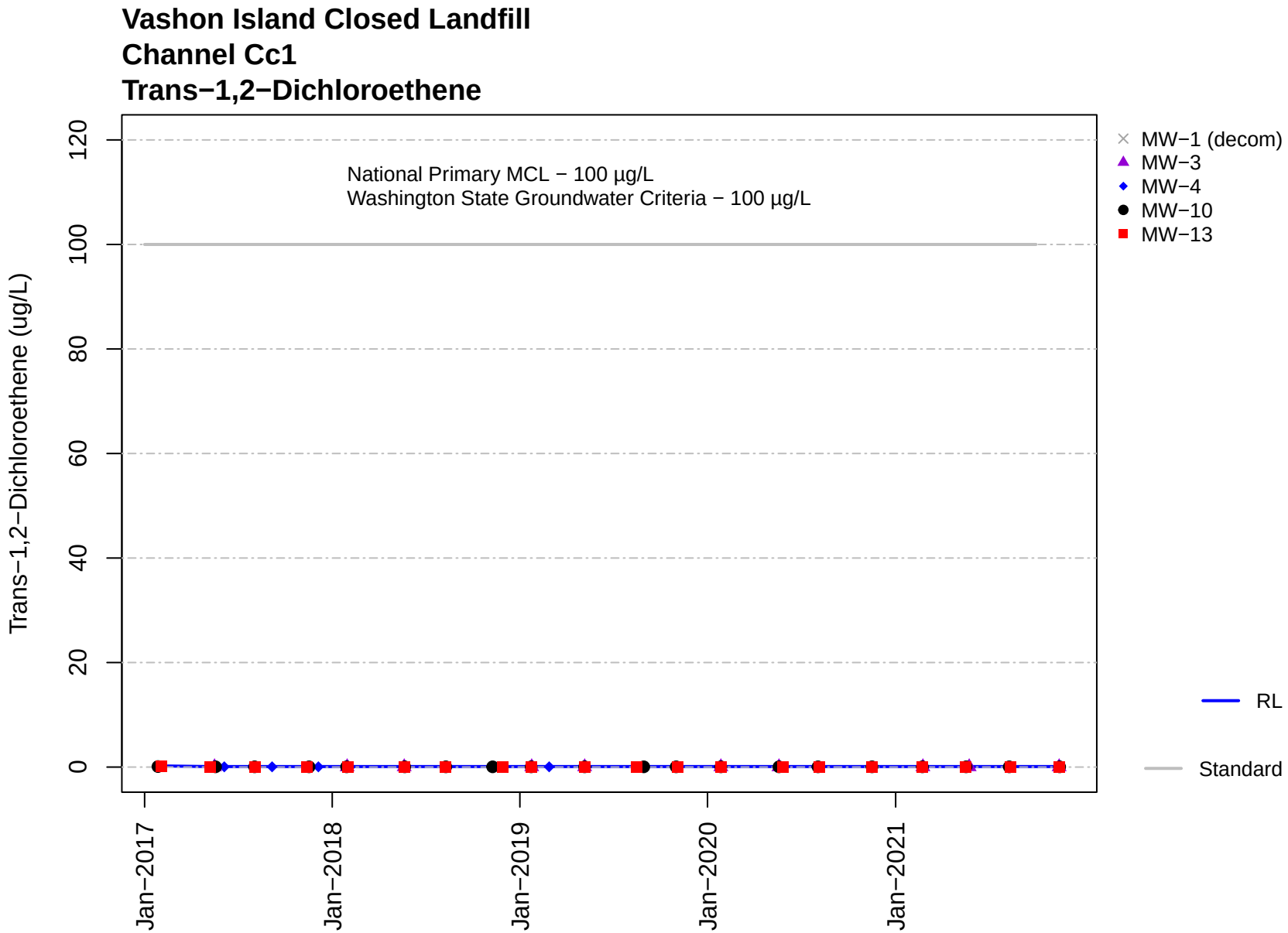

Vashon Island Closed Landfill
Channel Cc1
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

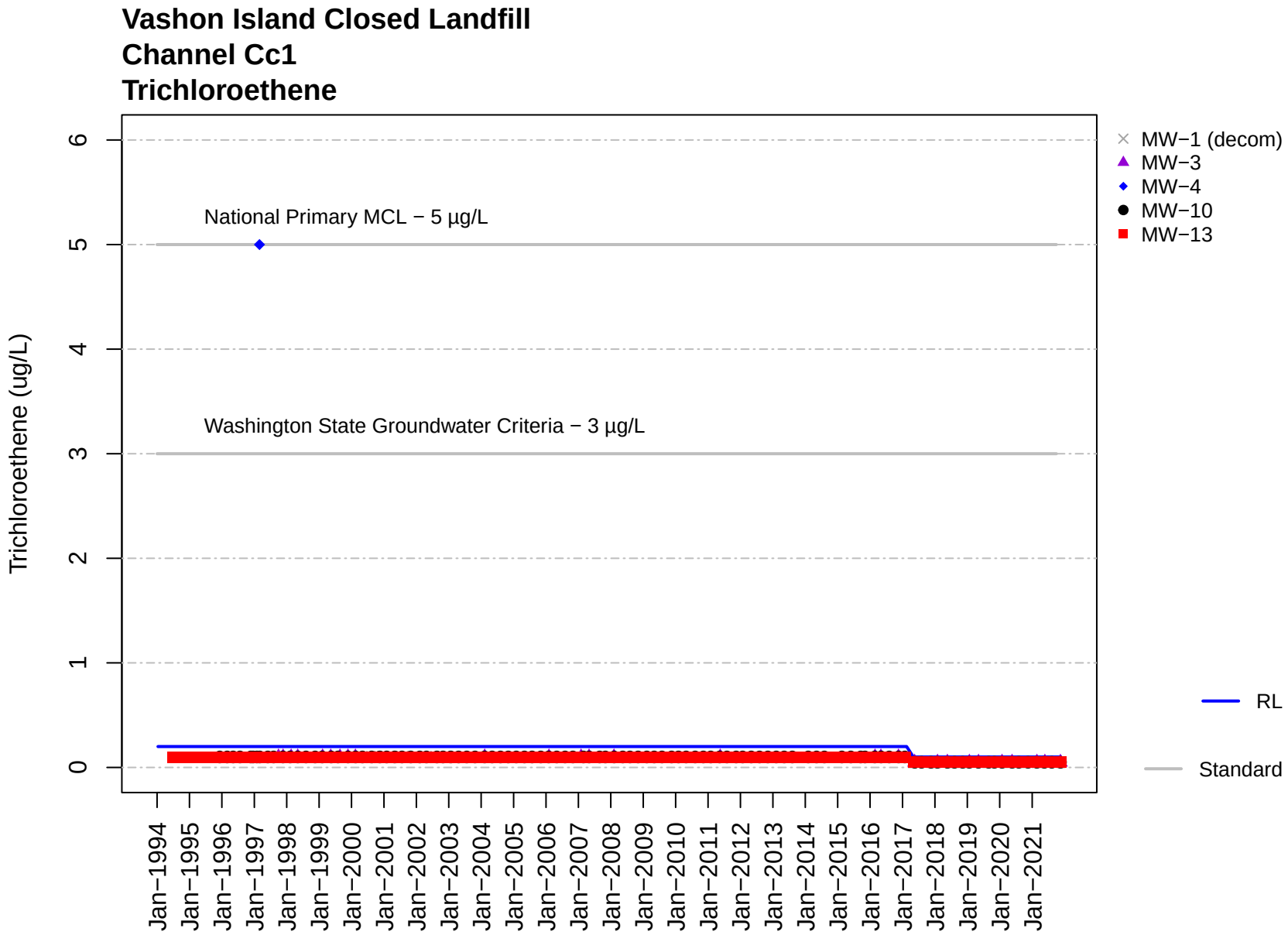

Vashon Island Closed Landfill
Channel Cc1
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

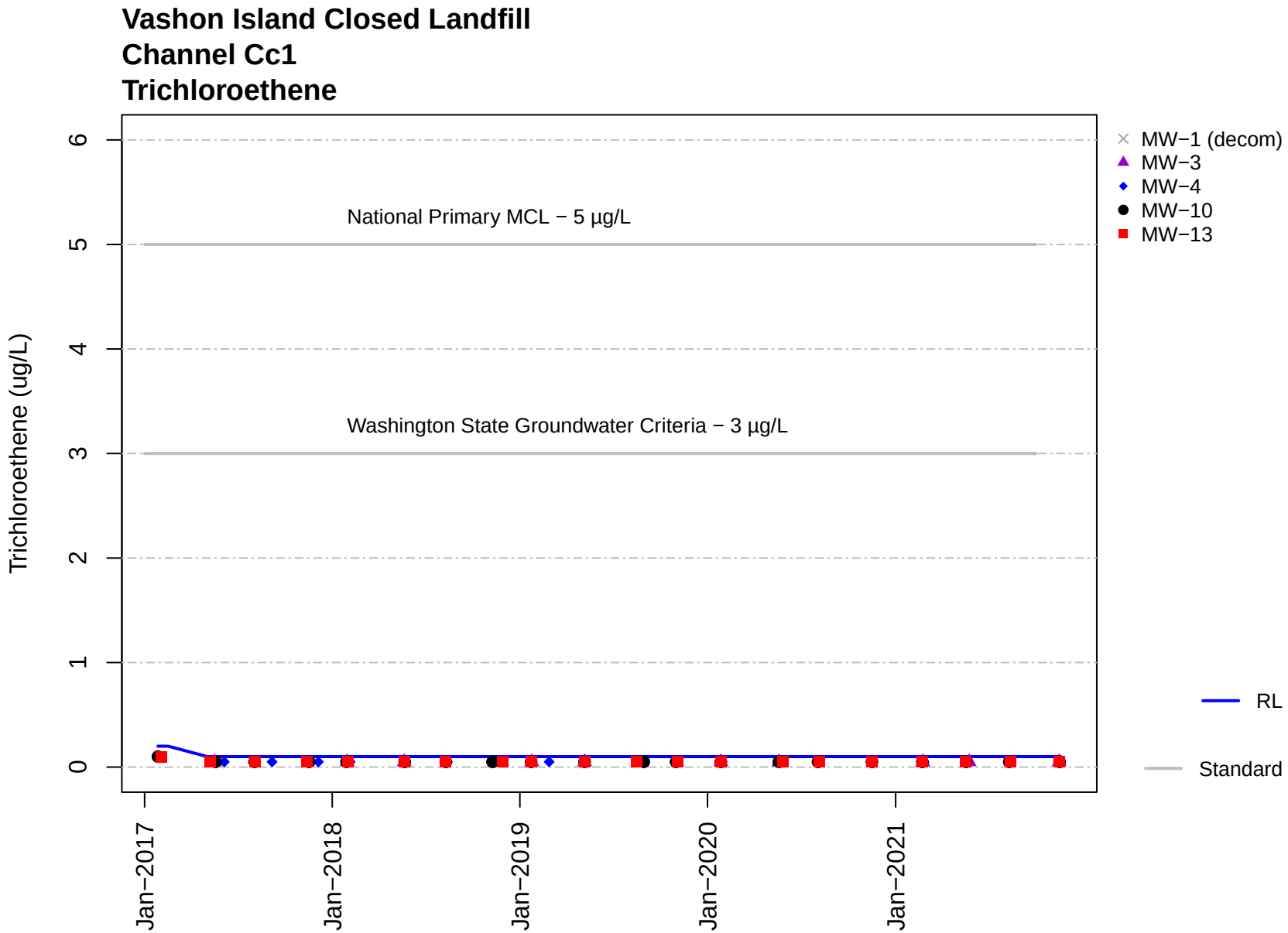

Vashon Island Closed Landfill
Channel Cc1
Toluene
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Toluene (ug/L)
0
200
400
600
800
1000
1200
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

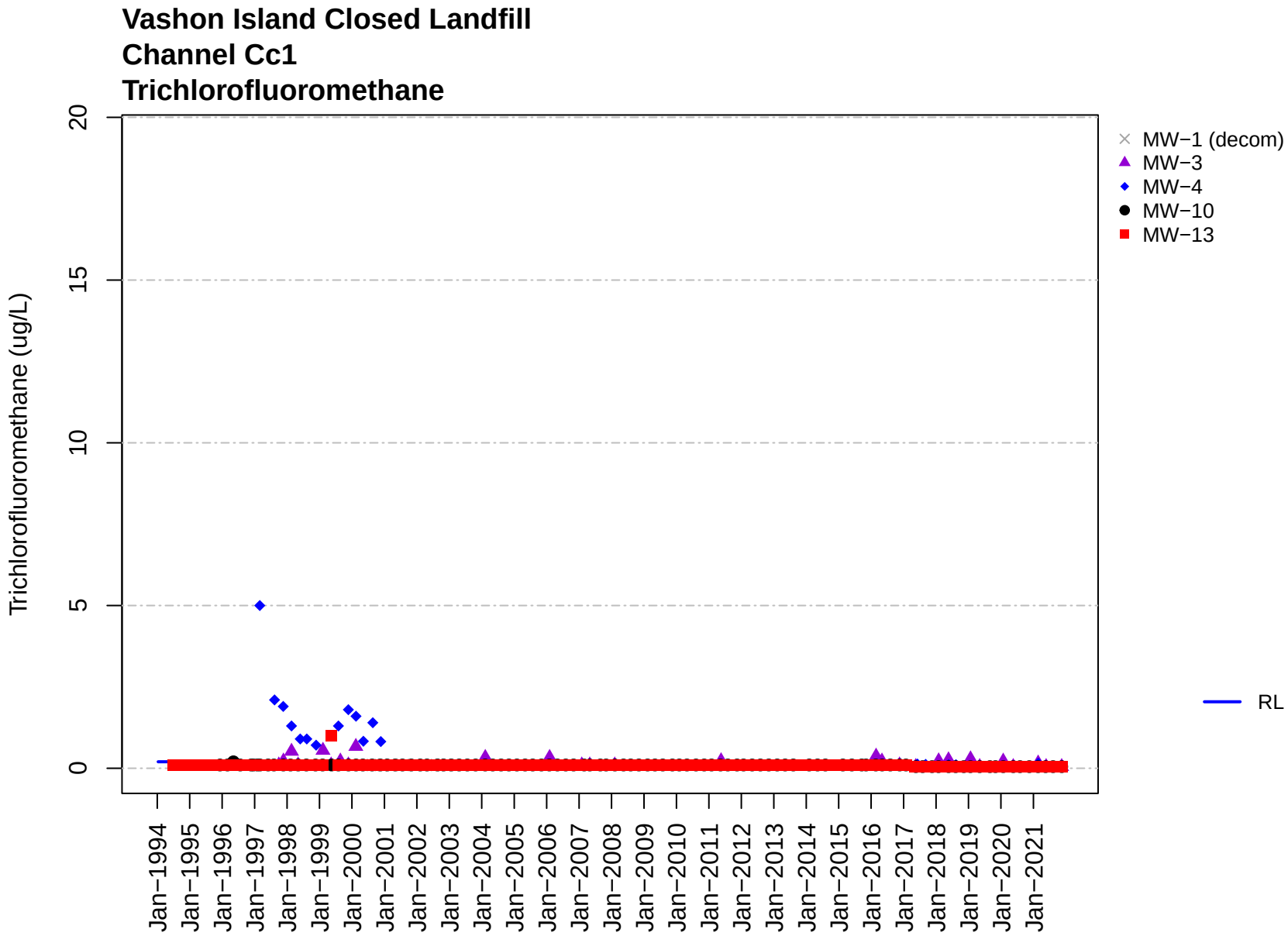

Vashon Island Closed Landfill
Channel Cc1
Toluene
Toluene (ug/L)
0
200
400
600
800
1000
1200
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

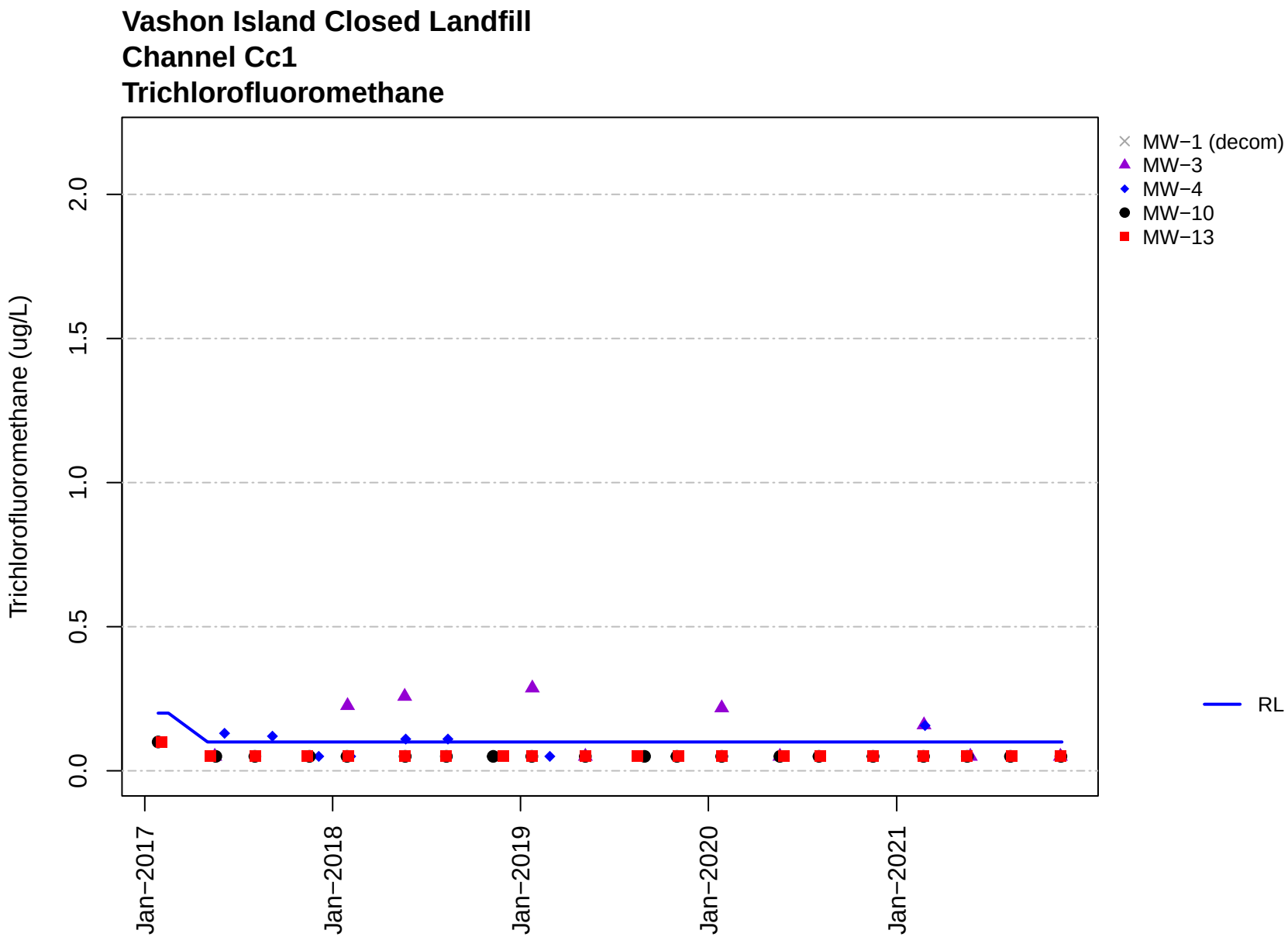

Vashon Island Closed Landfill
Channel Cc1
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

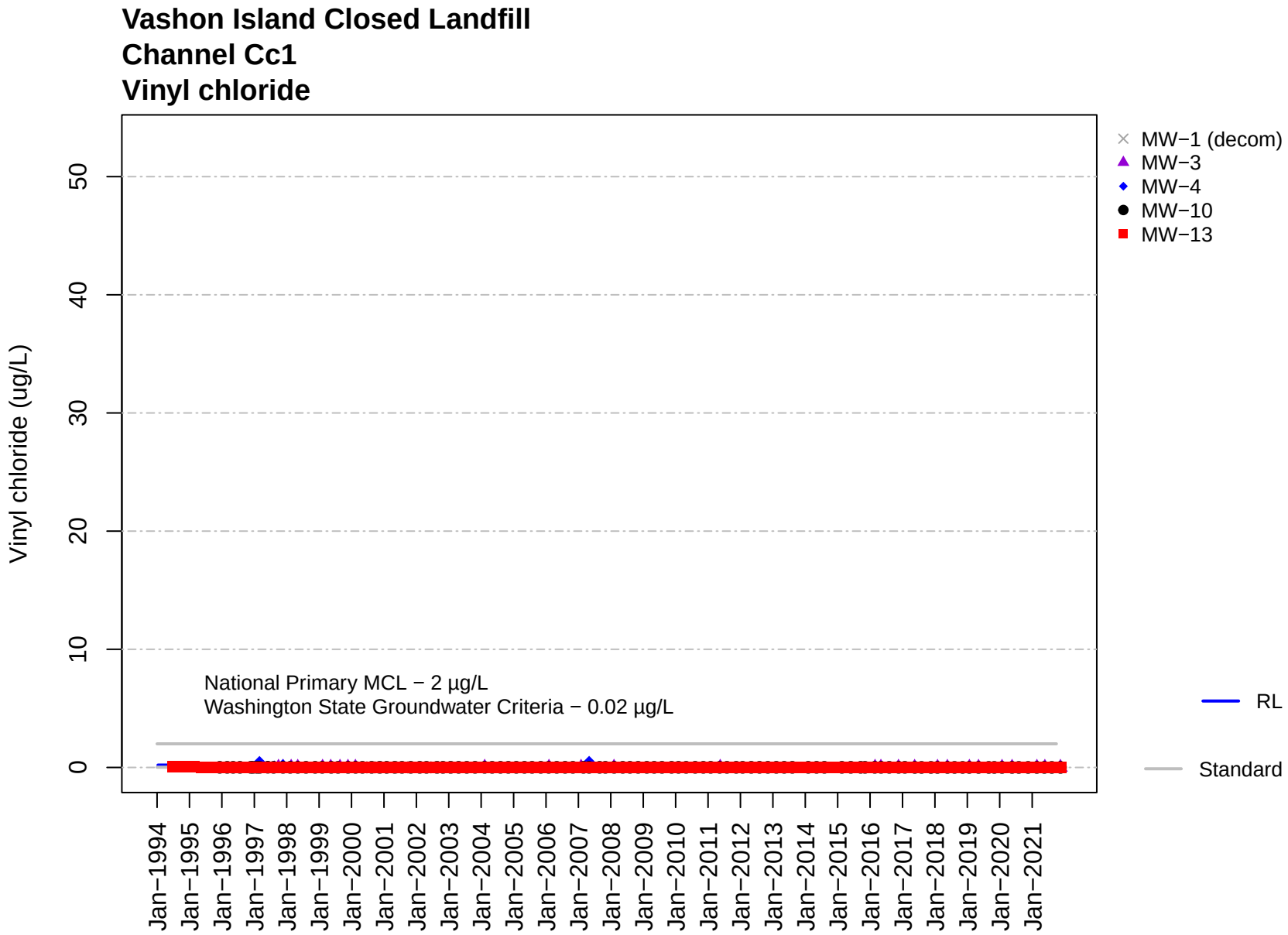

Vashon Island Closed Landfill
Channel Cc1
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

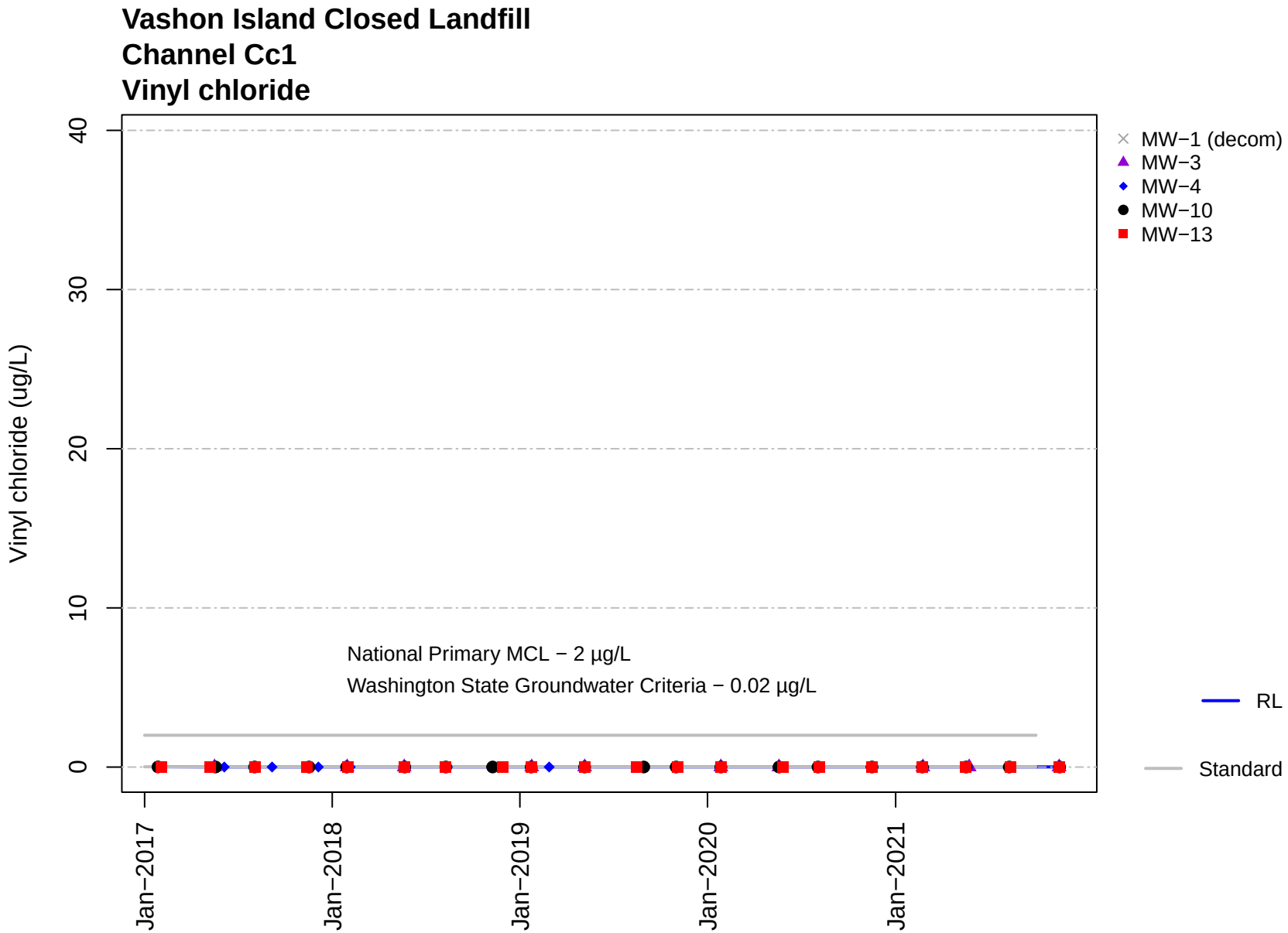

Vashon Island Closed Landfill
Channel Cc1
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021


Vashon Island Closed Landfill
Channel Cc1
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard


Vashon Island Closed Landfill
Channel Cc1
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0
5
10
15
20
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

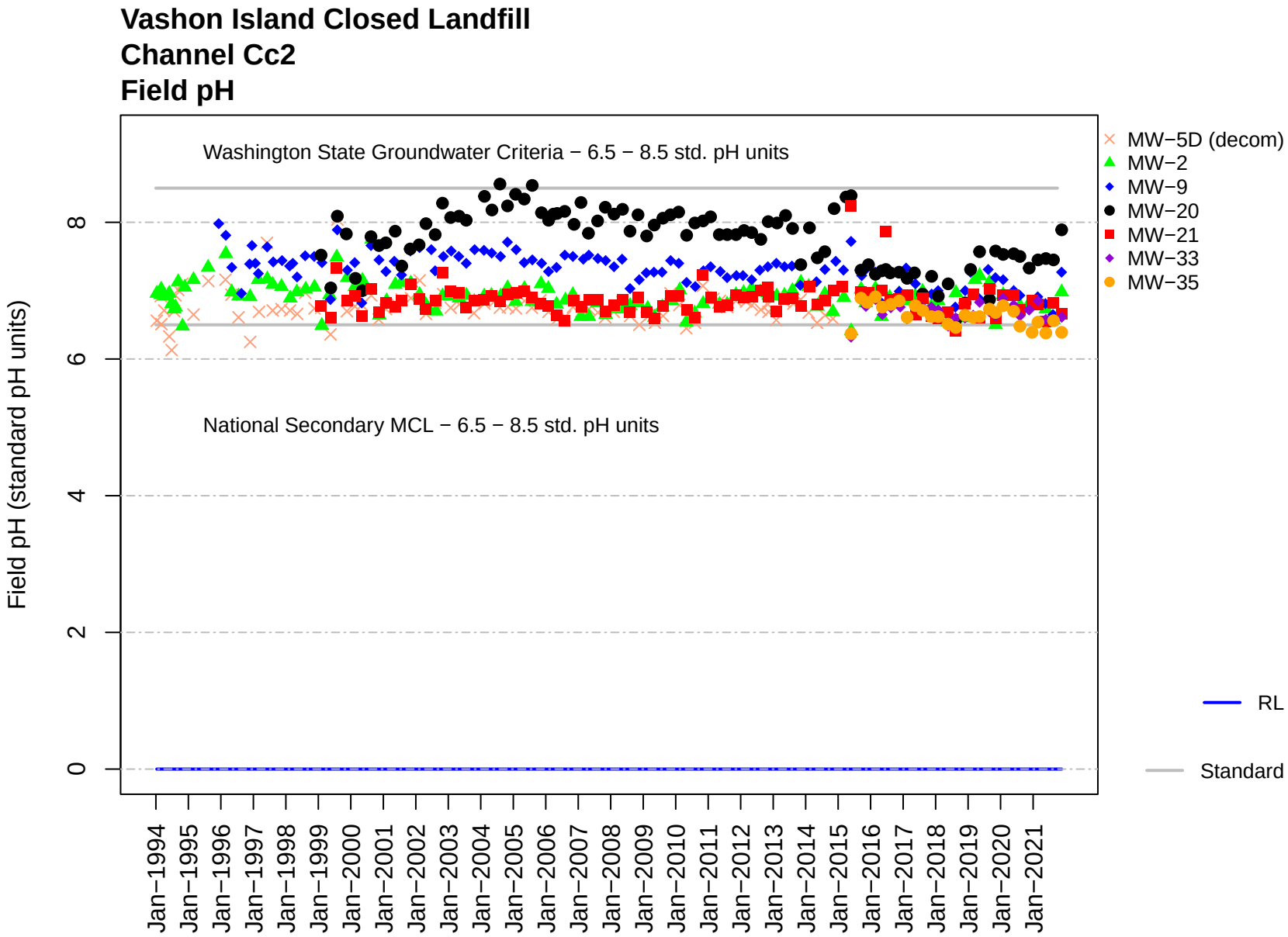

Vashon Island Closed Landfill
Channel Cc1
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

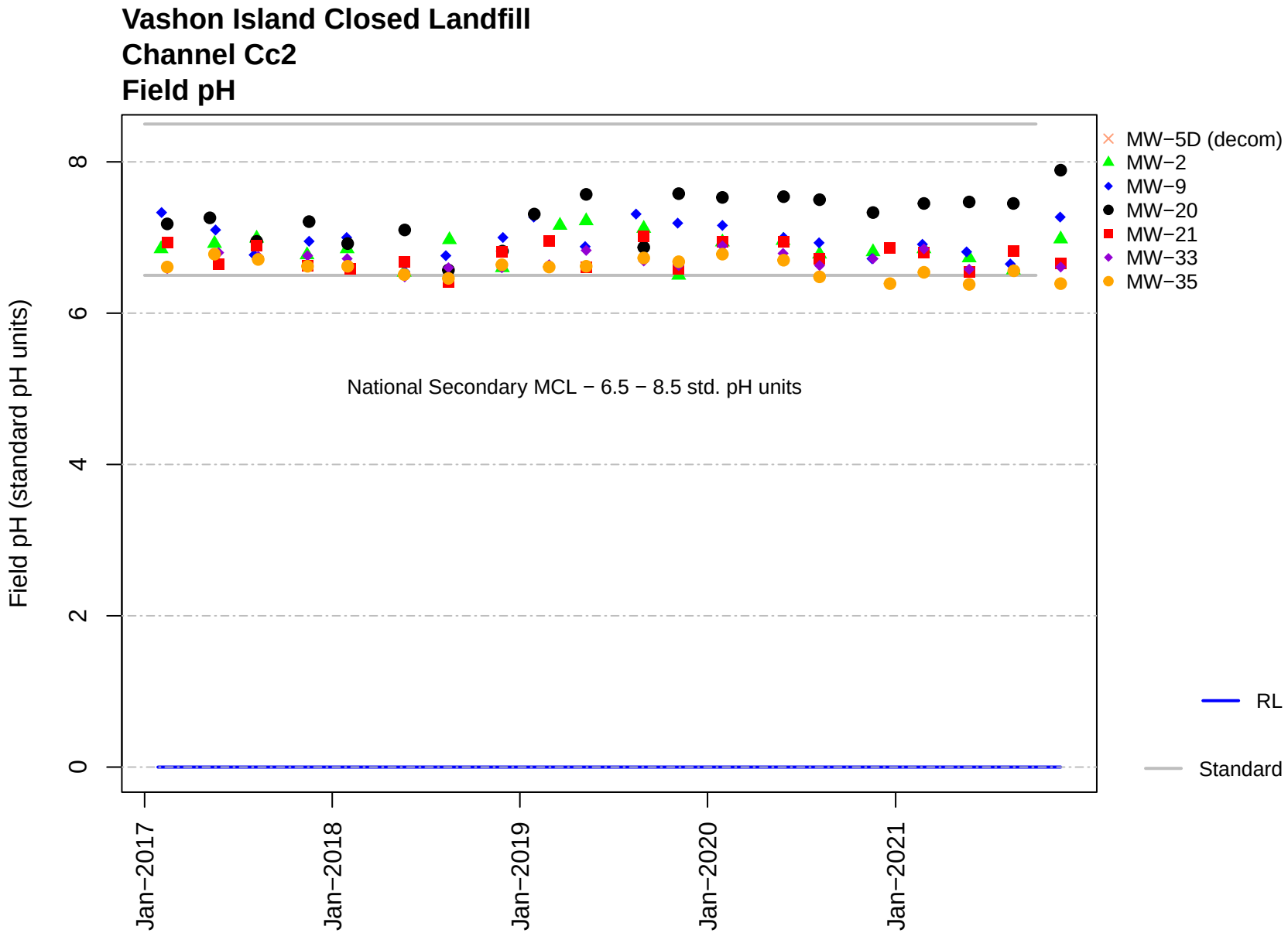

Vashon Island Closed Landfill
Channel Cc1
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
50
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

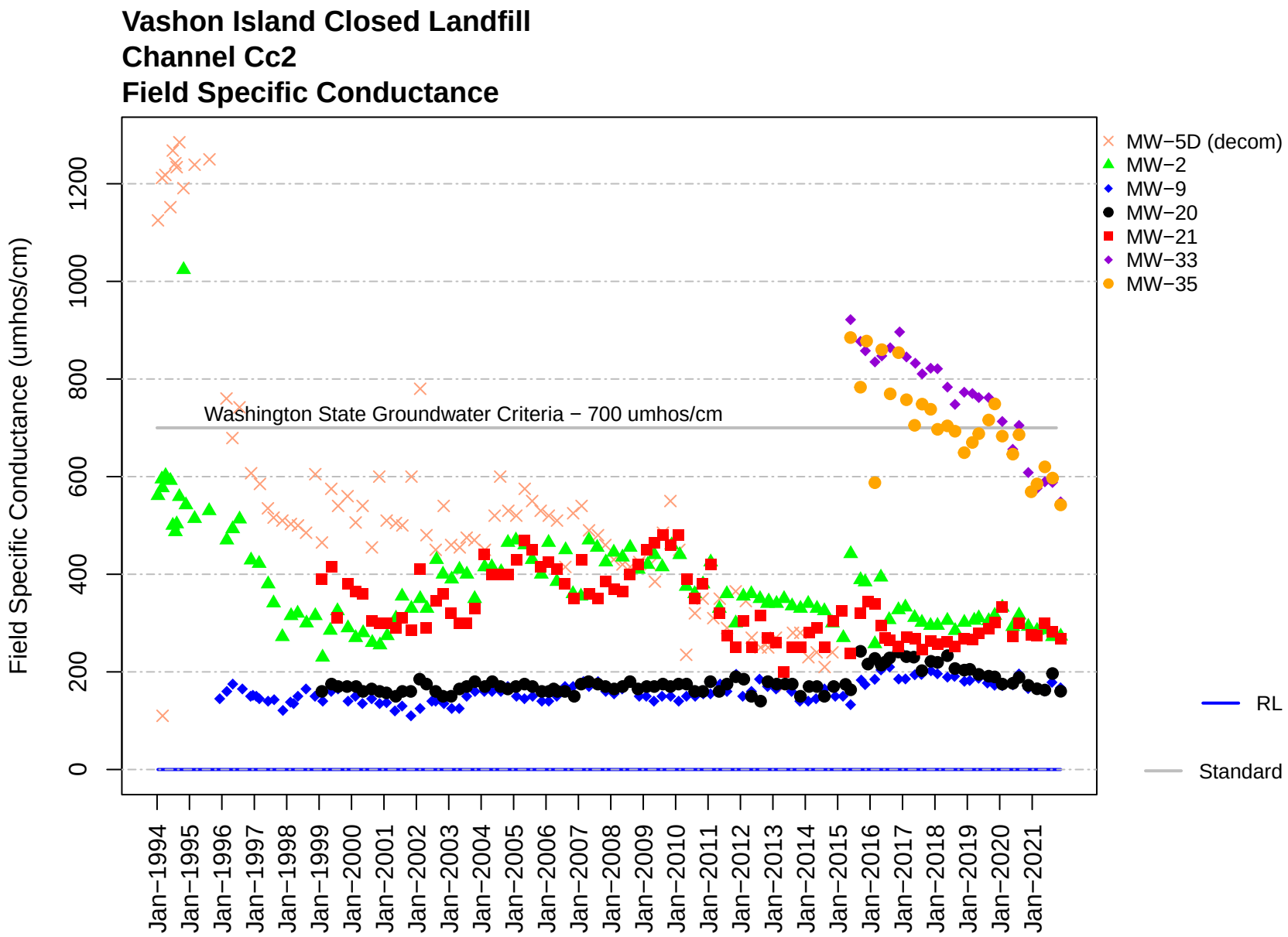

Vashon Island Closed Landfill
Channel Cc1
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

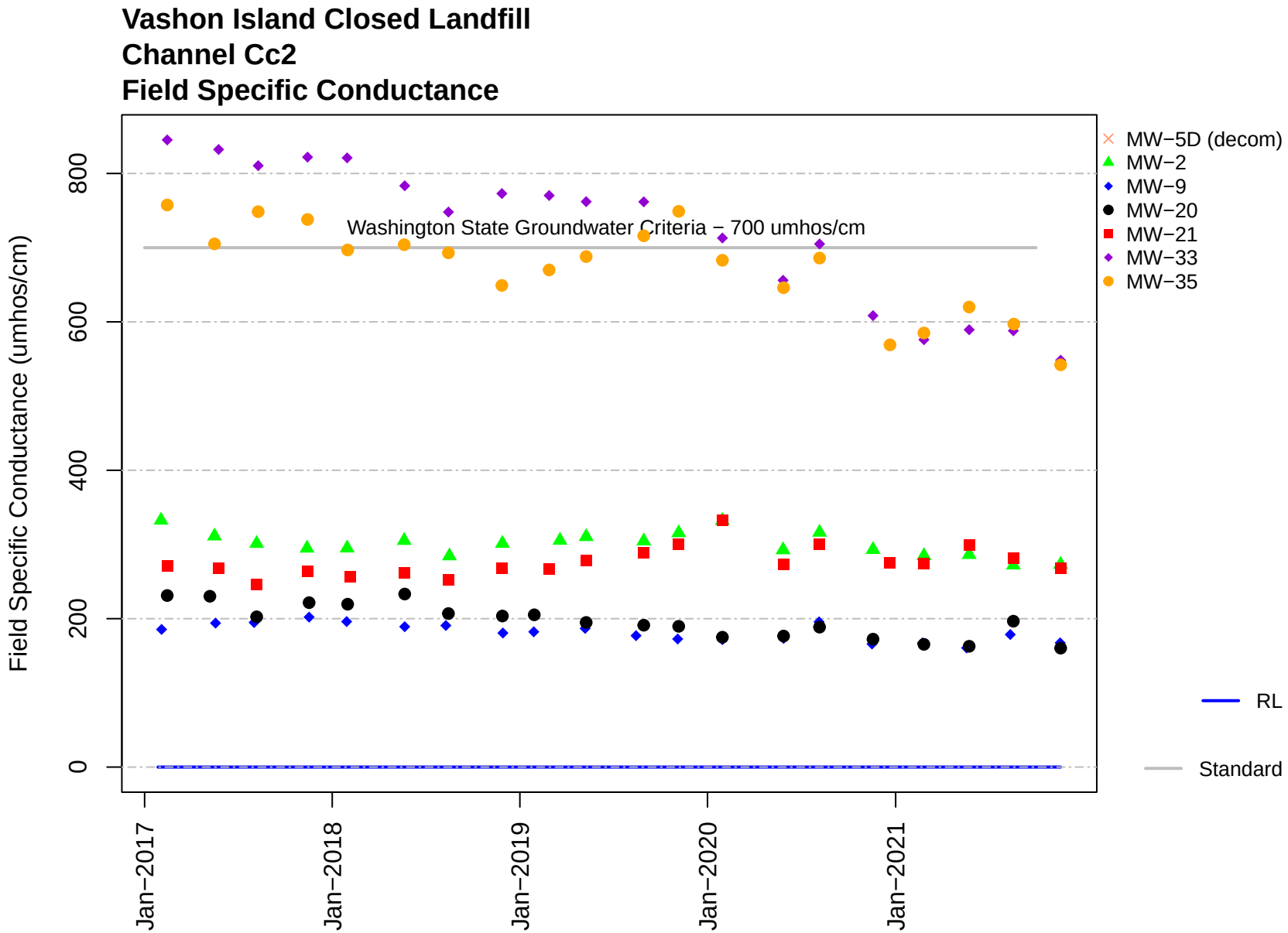
Appendix D

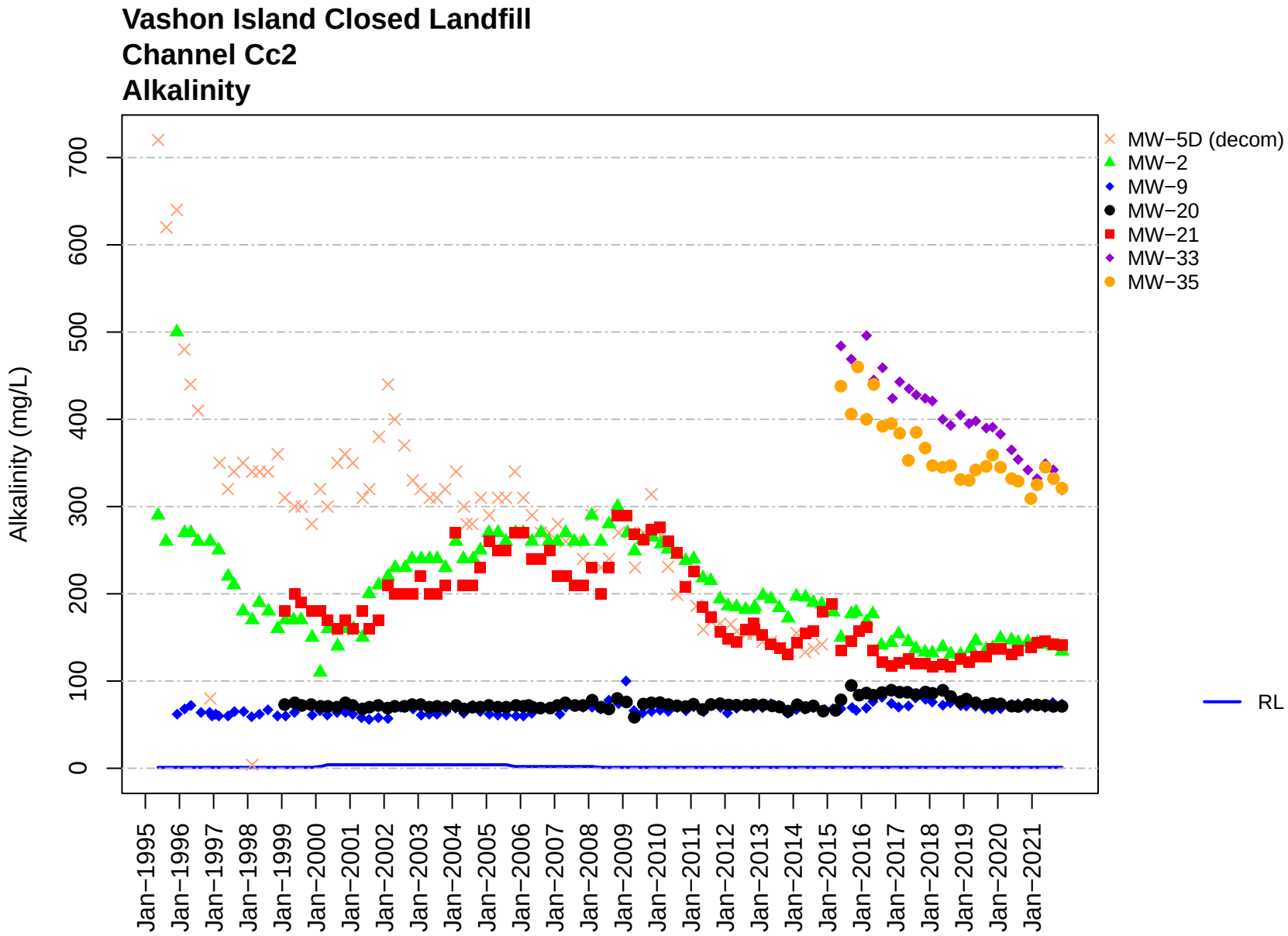
Time Concentration Plots for
Groundwater in Channel Cc2

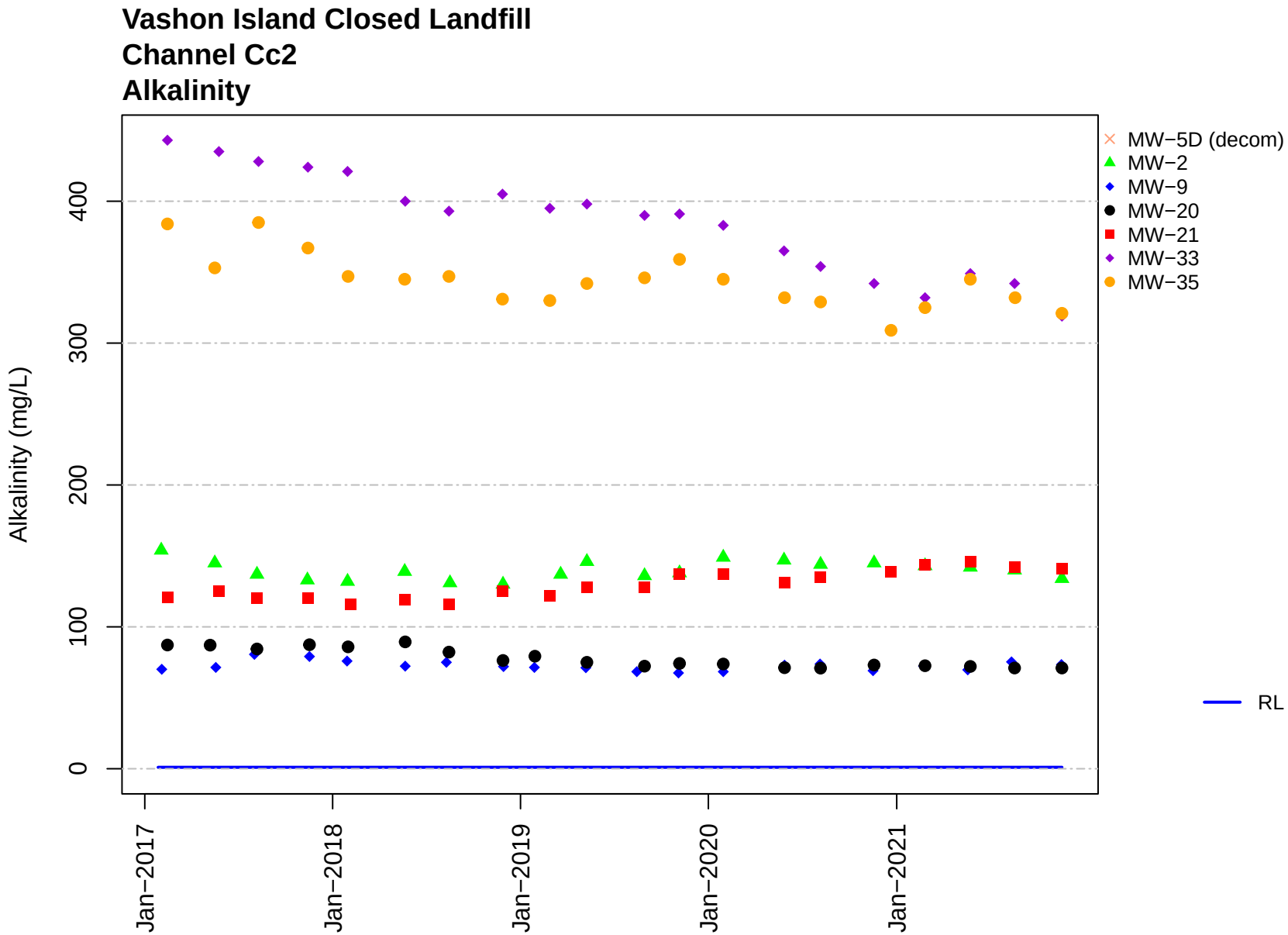

Vashon Island Closed Landfill
Channel Cc2
Field pH
Washington State Groundwater Criteria − 6.5 − 8.5 std. pH units
National Secondary MCL − 6.5 − 8.5 std. pH units
Field pH (standard pH units)
0
2
4
6
8
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

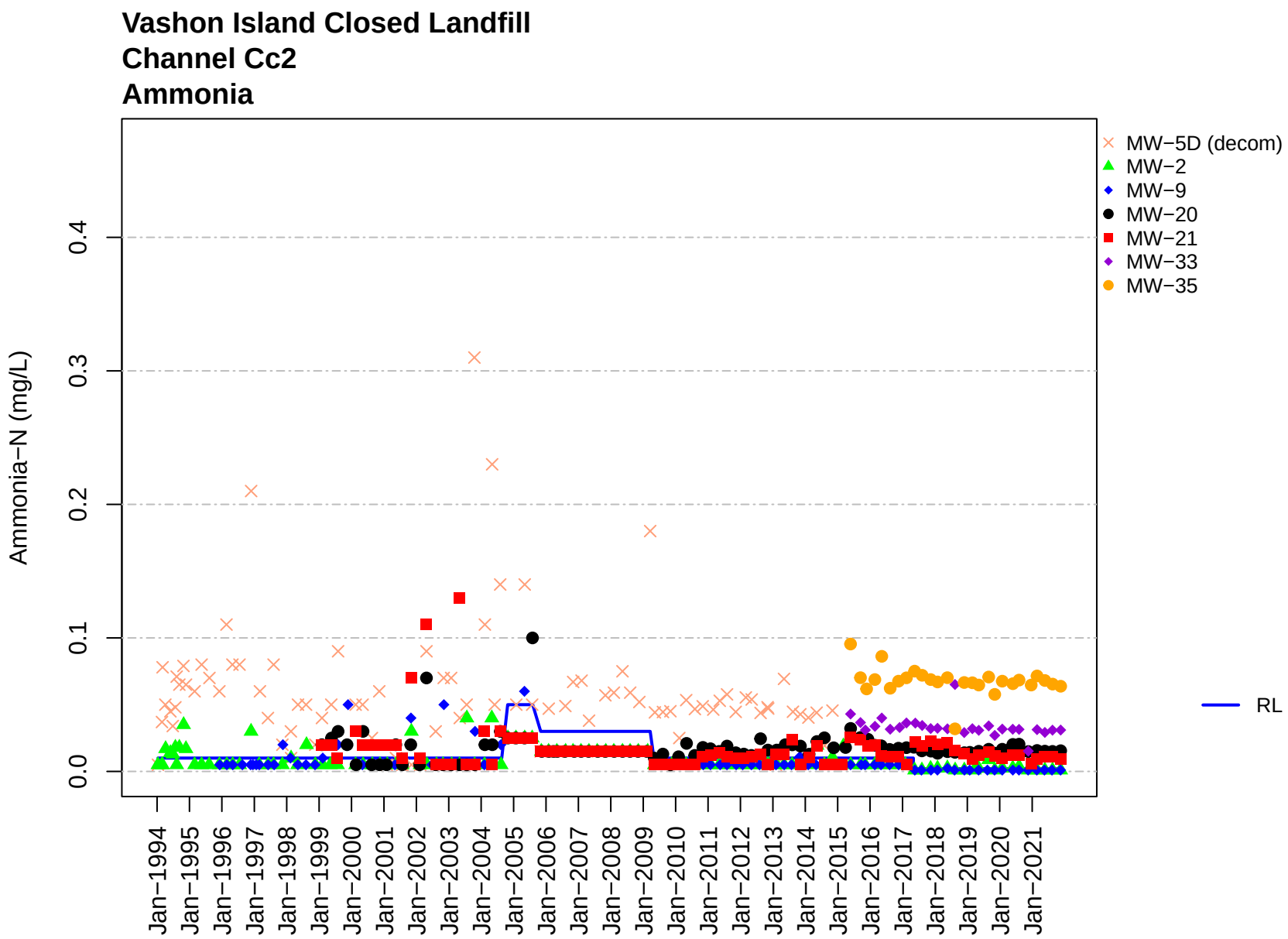

Vashon Island Closed Landfill
Channel Cc2
Field pH
Field pH (standard pH units)
0
2
4
6
8
National Secondary MCL − 6.5 − 8.5 std. pH units
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

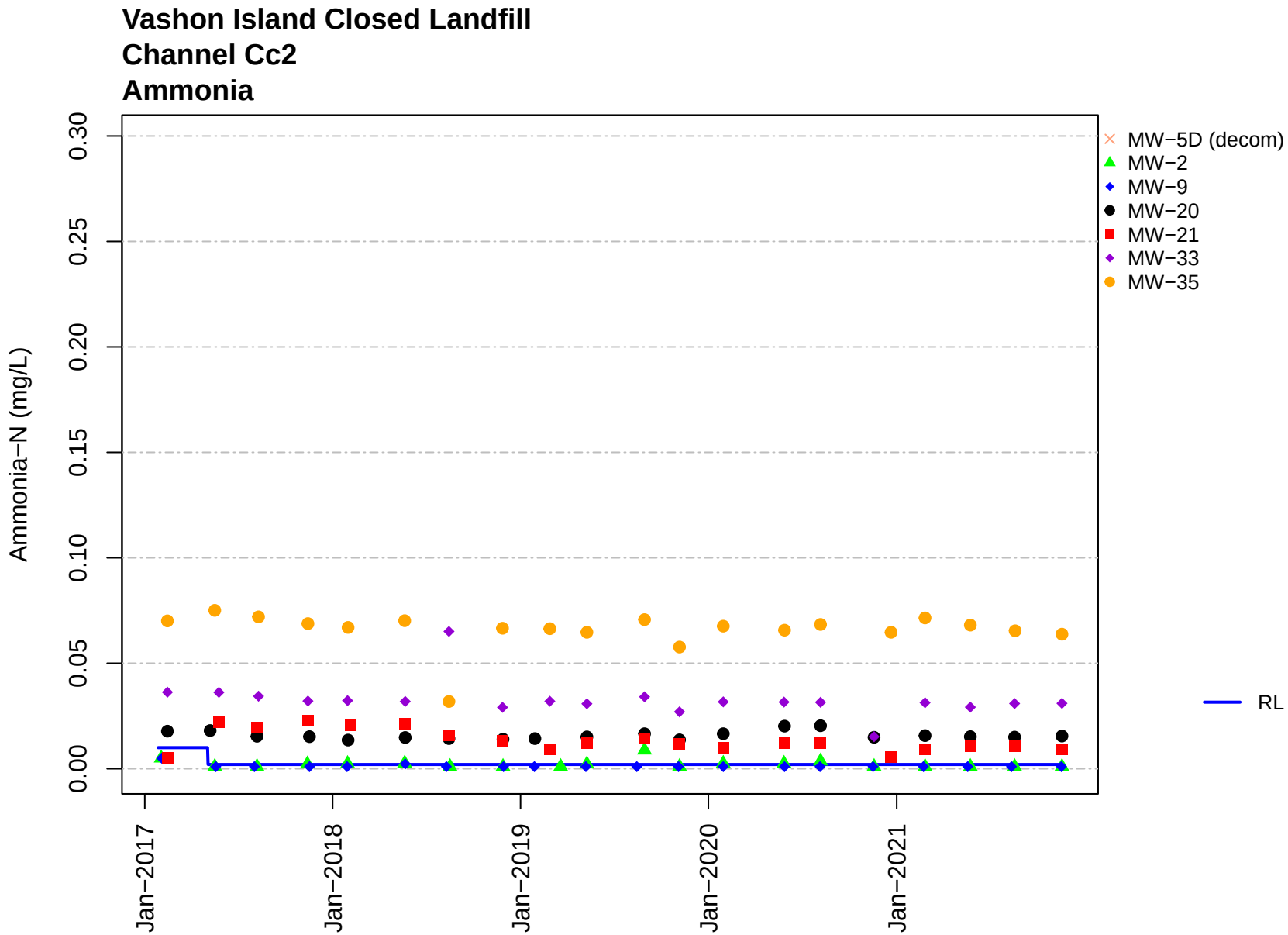

Vashon Island Closed Landfill
Channel Cc2
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
1000
1200
Washington State Groundwater Criteria − 700 umhos/cm
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

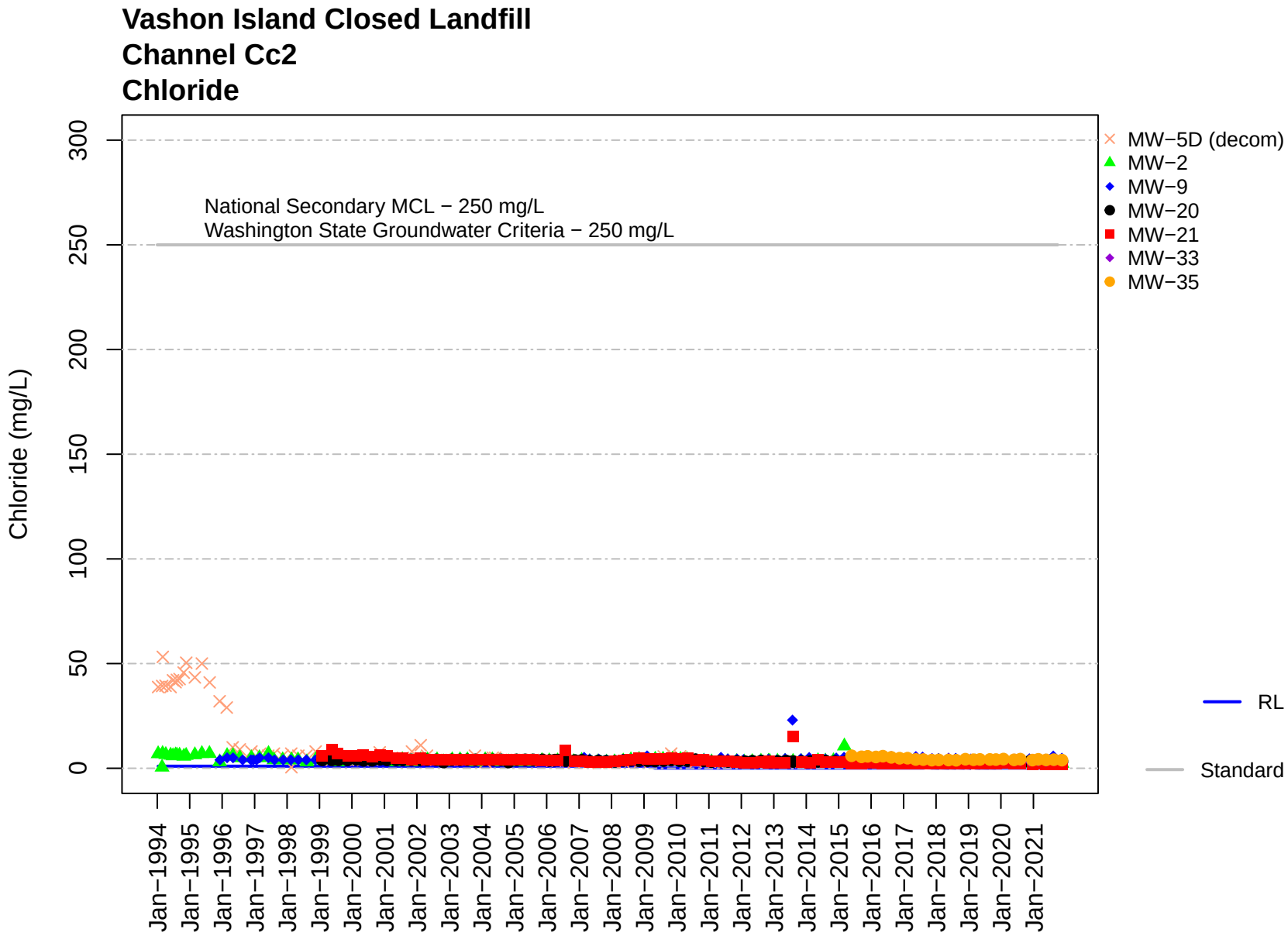

Vashon Island Closed Landfill
Channel Cc2
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
Washington State Groundwater Criteria – 700 umhos/cm
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

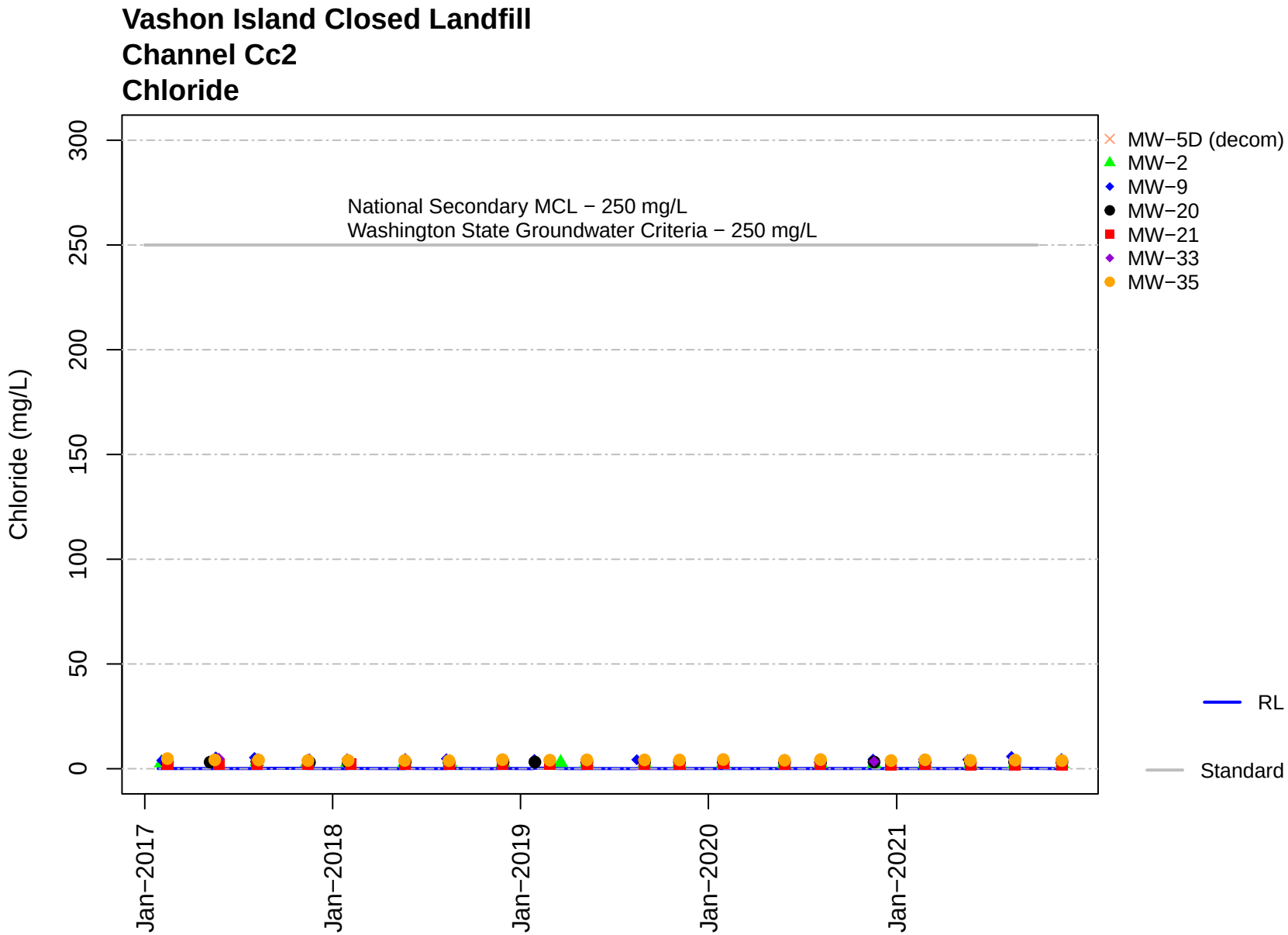

Vashon Island Closed Landfill
Channel Cc2
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
500
600
700
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

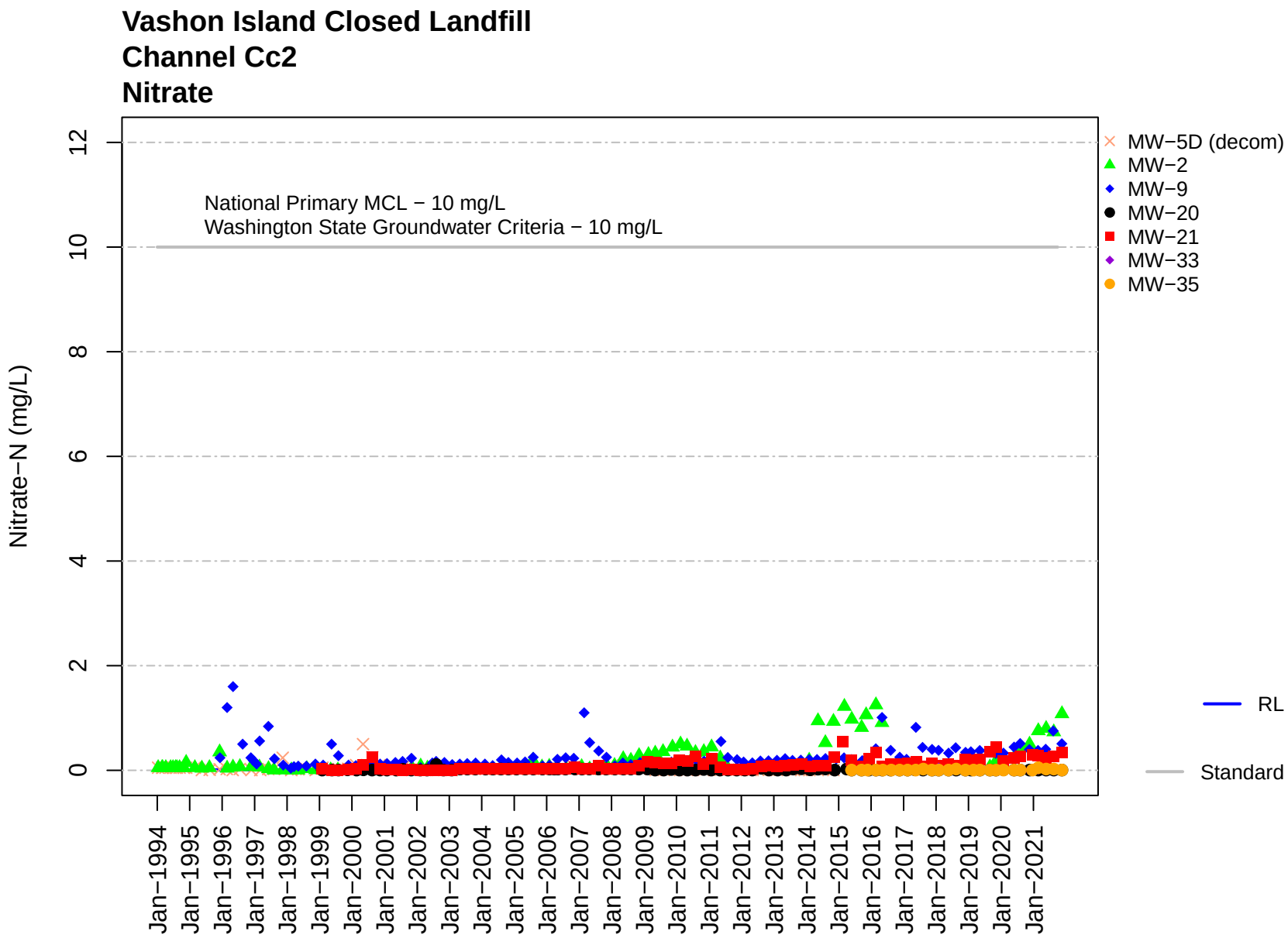

Vashon Island Closed Landfill
Channel Cc2
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

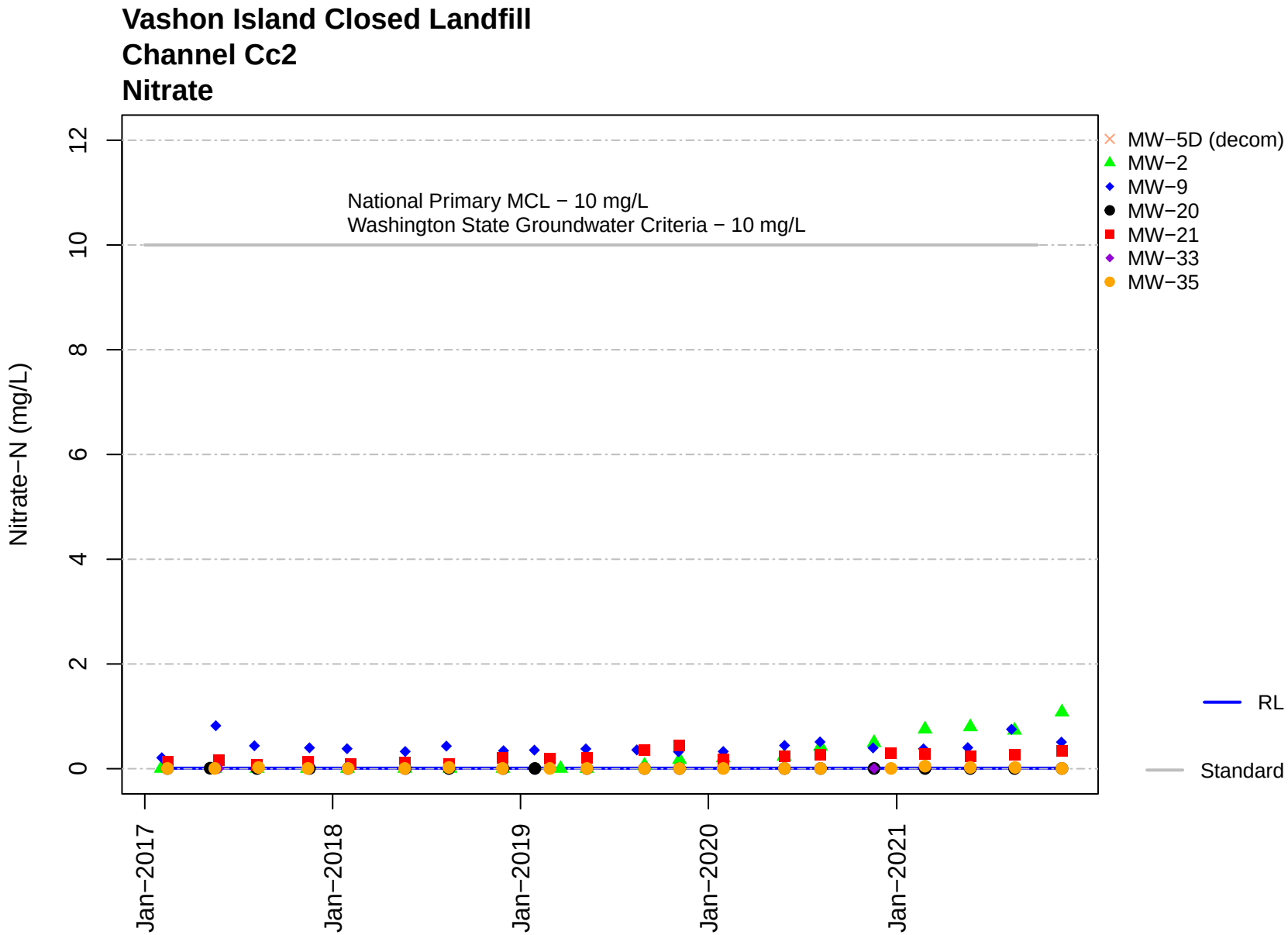

Vashon Island Closed Landfill
Channel Cc2
Ammonia
Ammonia−N (mg/L)
0.0
0.1
0.2
0.3
0.4
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

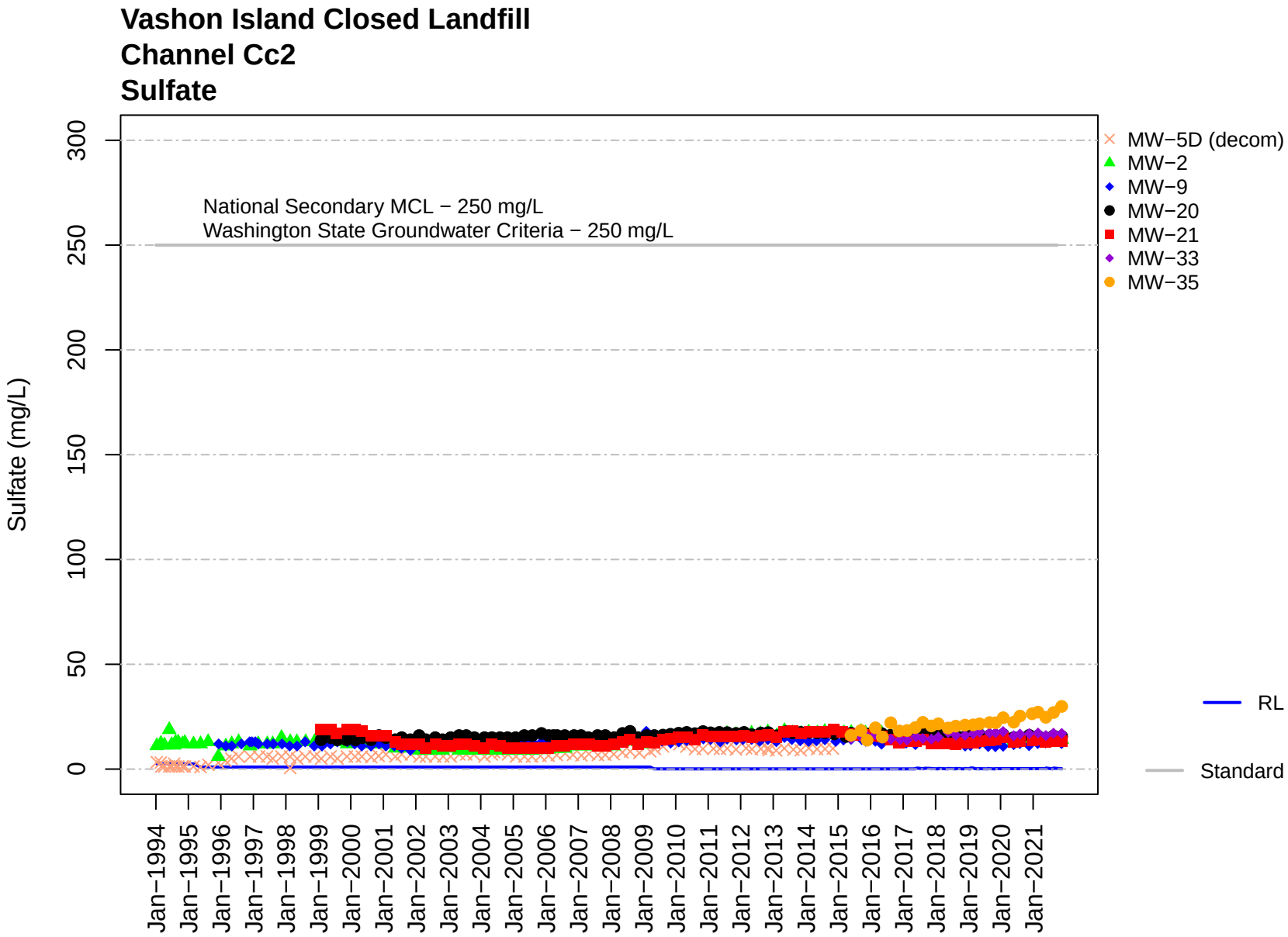

Vashon Island Closed Landfill
Channel Cc2
Ammonia
Ammonia−N (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

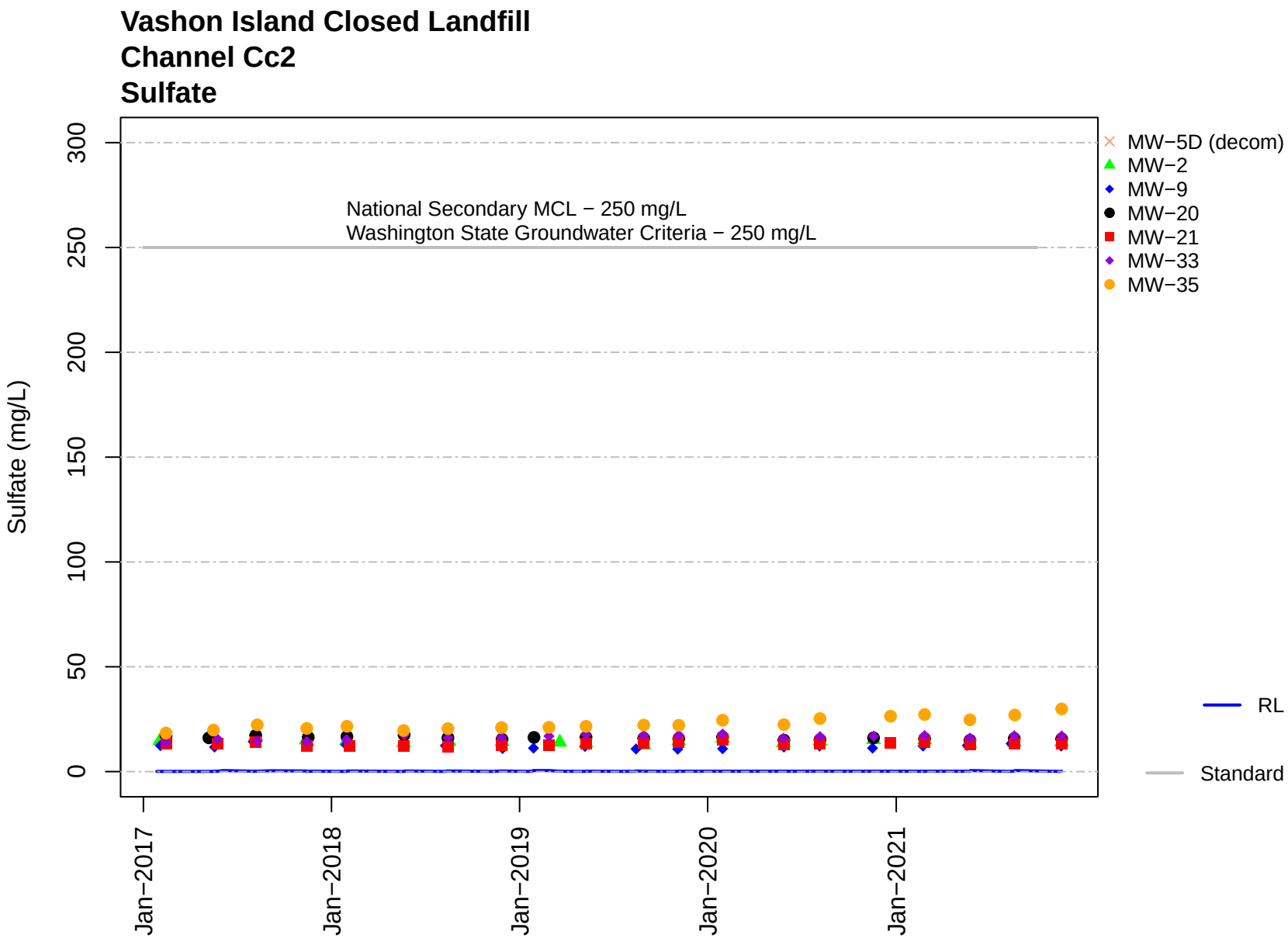

Vashon Island Closed Landfill
Channel Cc2
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

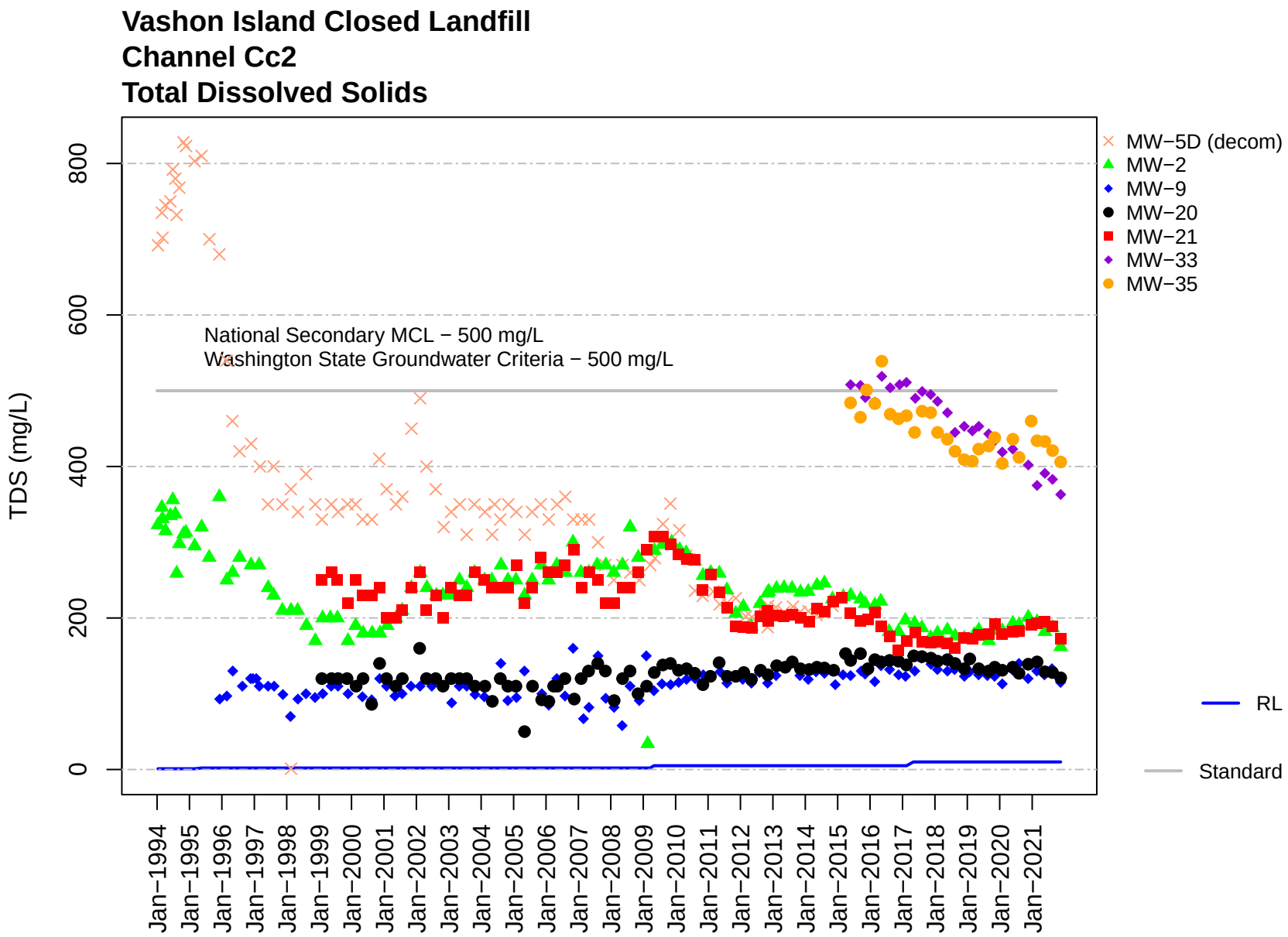

Vashon Island Closed Landfill
Channel Cc2
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

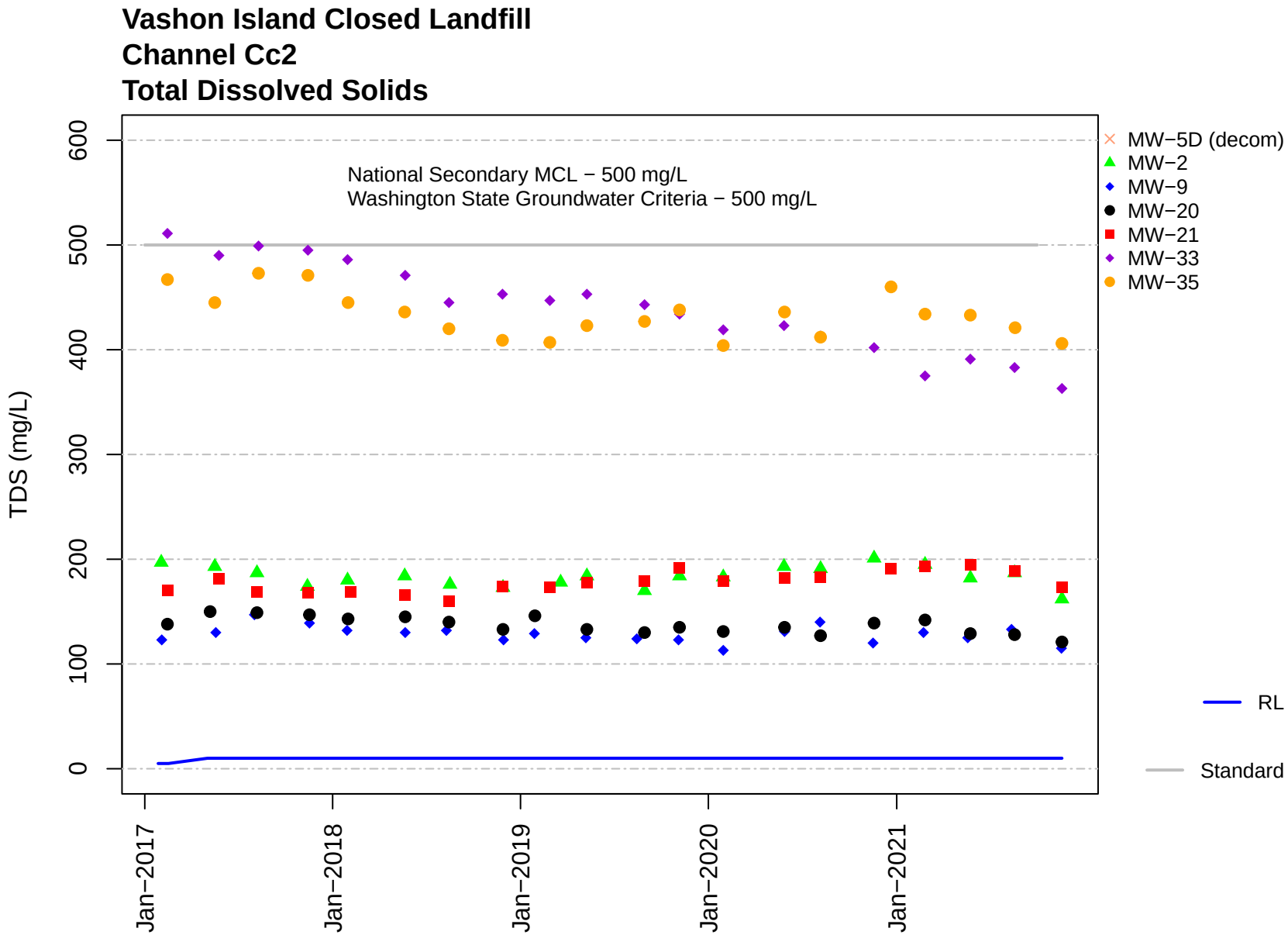

Vashon Island Closed Landfill
Channel Cc2
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

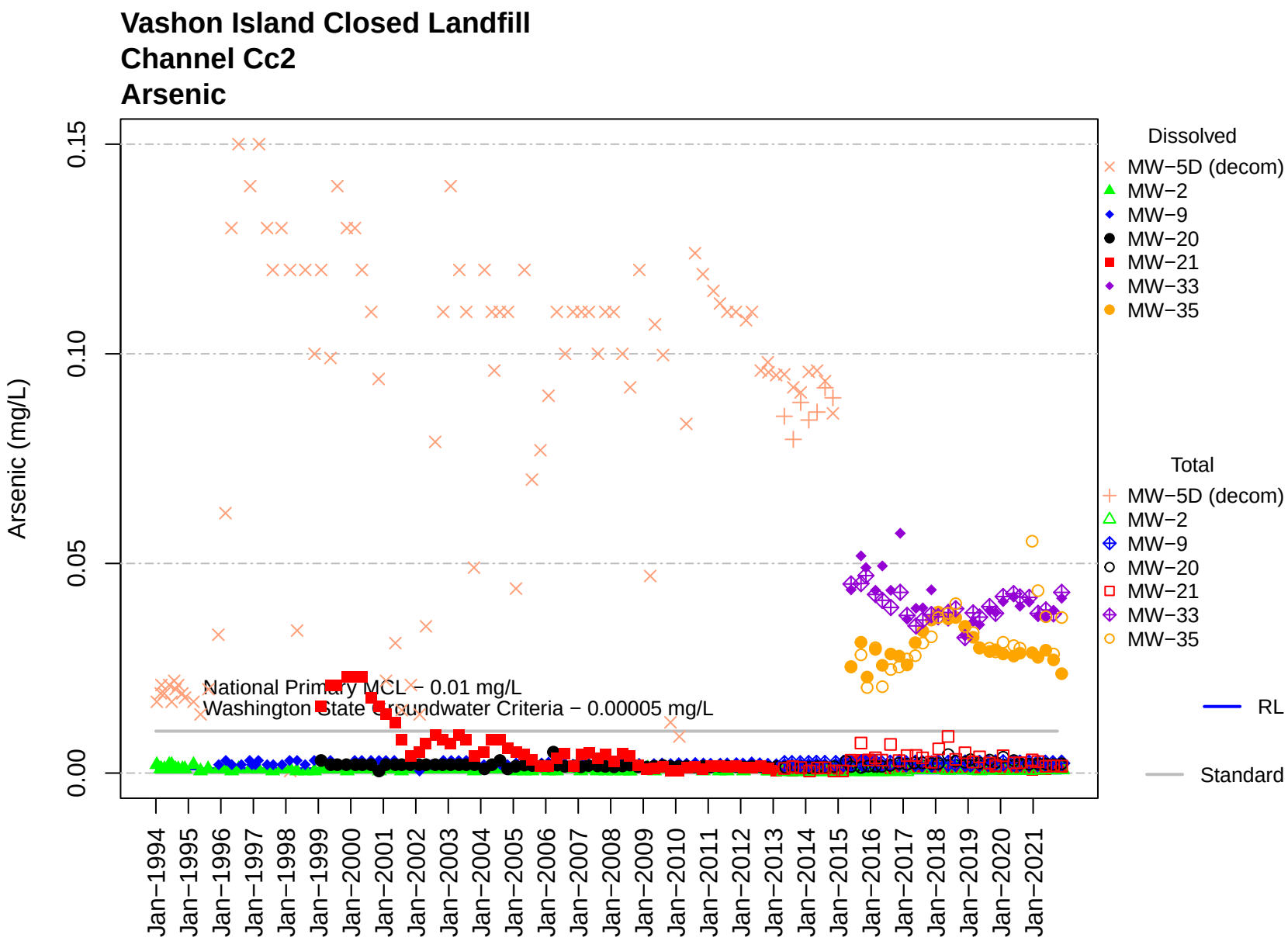

Vashon Island Closed Landfill
Channel Cc2
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

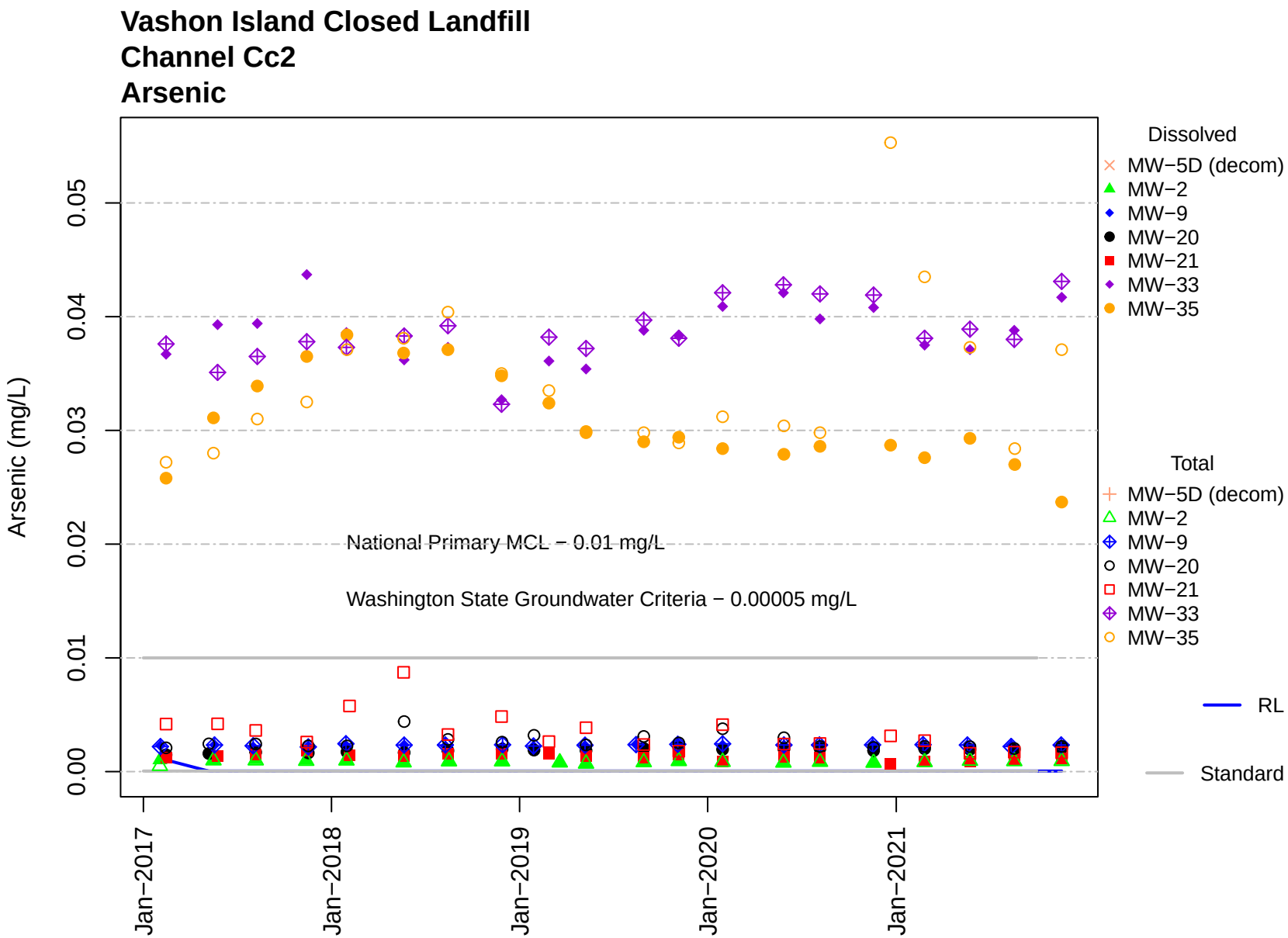

Vashon Island Closed Landfill
Channel Cc2
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

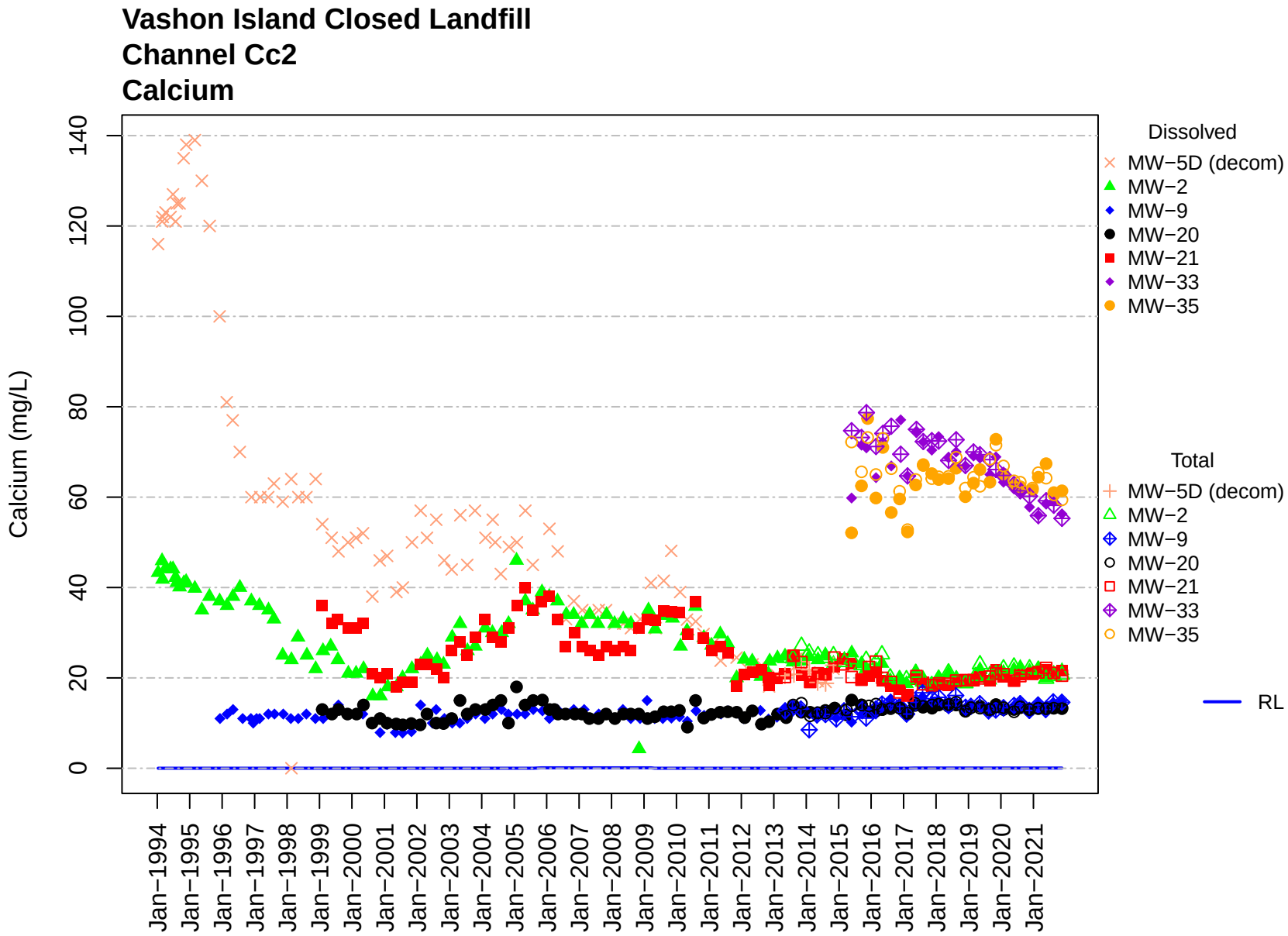

Vashon Island Closed Landfill
Channel Cc2
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

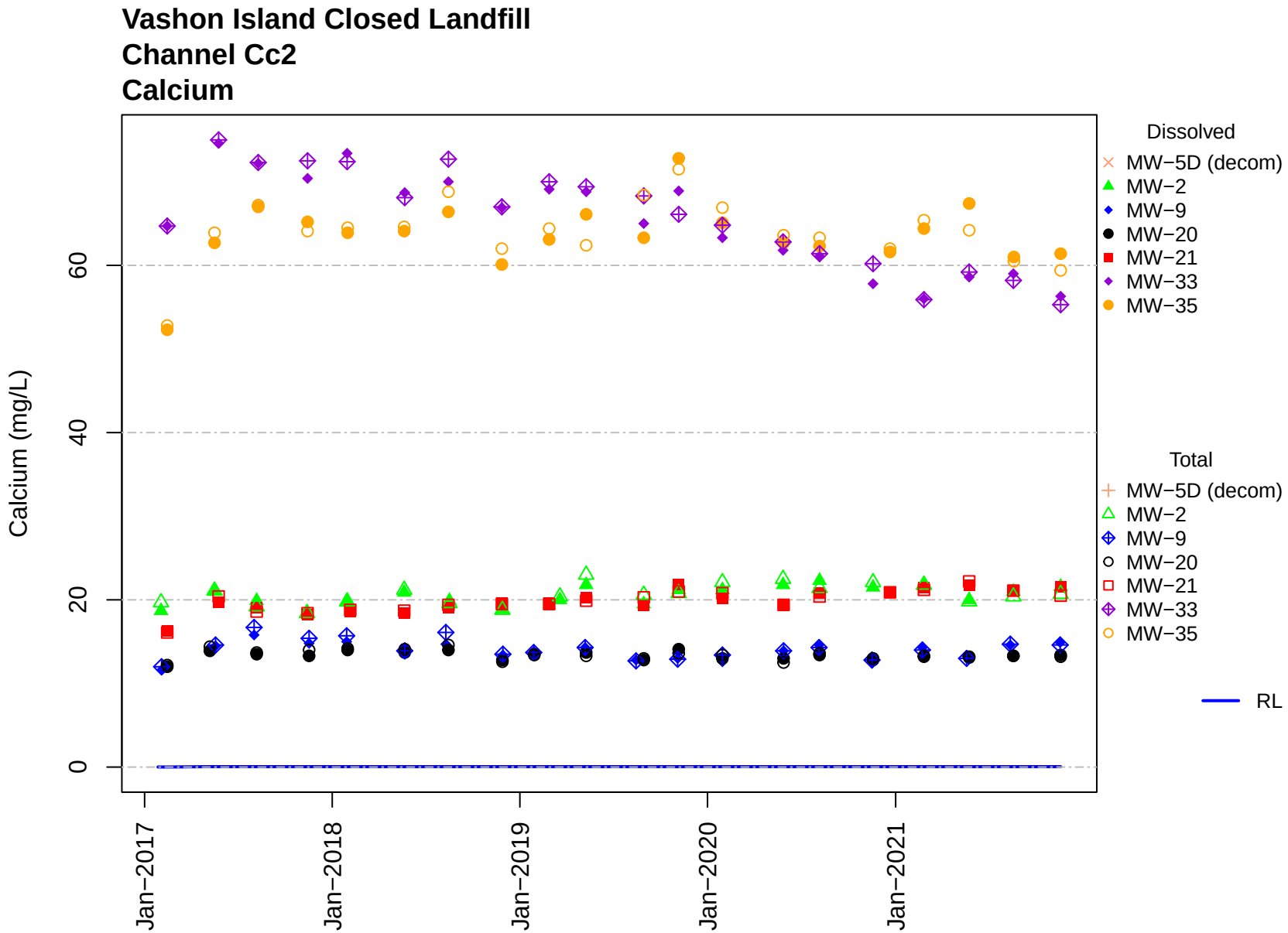

Vashon Island Closed Landfill
Channel Cc2
Total Dissolved Solids
TDS (mg/L)
0
200
400
600
800
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

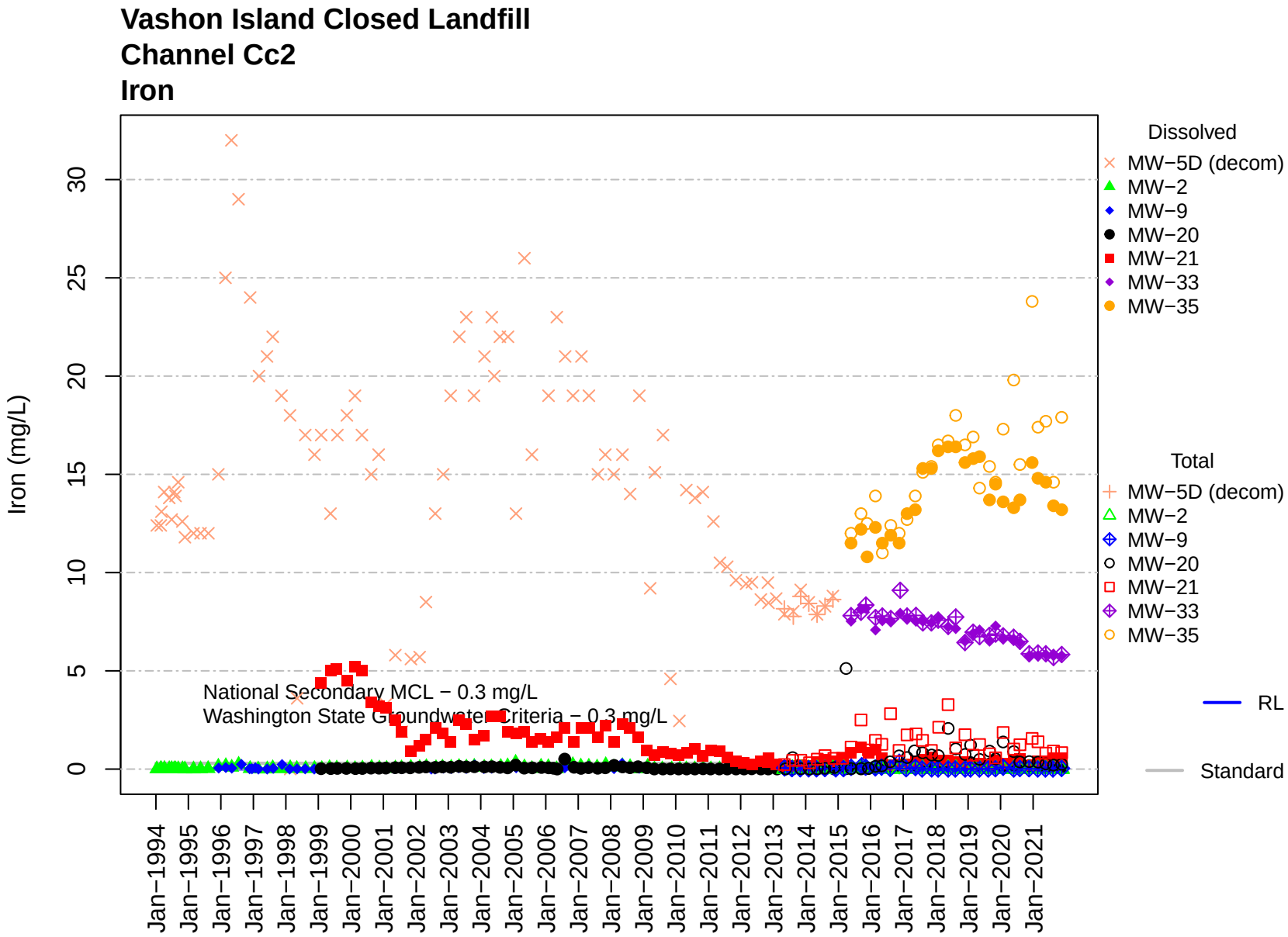

Vashon Island Closed Landfill
Channel Cc2
Total Dissolved Solids
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
TDS (mg/L)
0
100
200
300
400
500
600
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

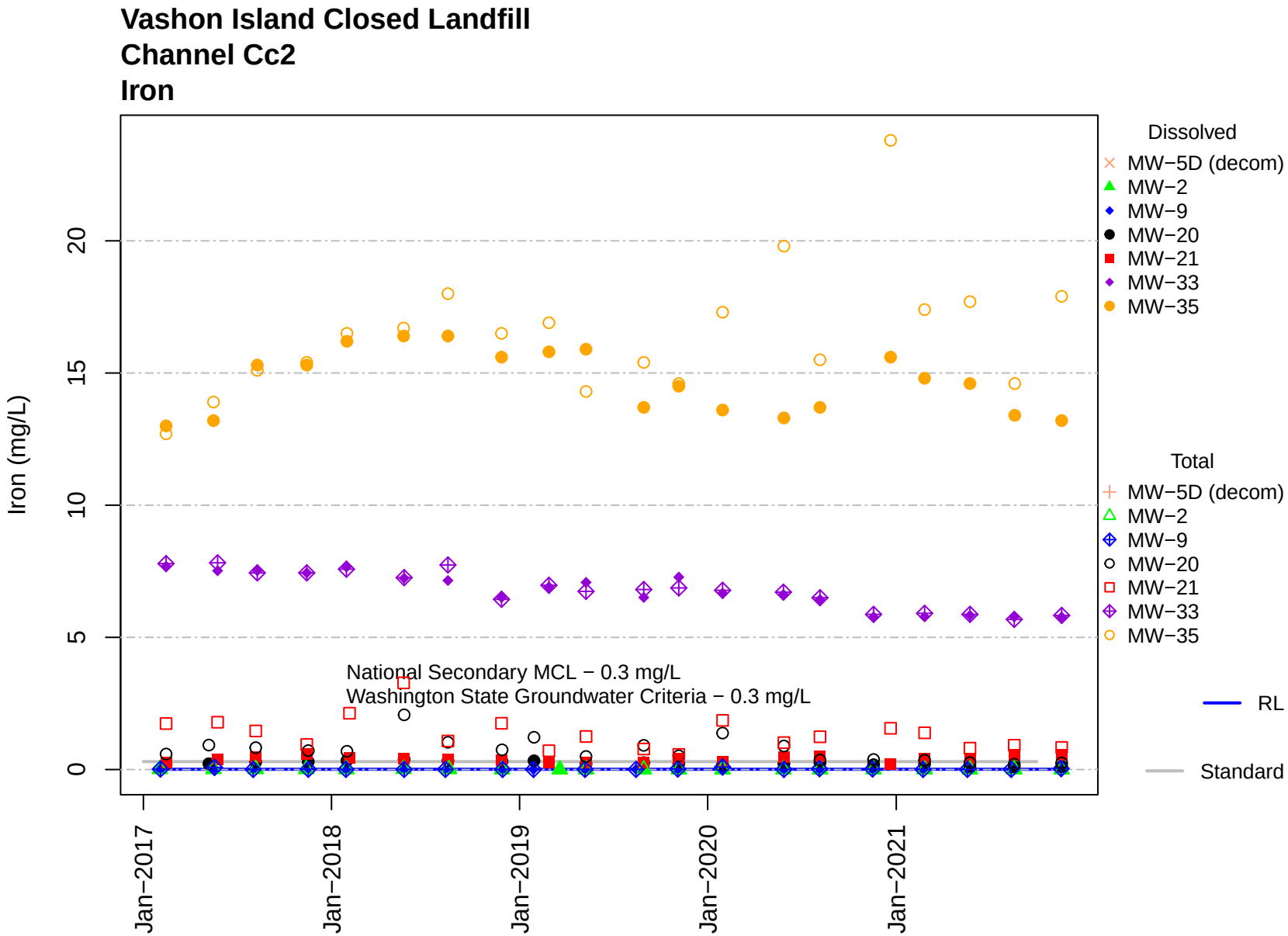

Vashon Island Closed Landfill
Channel Cc2
Arsenic
Arsenic (mg/L)
0.00
0.05
0.10
0.15
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

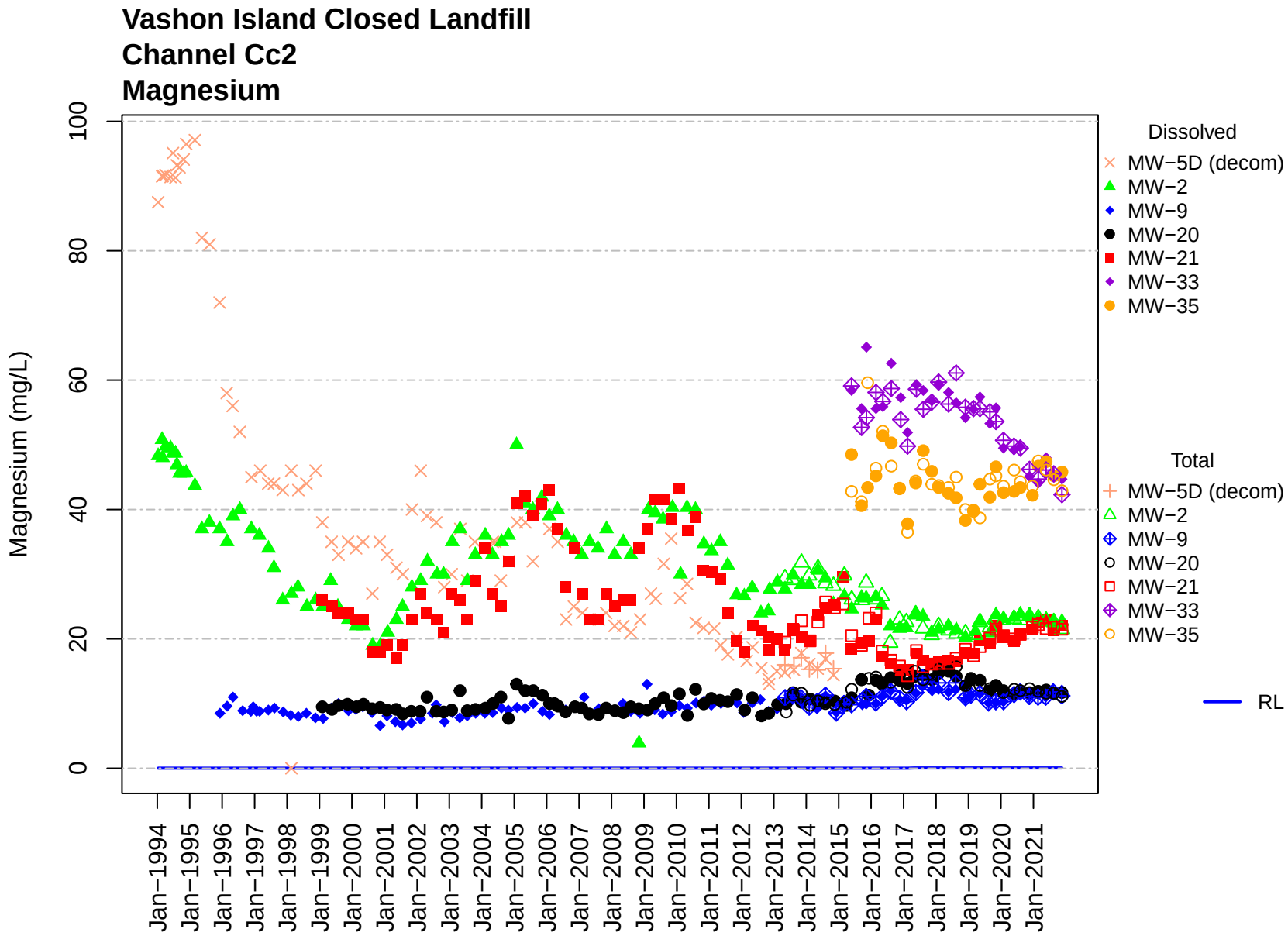

Vashon Island Closed Landfill
Channel Cc2
Arsenic
Arsenic (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

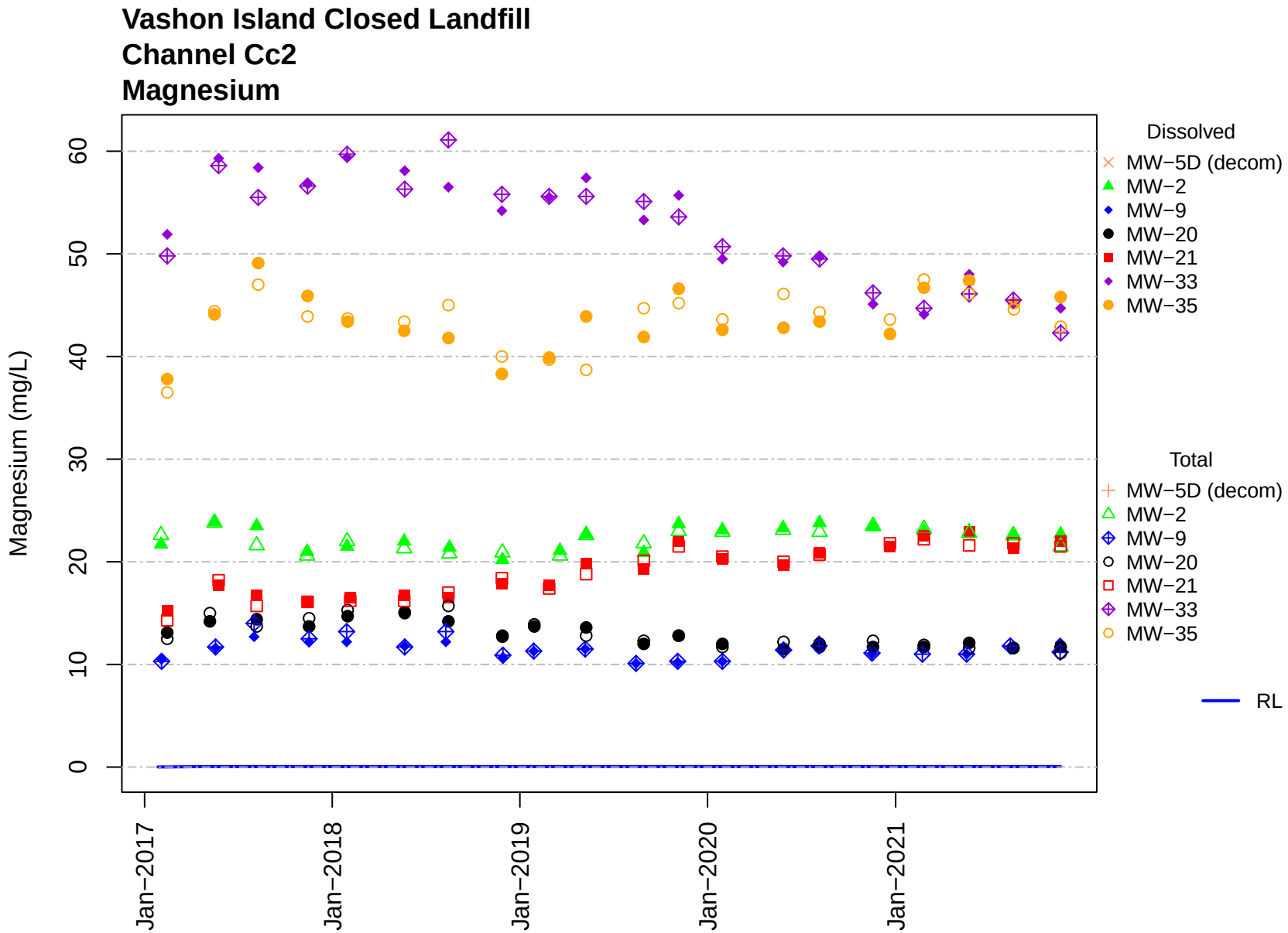

Vashon Island Closed Landfill
Channel Cc2
Calcium
Calcium (mg/L)
0
20
40
60
80
100
120
140
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

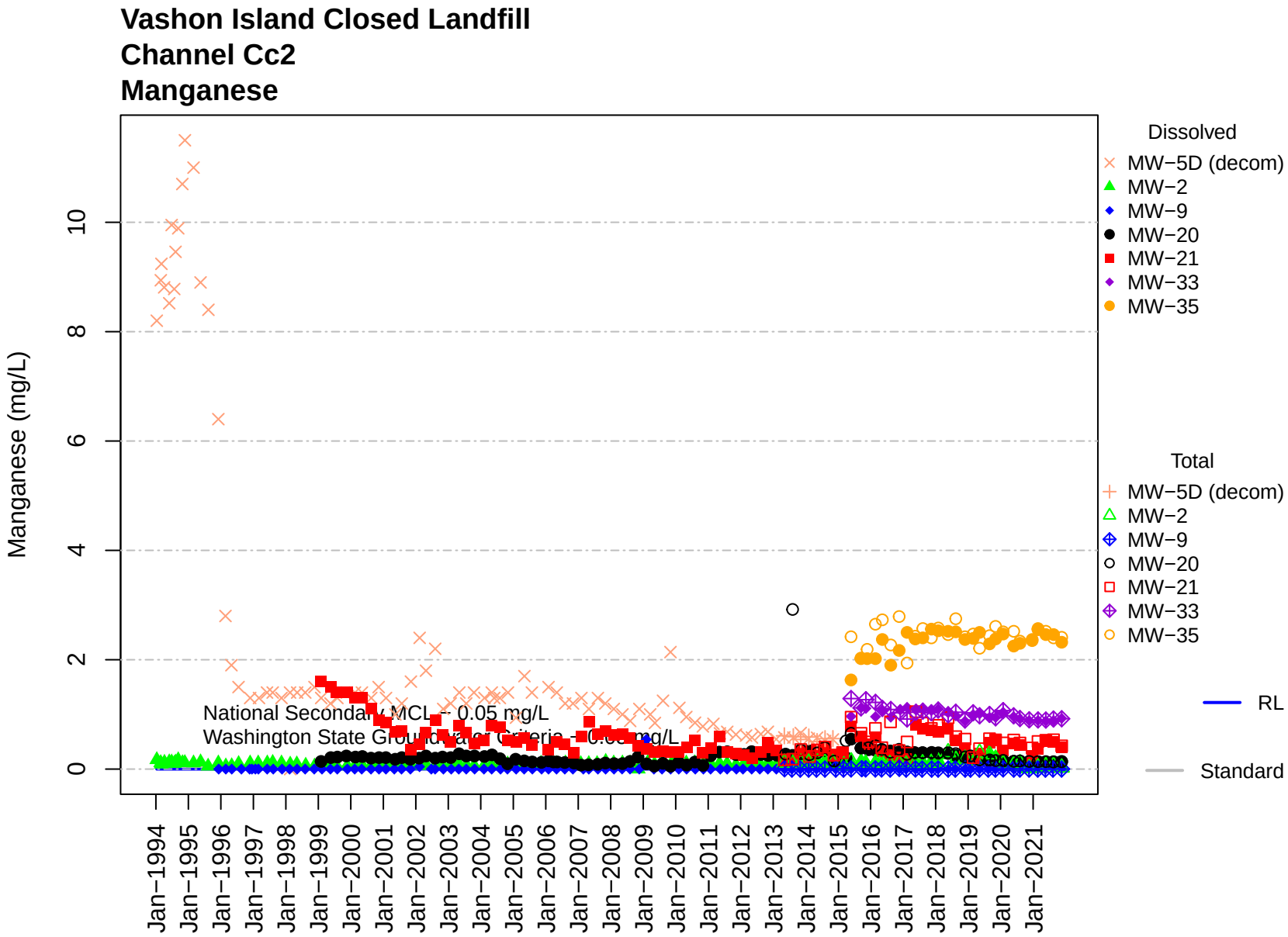

Vashon Island Closed Landfill
Channel Cc2
Calcium
Calcium (mg/L)
0
20
40
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

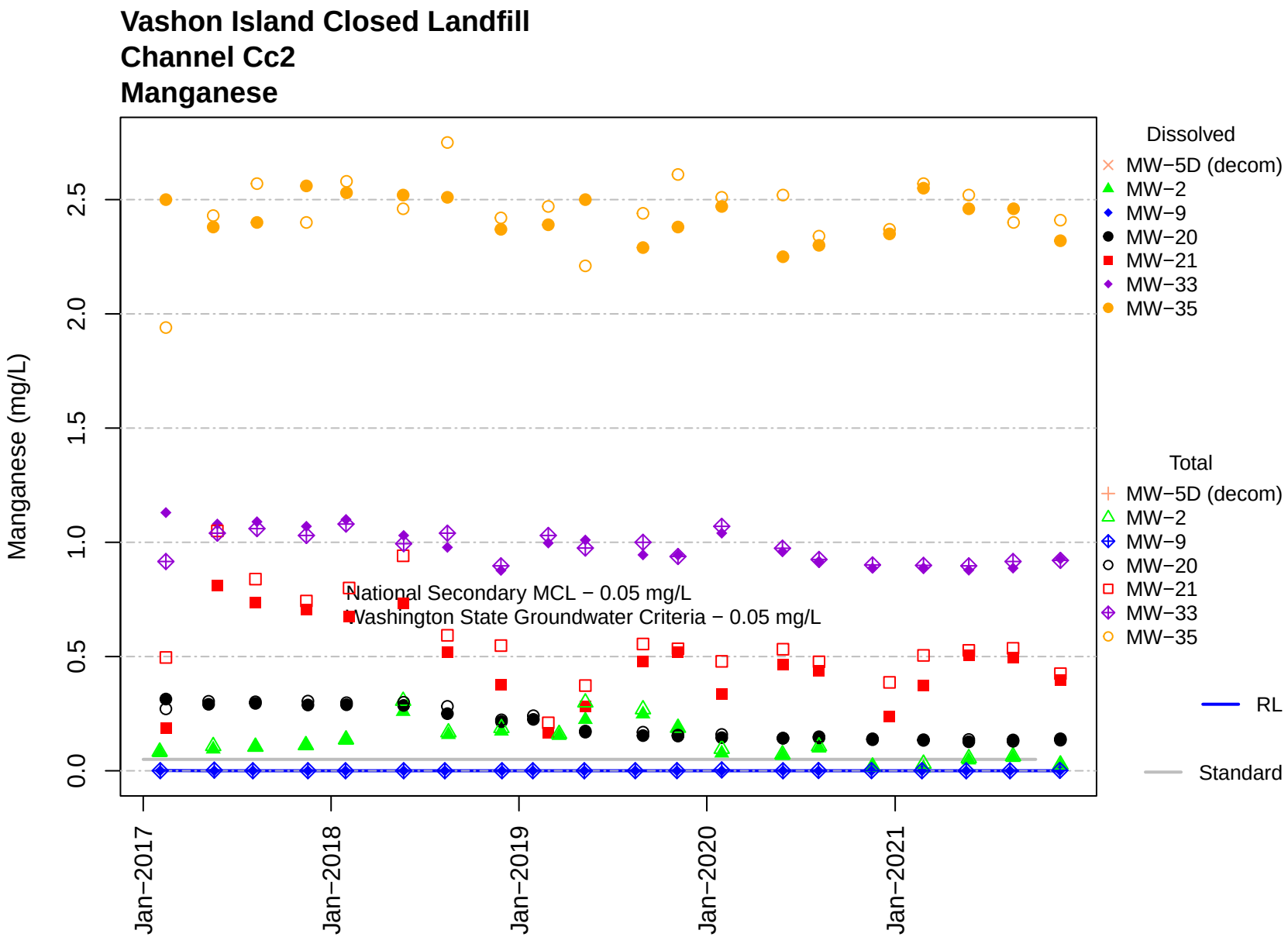

Vashon Island Closed Landfill
Channel Cc2
Iron
Iron (mg/L)
0
5
10
15
20
25
30
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

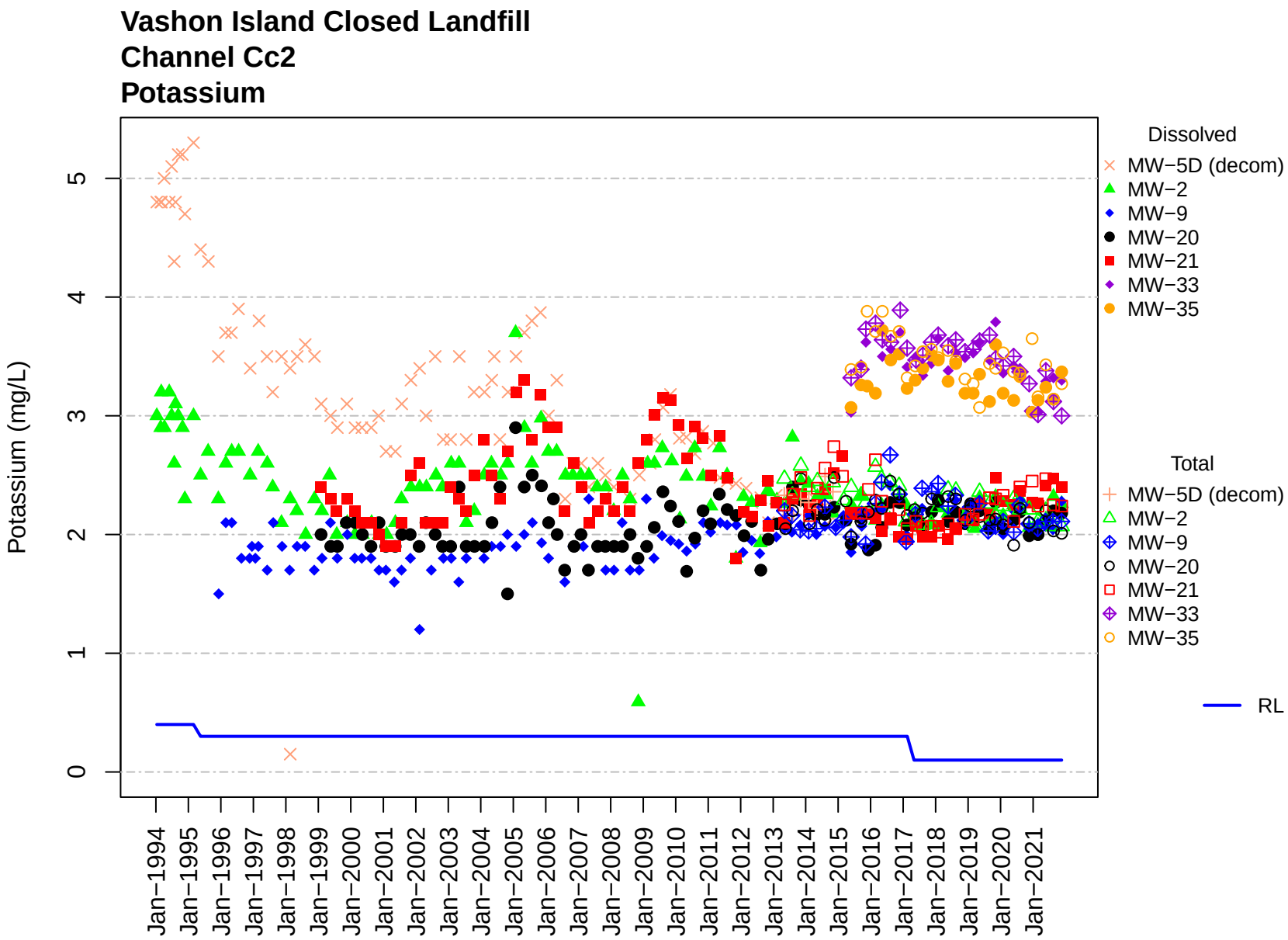

Vashon Island Closed Landfill
Channel Cc2
Iron
Iron (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

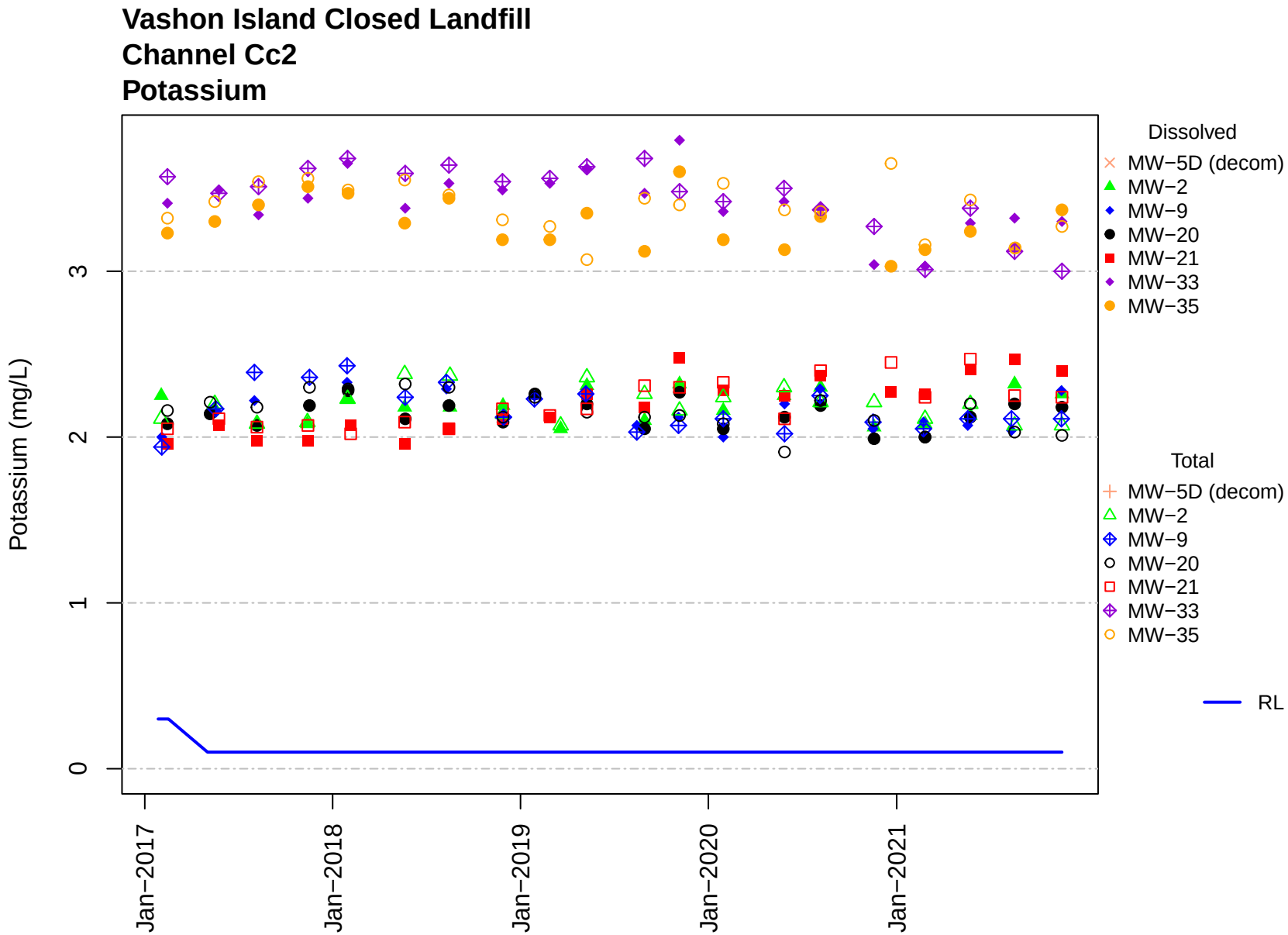

Vashon Island Closed Landfill
Channel Cc2
Magnesium
Magnesium (mg/L)
0
20
40
60
80
100
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

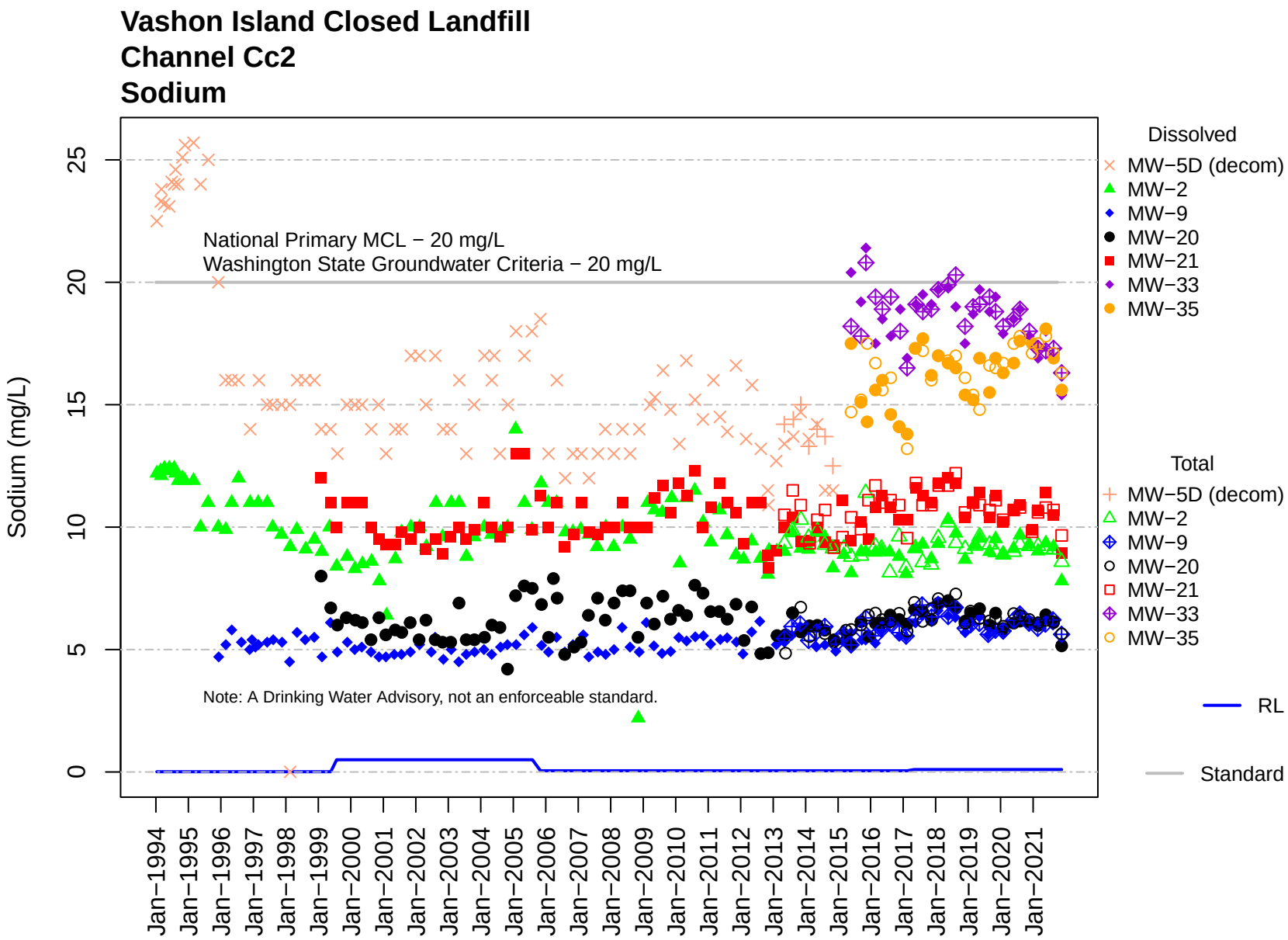

Vashon Island Closed Landfill
Channel Cc2
Magnesium
Magnesium (mg/L)
0
10
20
30
40
50
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

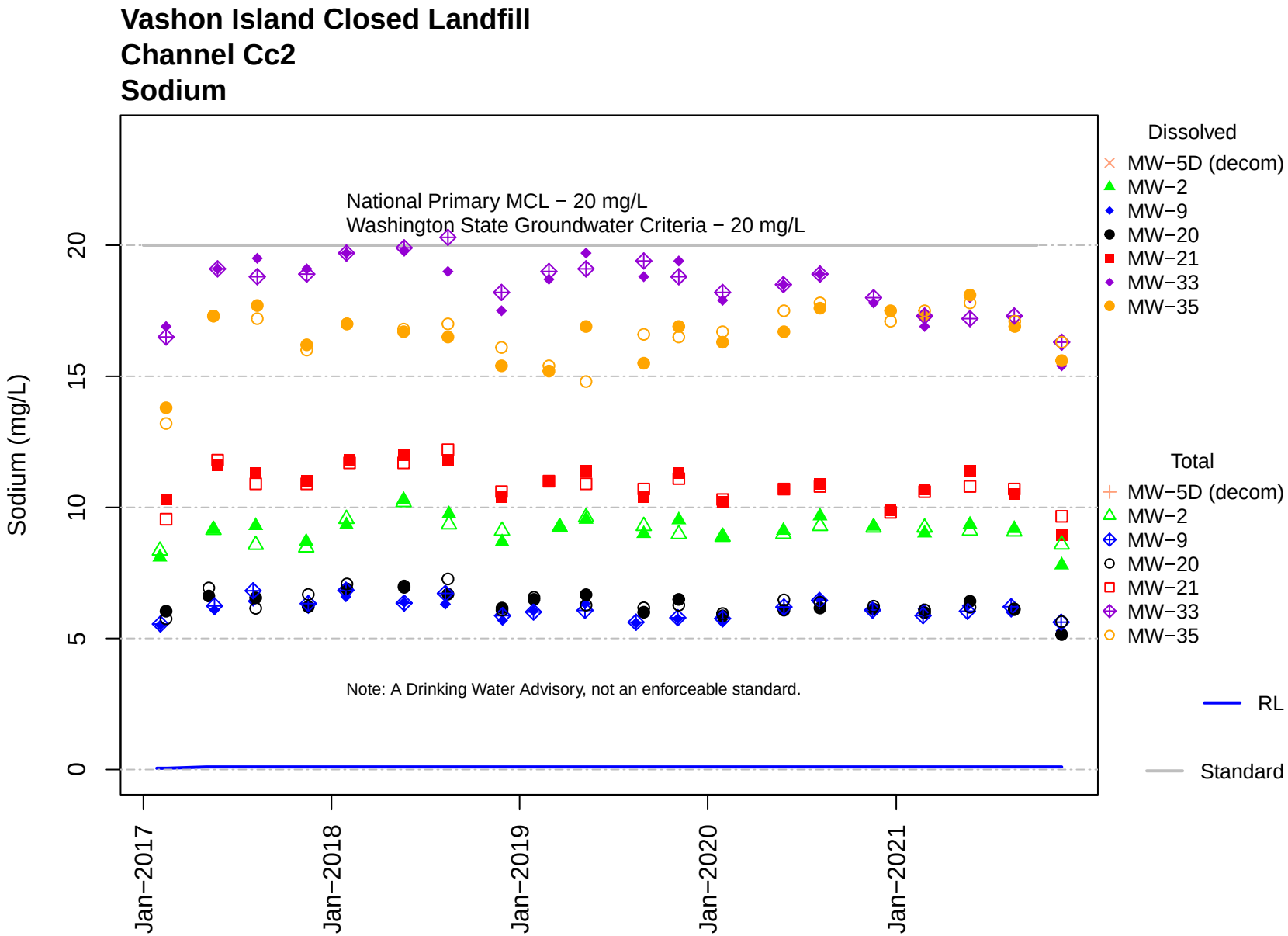

Vashon Island Closed Landfill
Channel Cc2
Manganese
Manganese (mg/L)
0
2
4
6
8
10
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

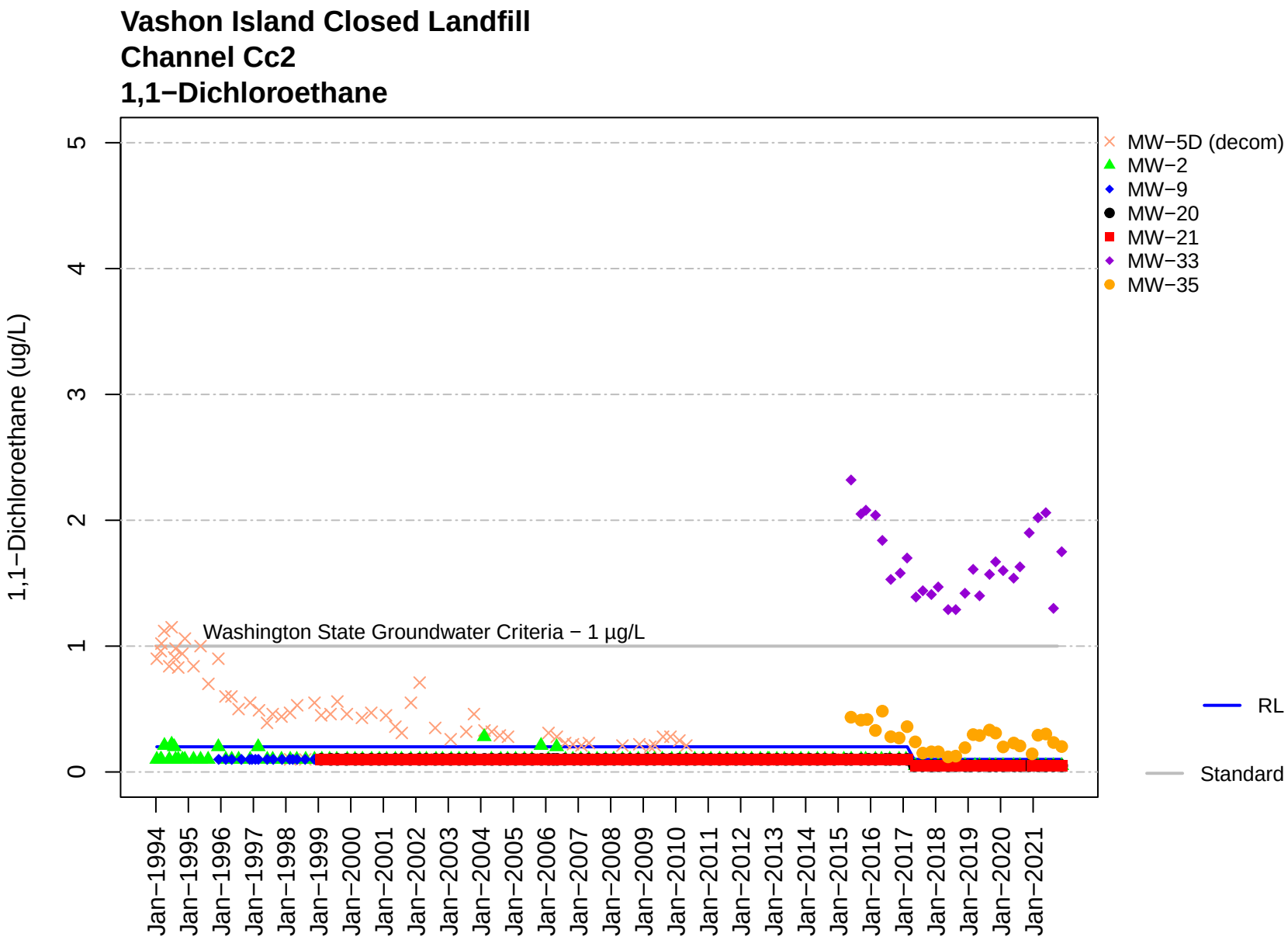

Vashon Island Closed Landfill
Channel Cc2
Manganese
Manganese (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

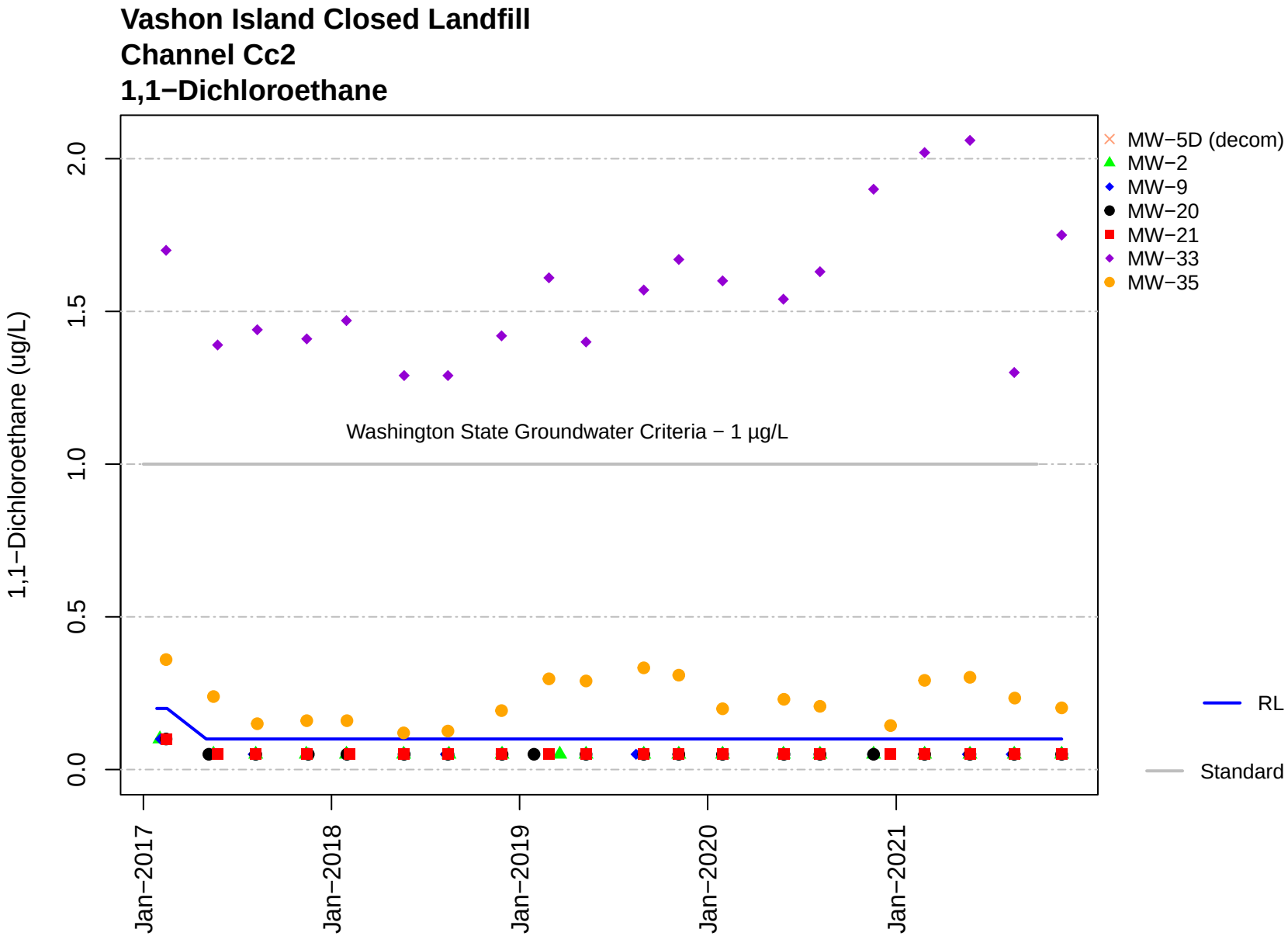

Vashon Island Closed Landfill
Channel Cc2
Potassium
Potassium (mg/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

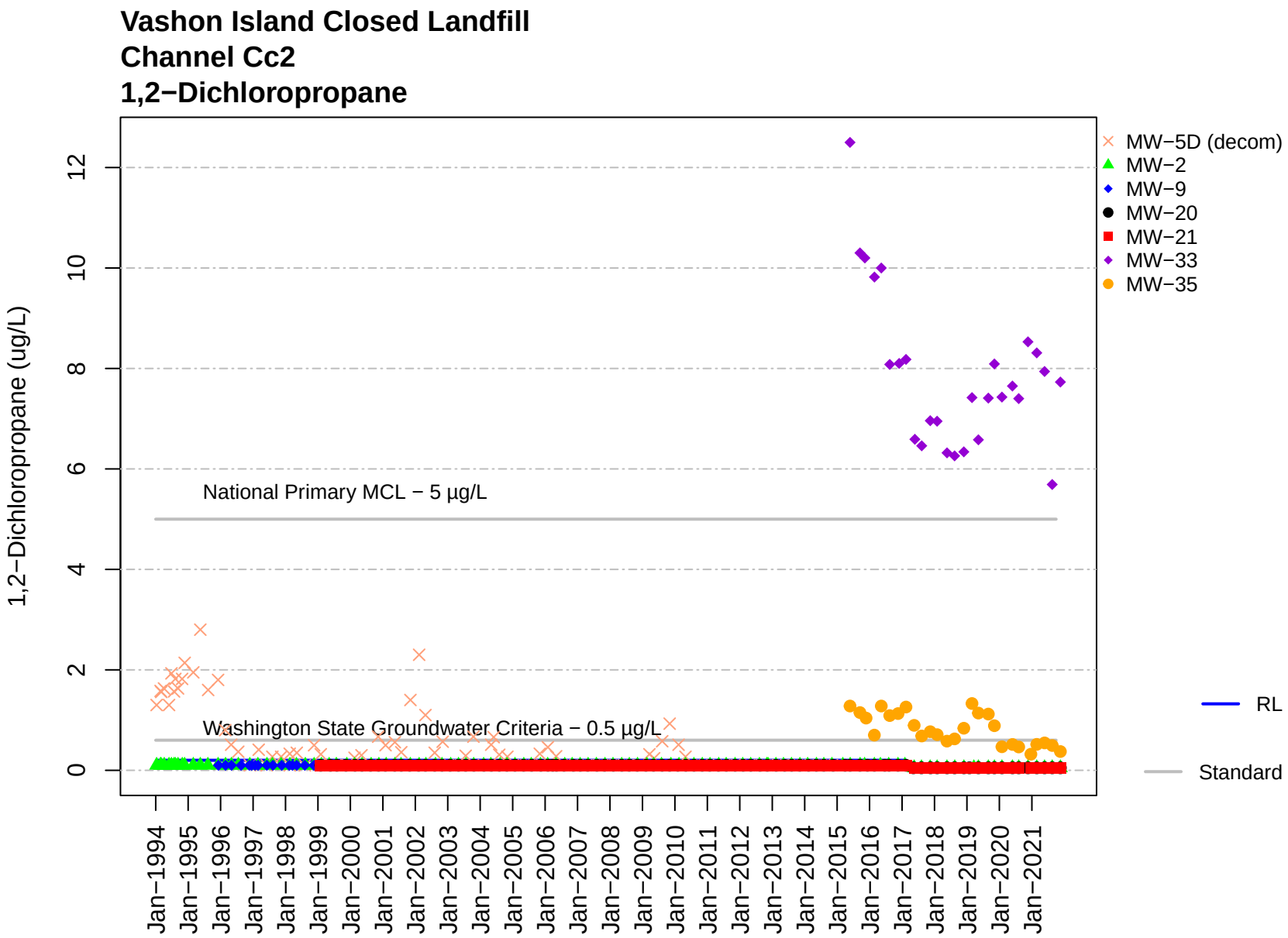

Vashon Island Closed Landfill
Channel Cc2
Potassium
Potassium (mg/L)
0
1
2
3
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

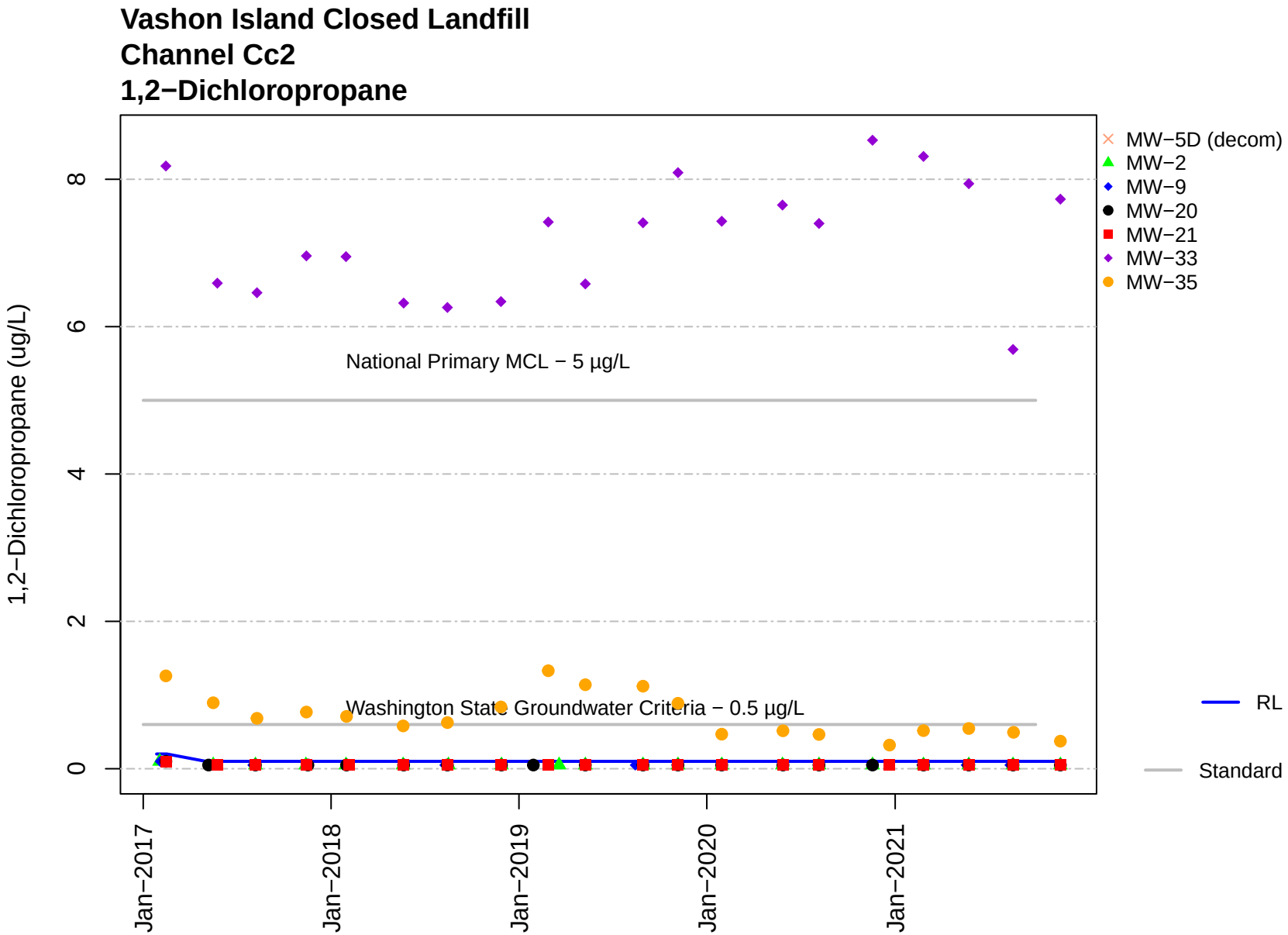

Vashon Island Closed Landfill
Channel Cc2
Sodium
Sodium (mg/L)
0
5
10
15
20
25
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

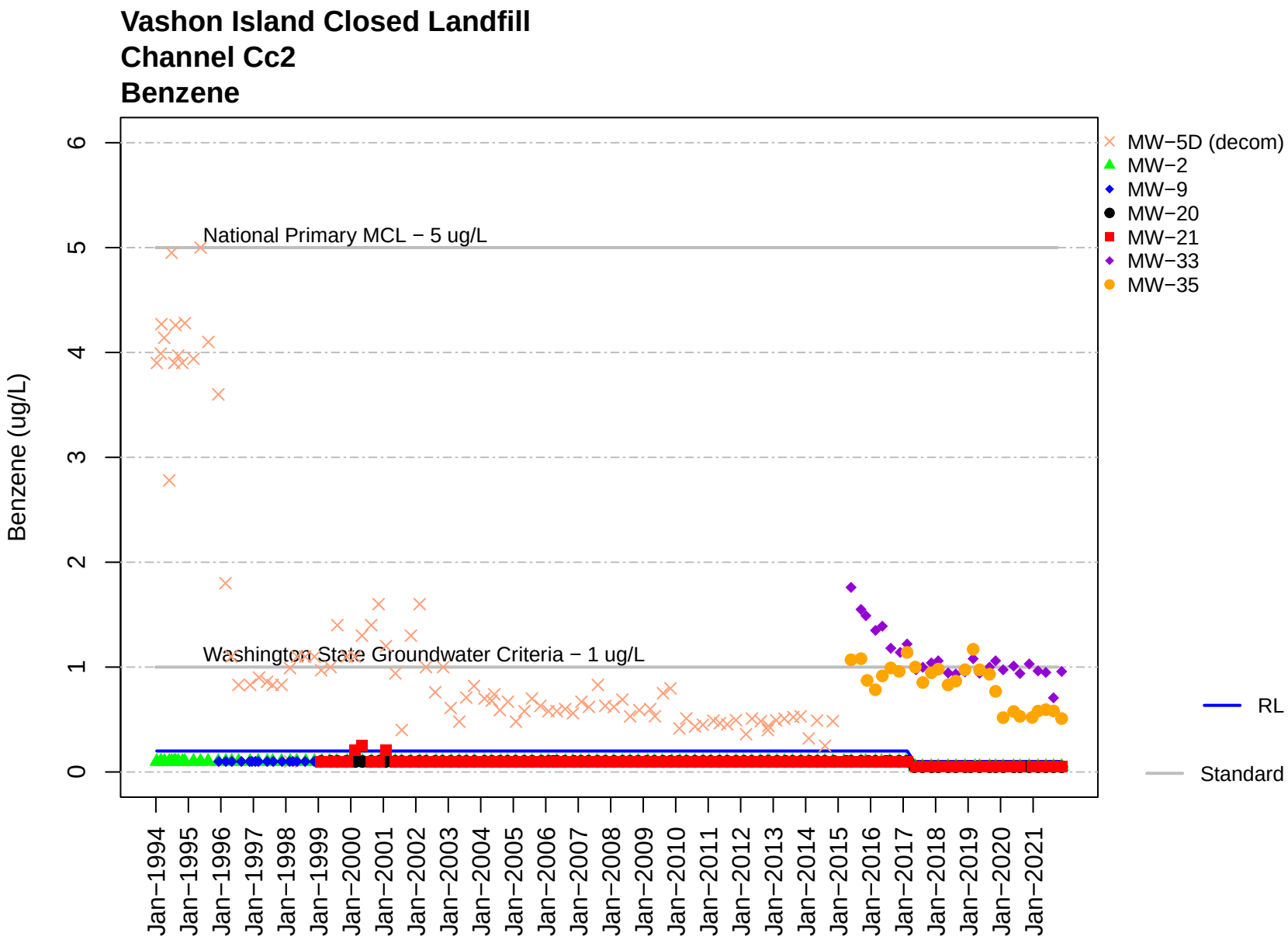

Vashon Island Closed Landfill
Channel Cc2
Sodium
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Sodium (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

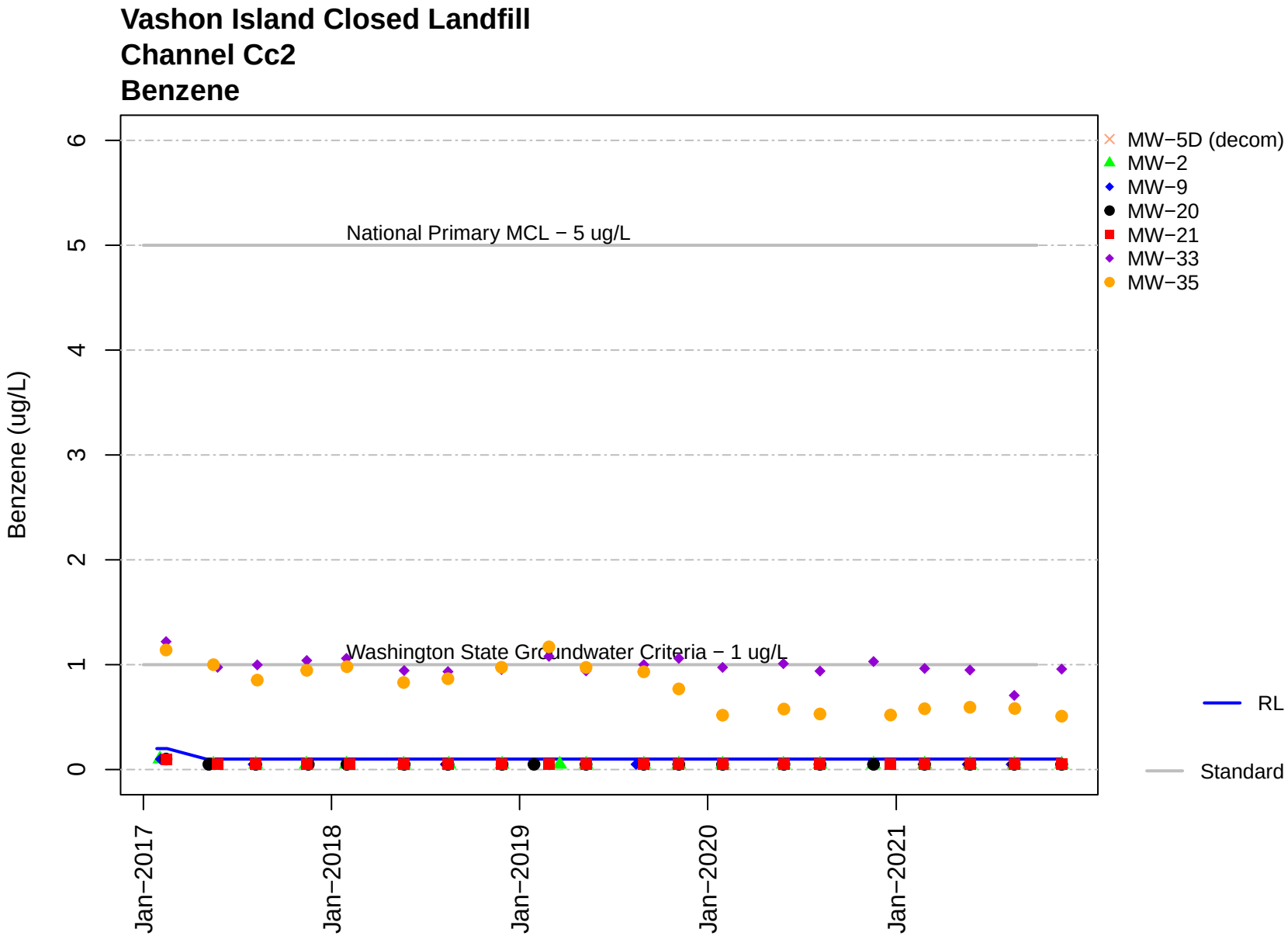

Vashon Island Closed Landfill
Channel Cc2
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0
1
2
3
4
5
Washington State Groundwater Criteria − 1 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

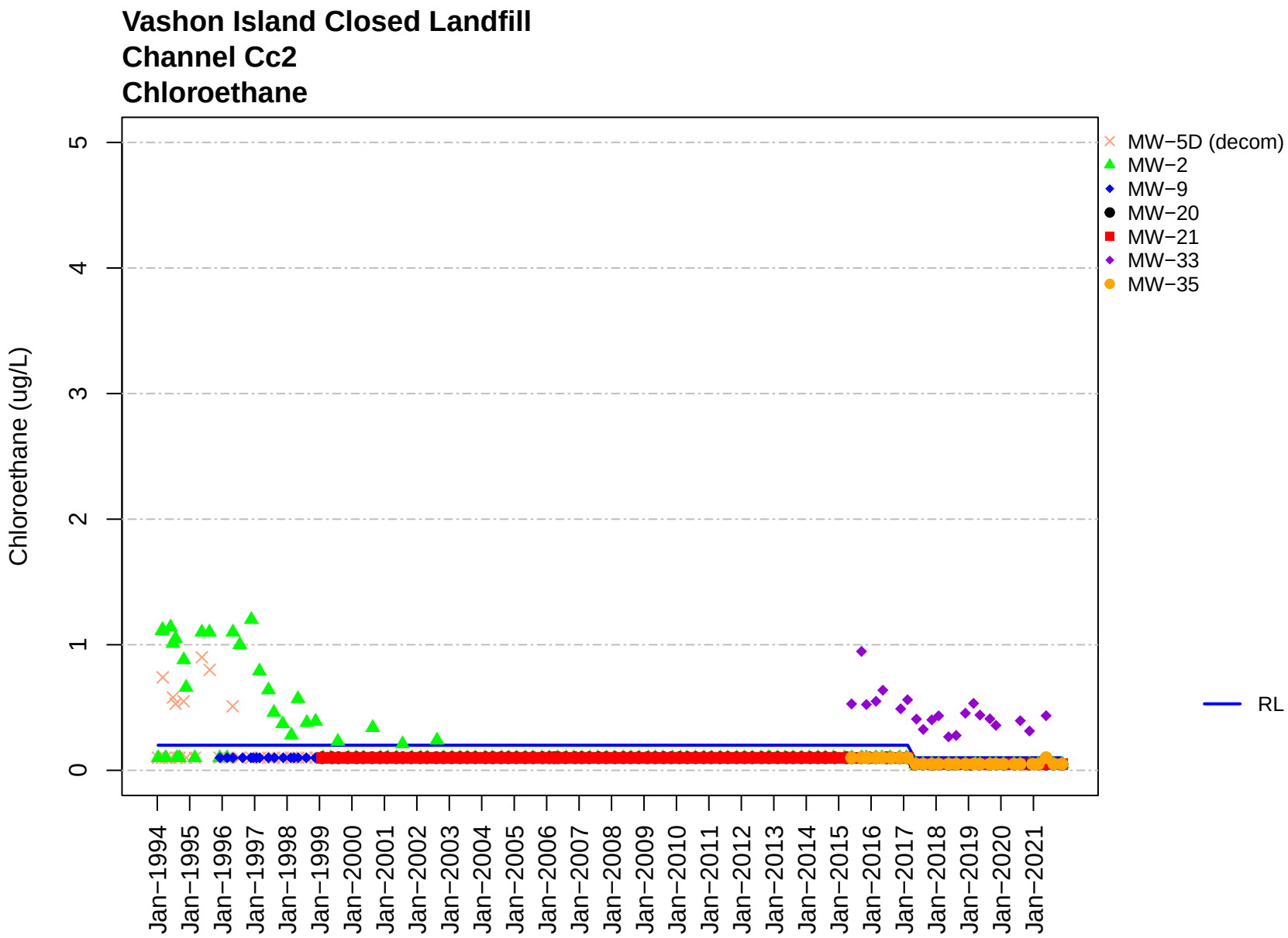

Vashon Island Closed Landfill
Channel Cc2
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Washington State Groundwater Criteria − 1 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

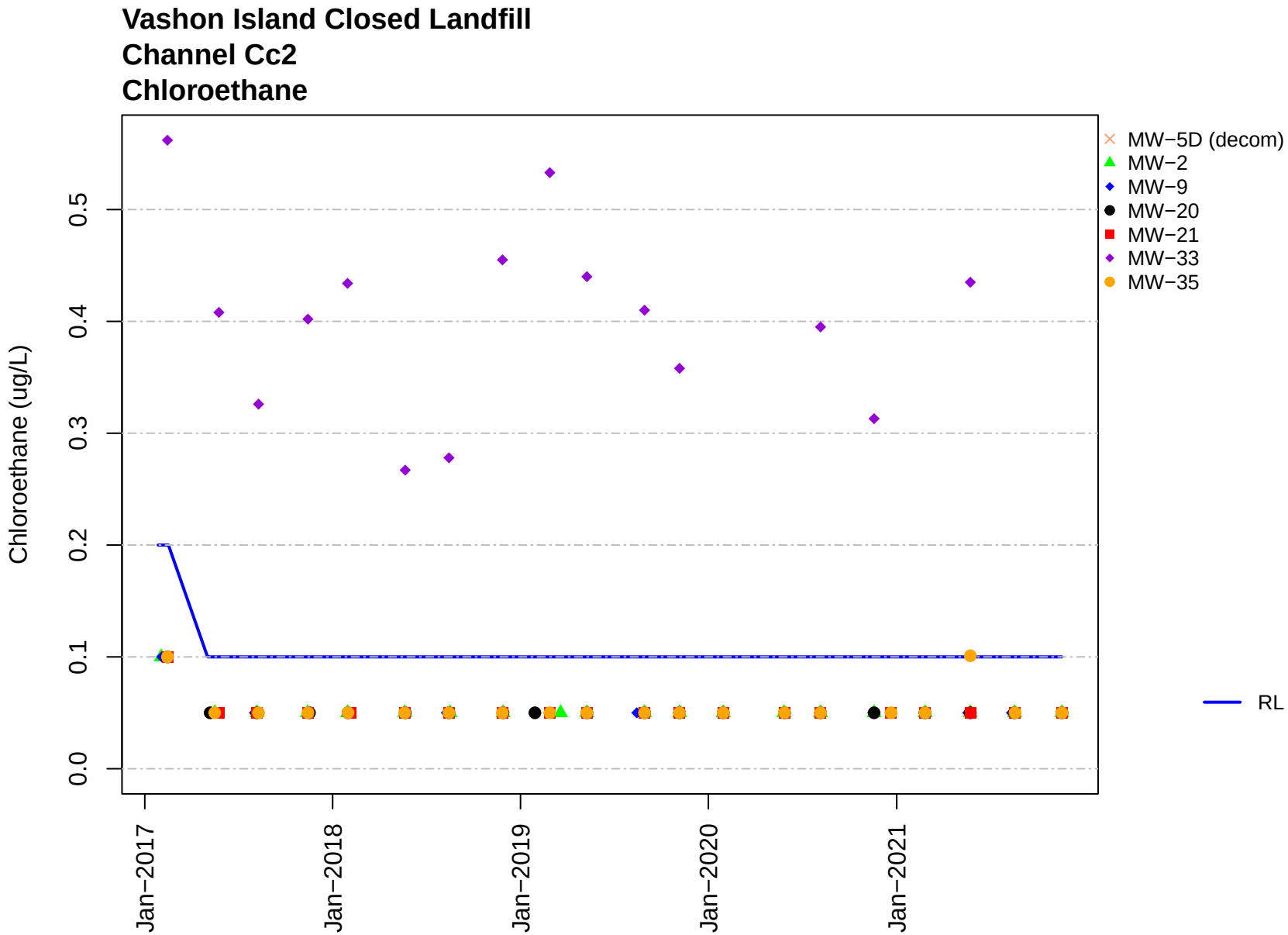

Vashon Island Closed Landfill
Channel Cc2
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
10
12
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

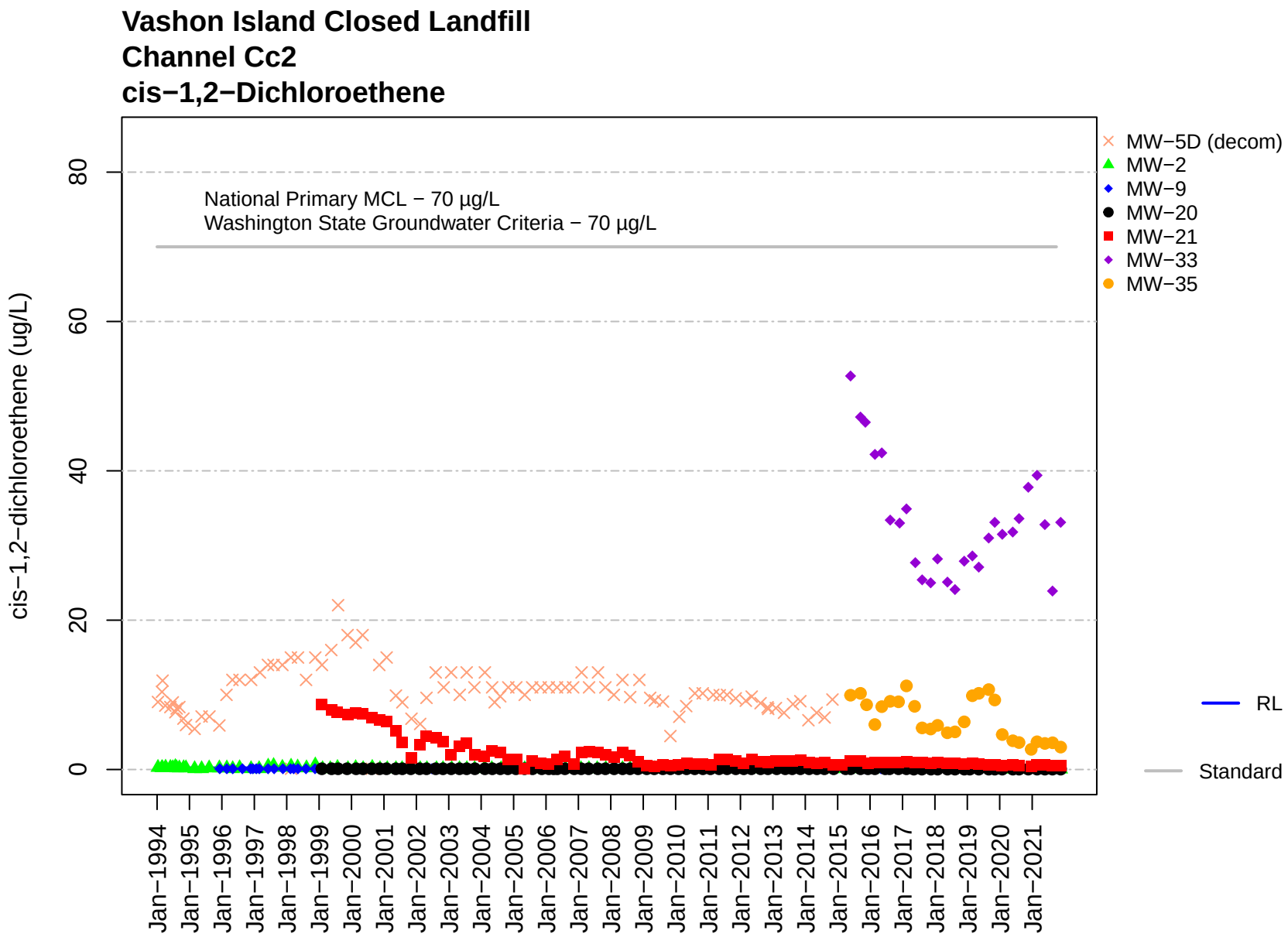

Vashon Island Closed Landfill
Channel Cc2
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

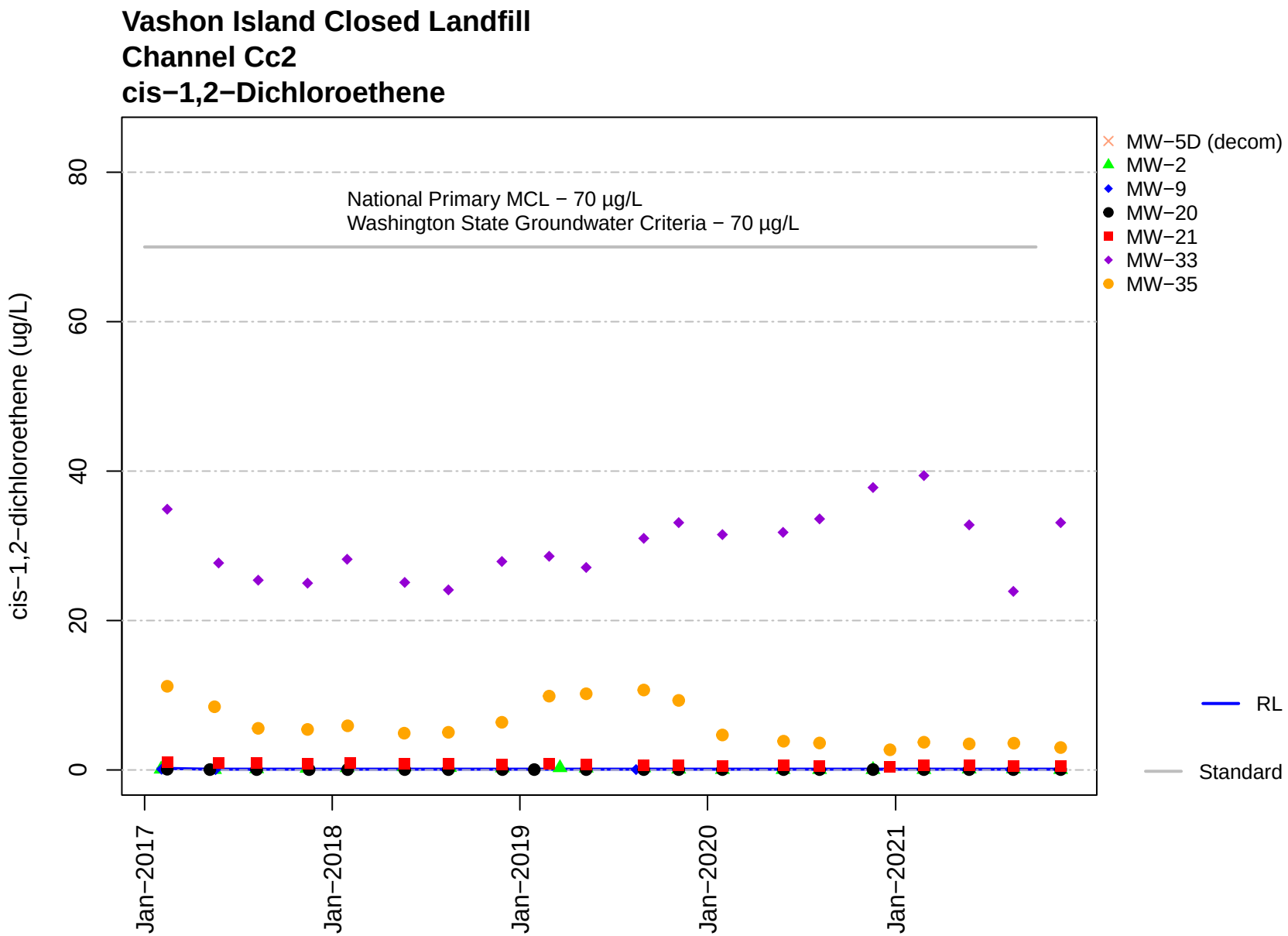

Vashon Island Closed Landfill
Channel Cc2
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

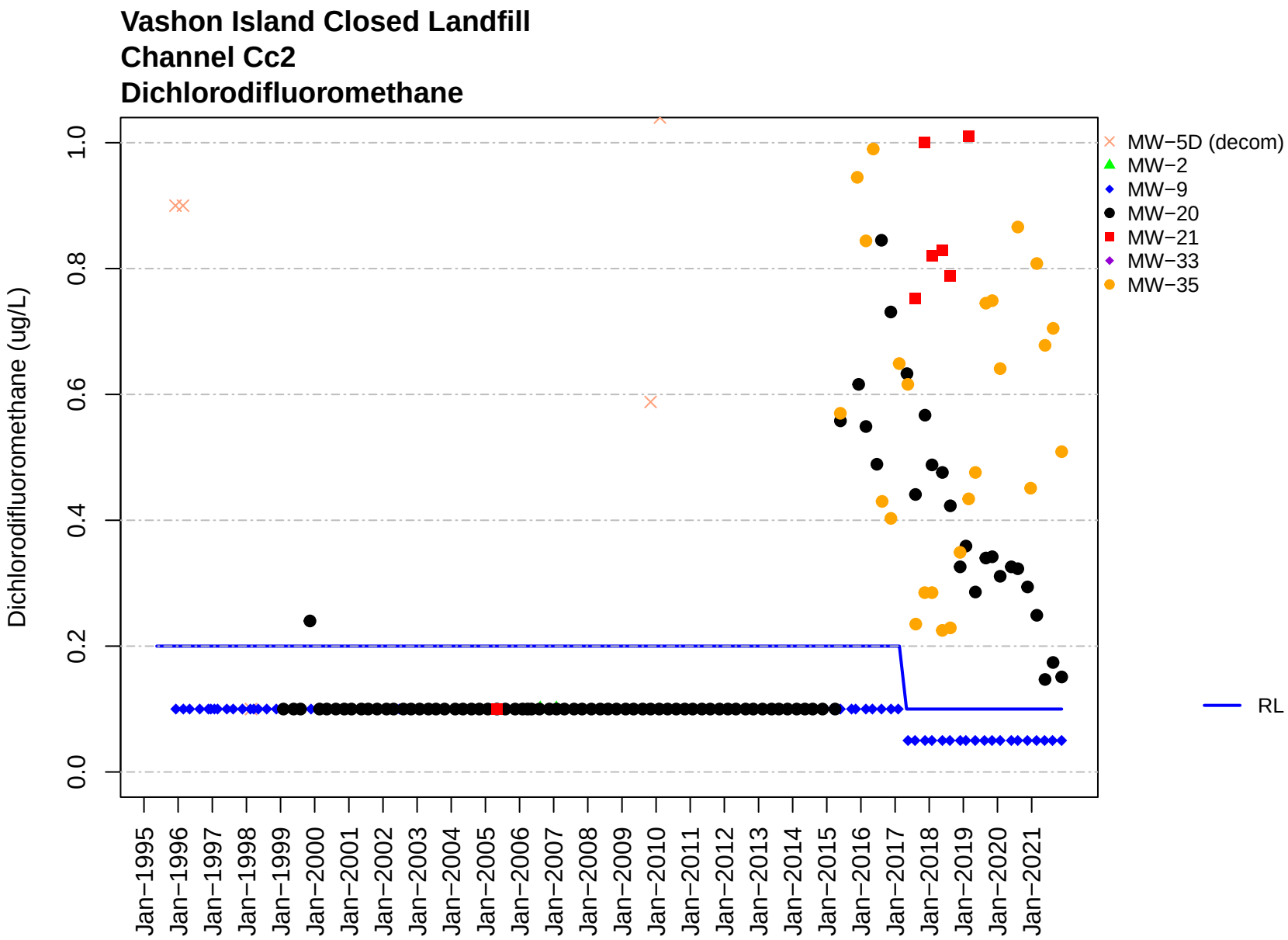

Vashon Island Closed Landfill
Channel Cc2
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

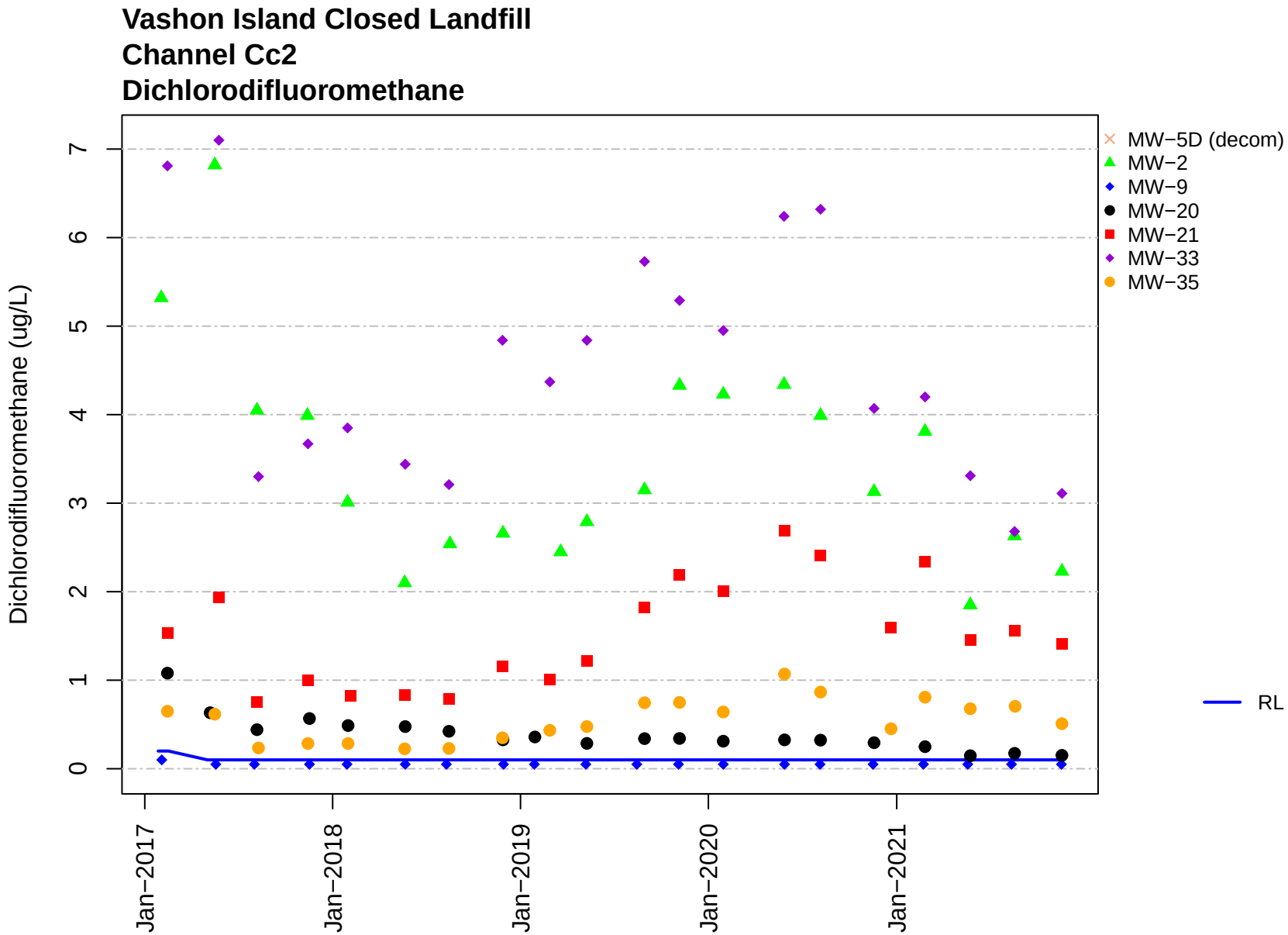

Vashon Island Closed Landfill
Channel Cc2
Chloroethane
Chloroethane (ug/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

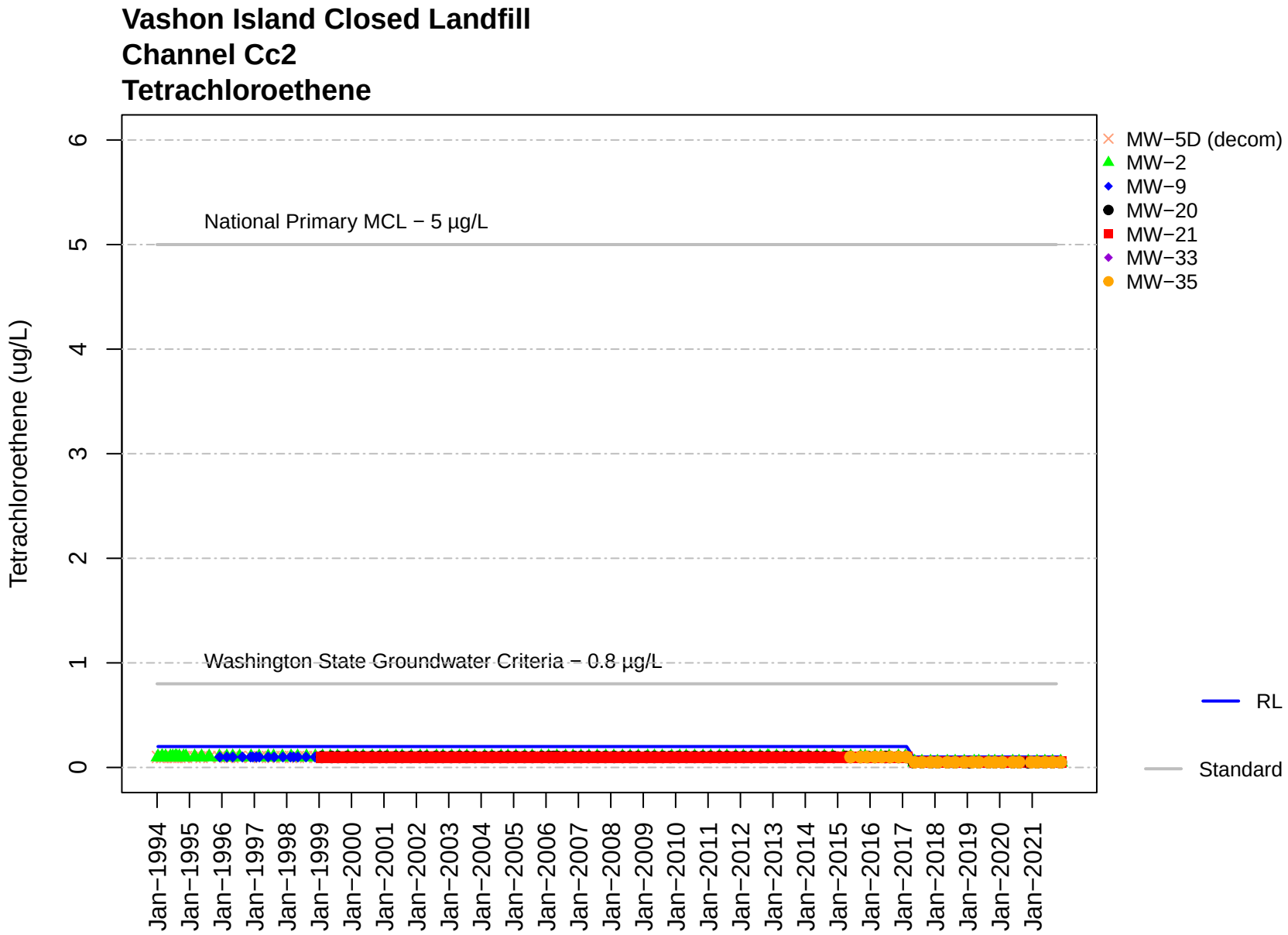

Vashon Island Closed Landfill
Channel Cc2
Chloroethane
Chloroethane (ug/L)
0.0
0.1
0.2
0.3
0.4
0.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

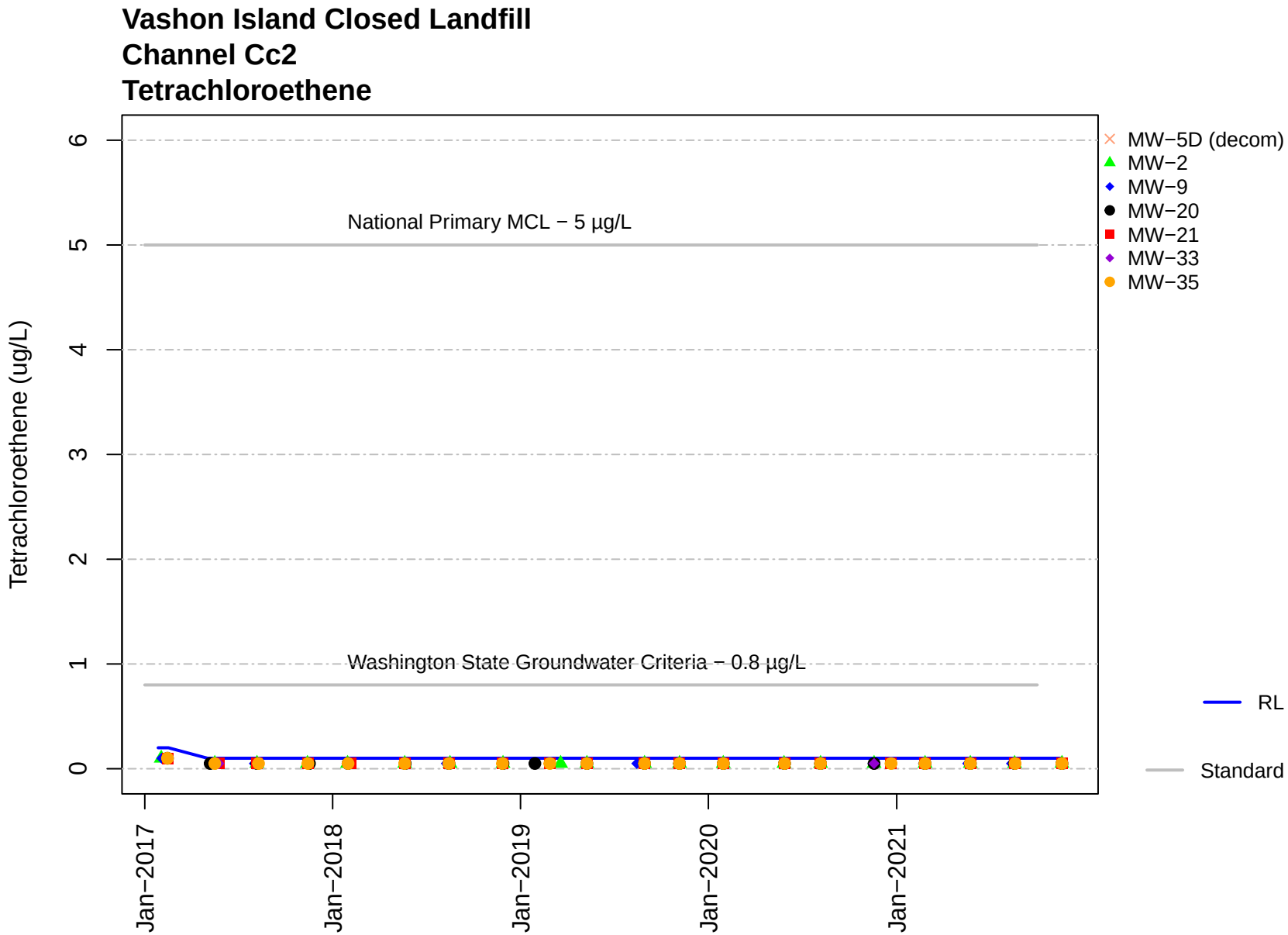

Vashon Island Closed Landfill
Channel Cc2
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

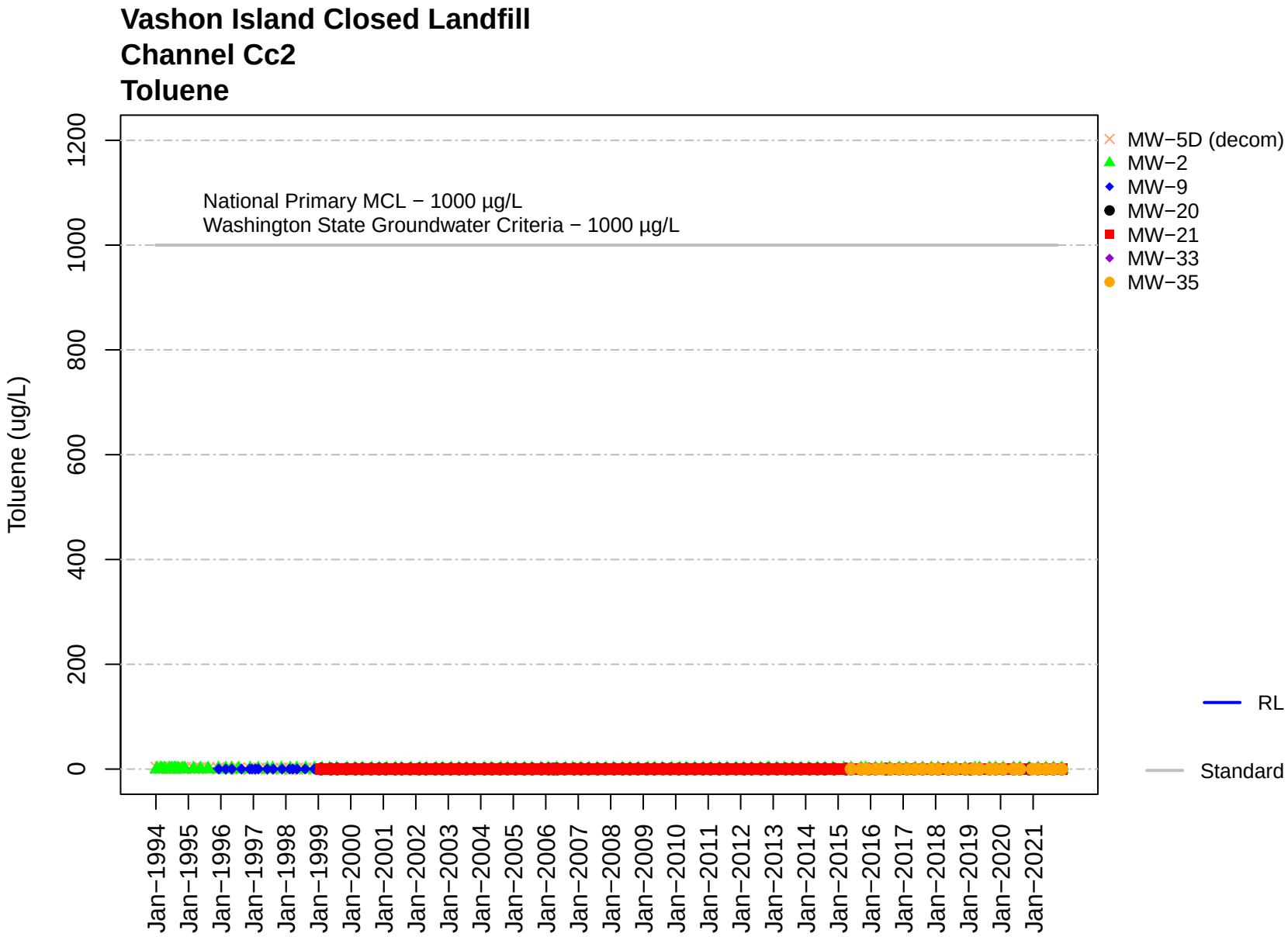

Vashon Island Closed Landfill
Channel Cc2
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

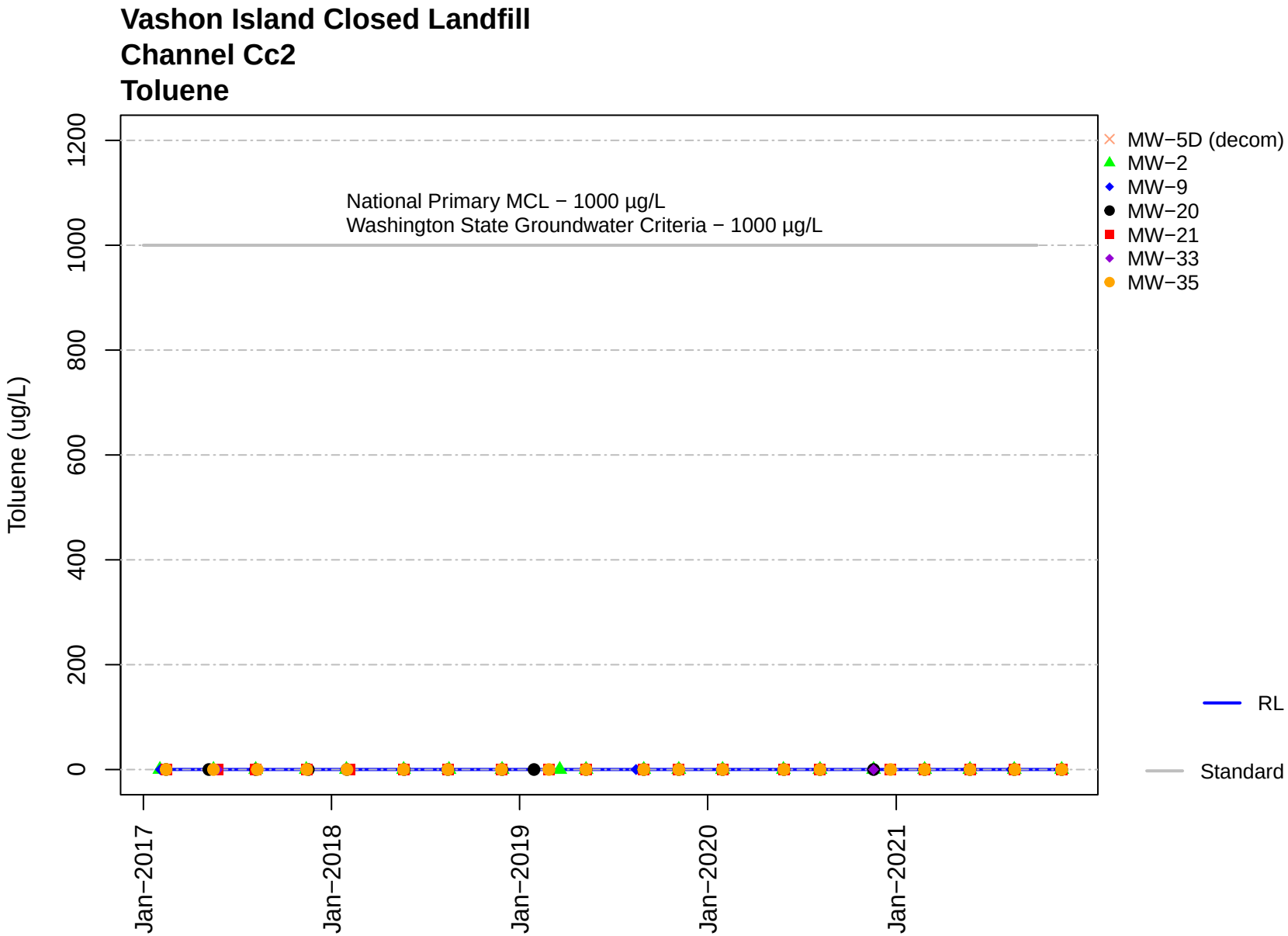

Vashon Island Closed Landfill
Channel Cc2
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0.0
0.2
0.4
0.6
0.8
1.0
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

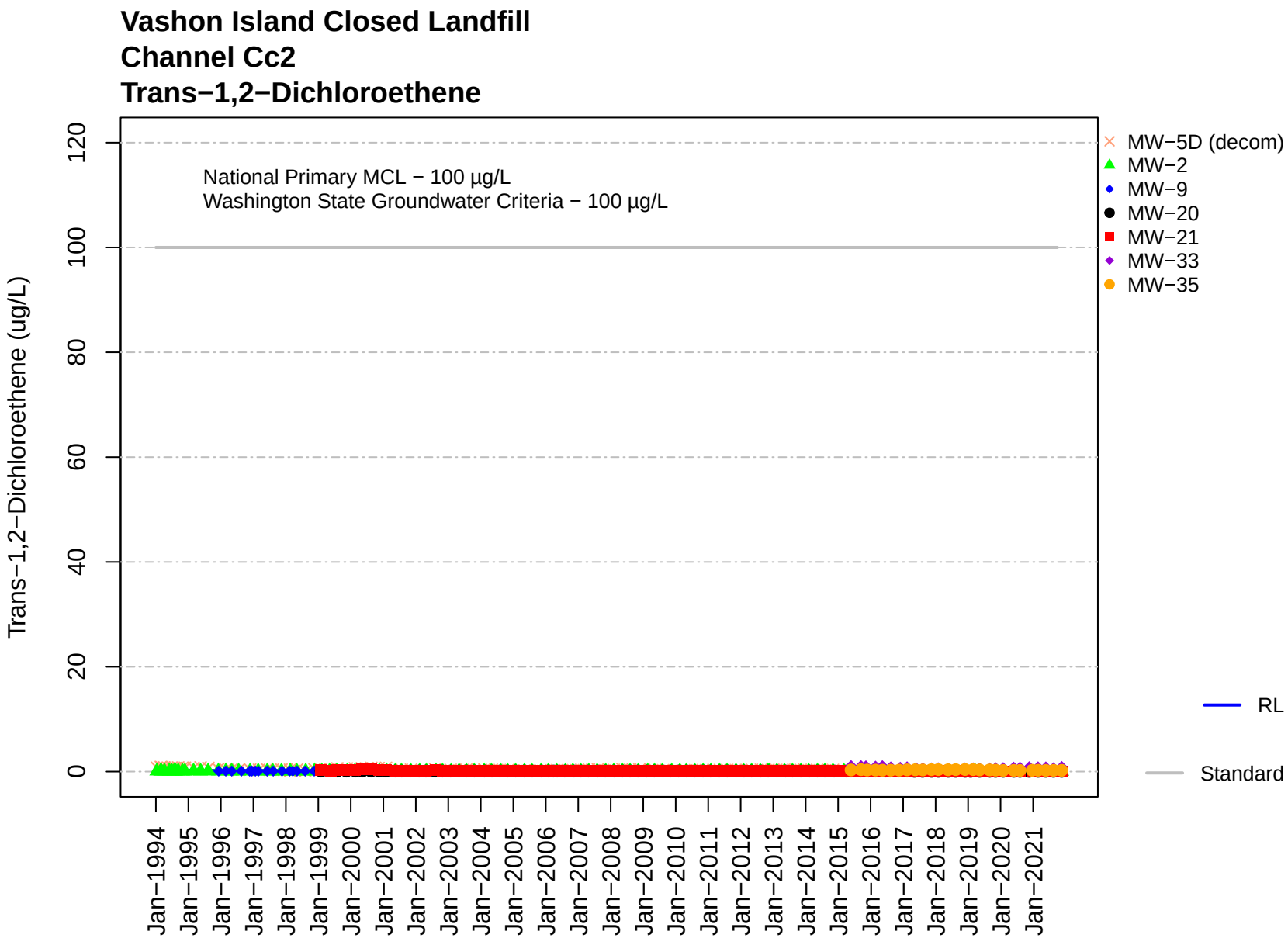

Vashon Island Closed Landfill
Channel Cc2
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0
1
2
3
4
5
6
7
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

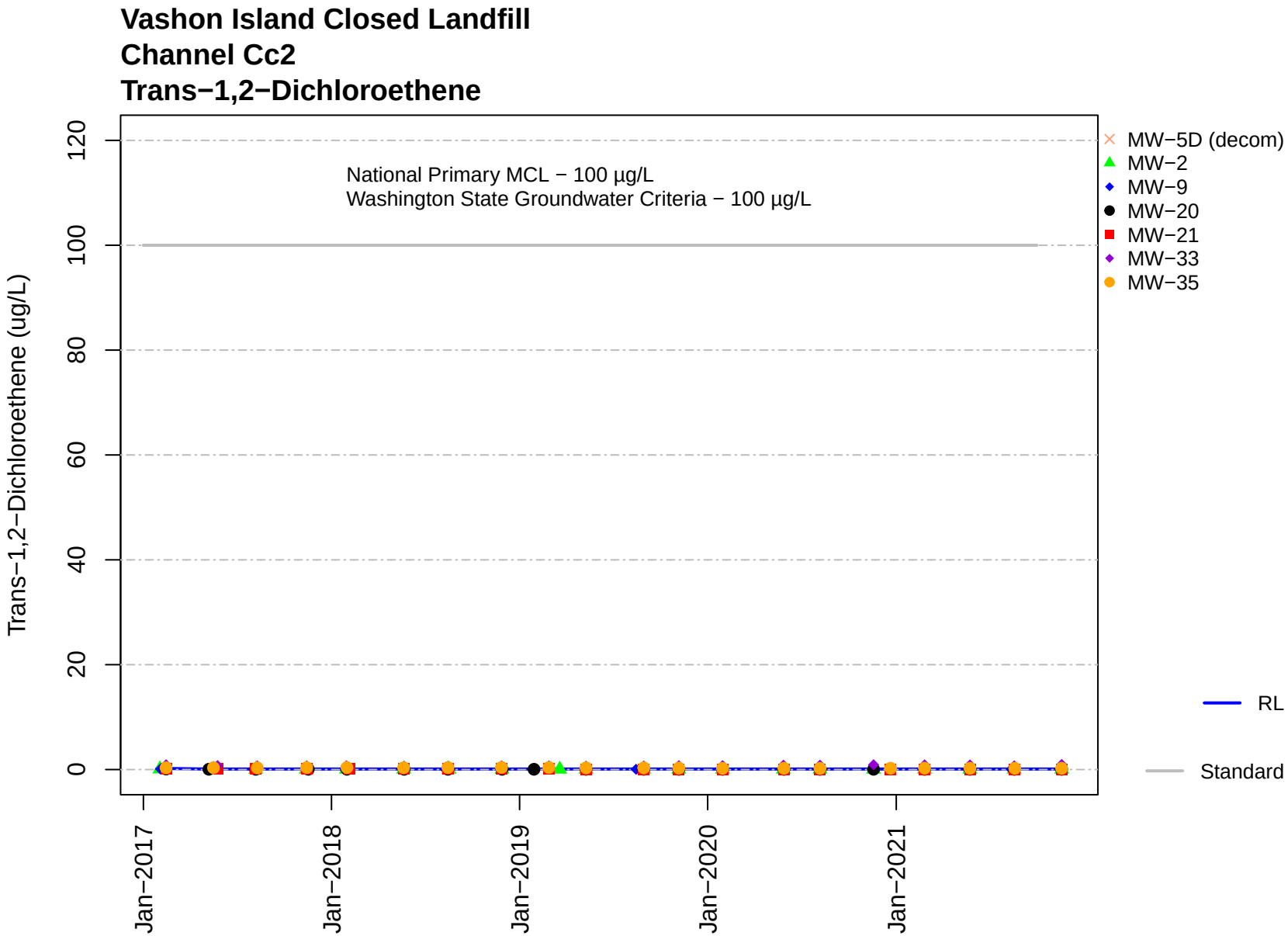

Vashon Island Closed Landfill
Channel Cc2
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

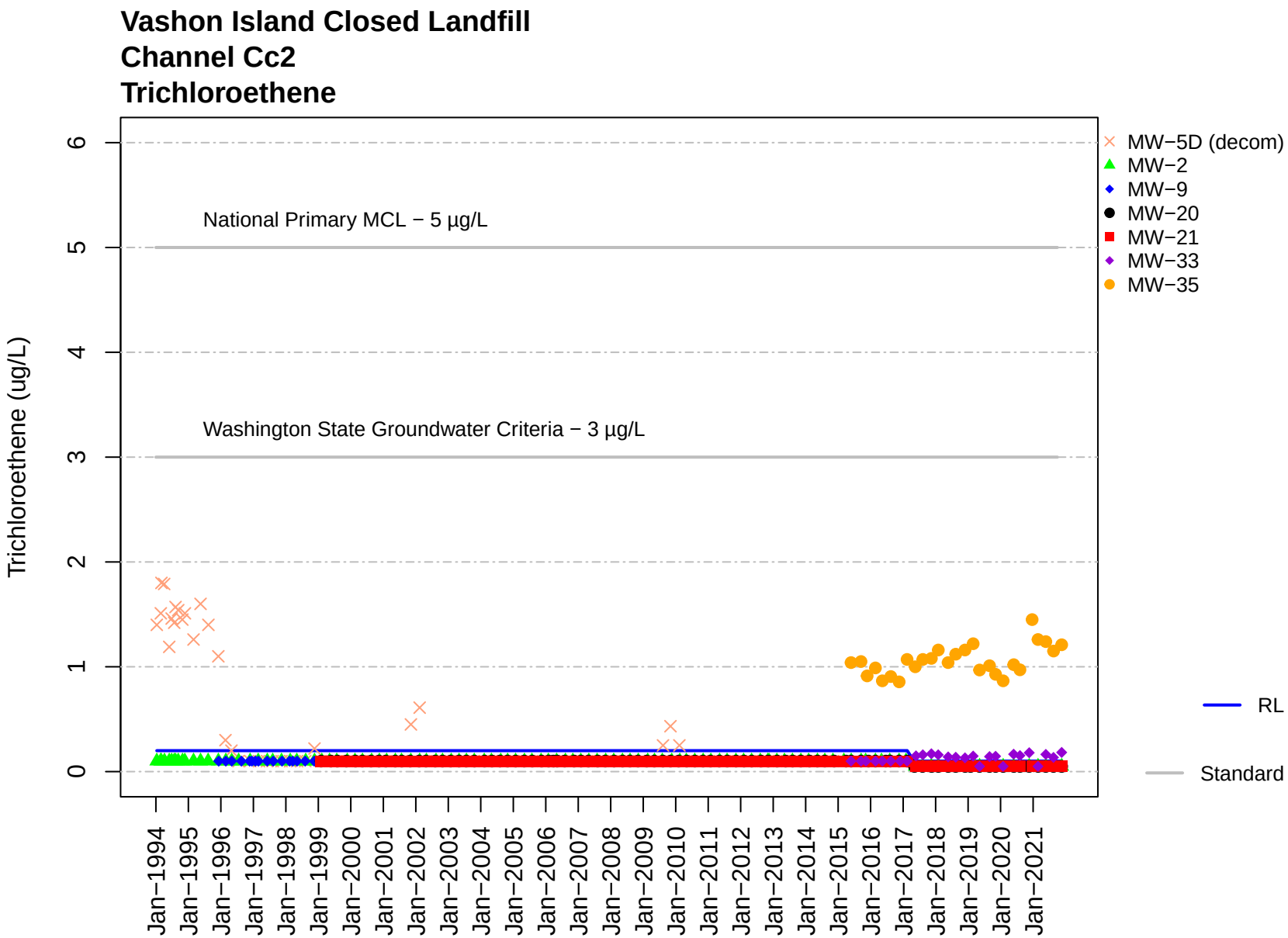

Vashon Island Closed Landfill
Channel Cc2
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

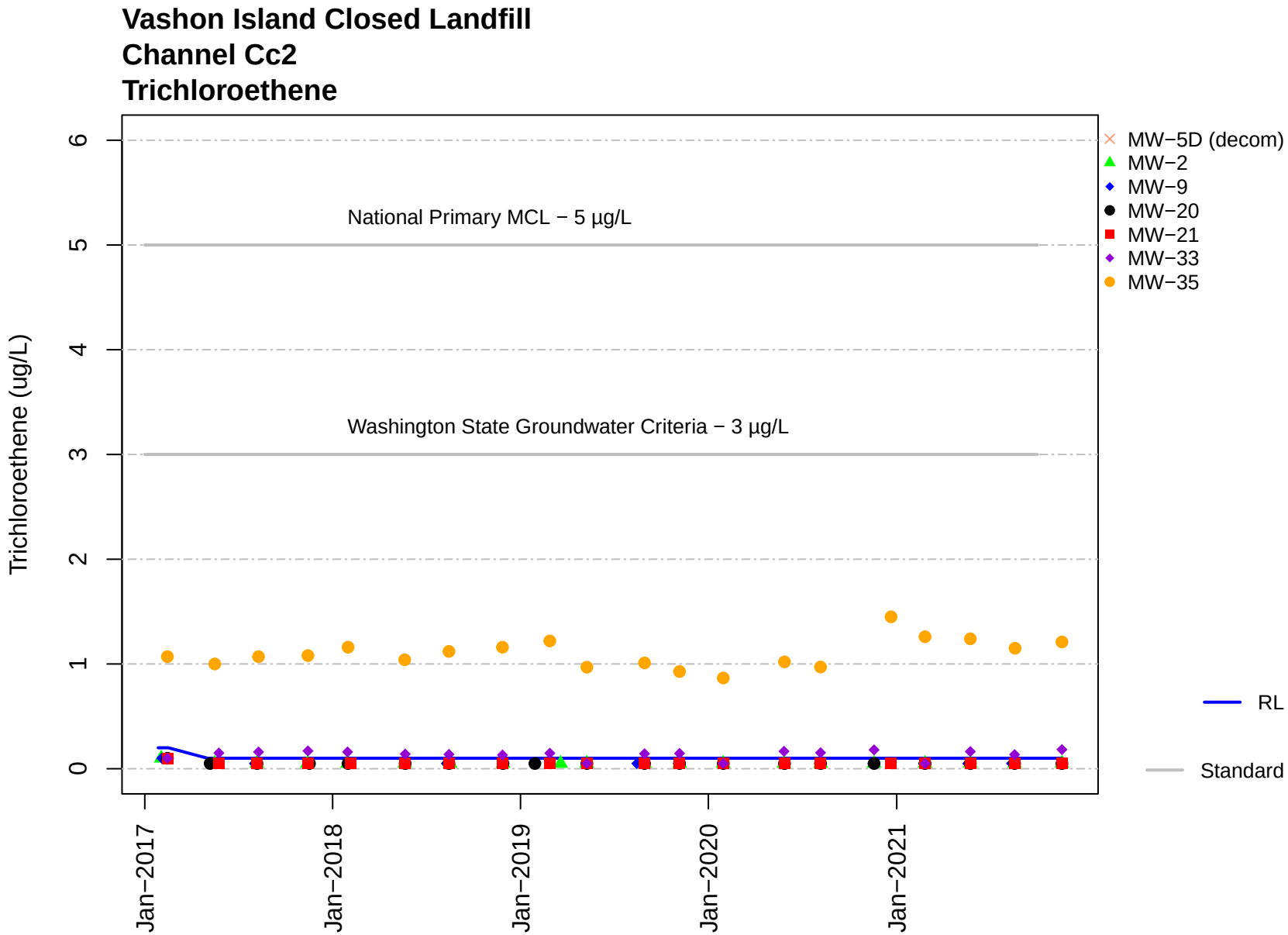

Vashon Island Closed Landfill
Channel Cc2
Toluene
Toluene (ug/L)
0
200
400
600
800
1000
1200
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

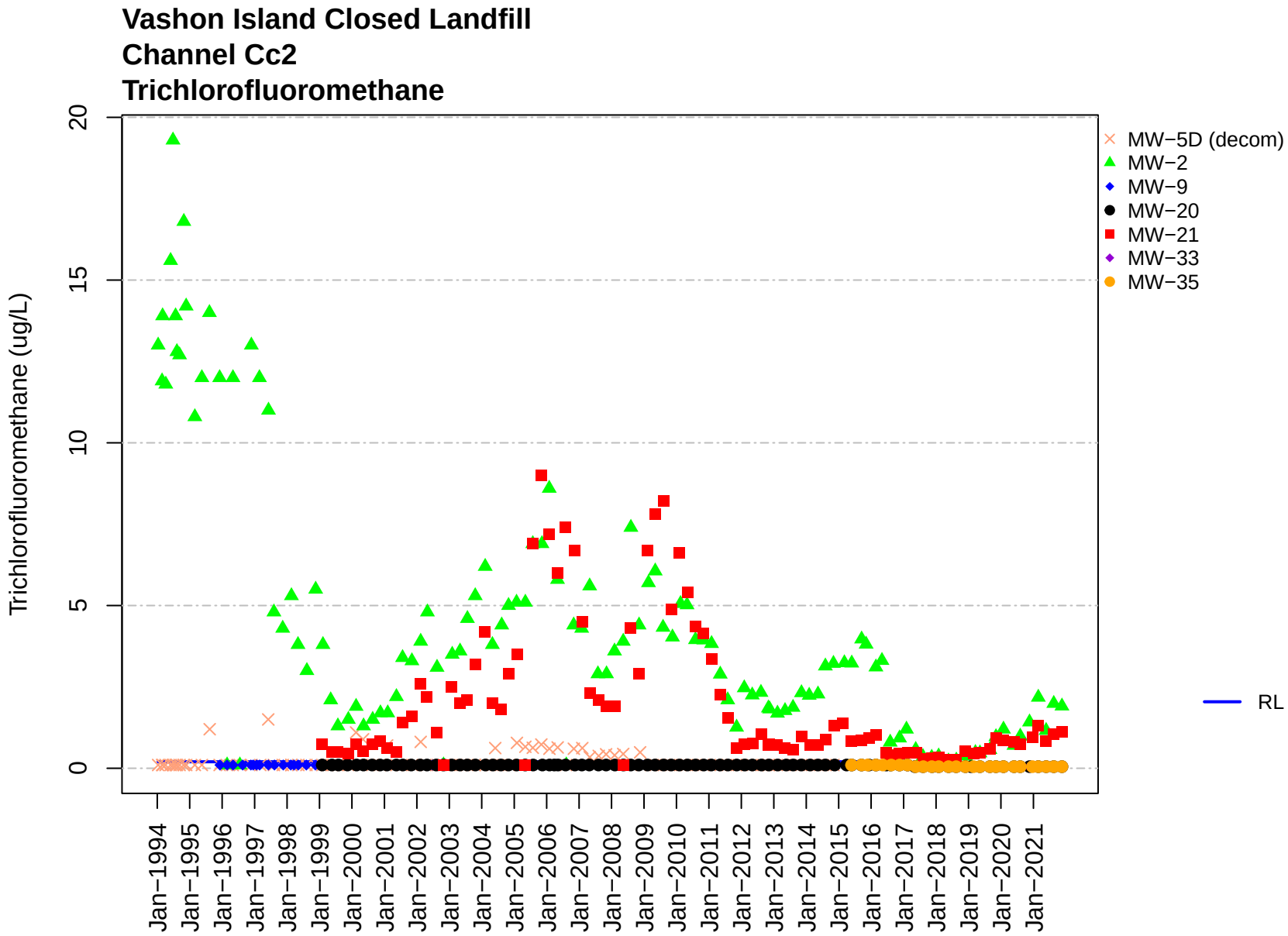

Vashon Island Closed Landfill
Channel Cc2
Toluene
Toluene (ug/L)
0
200
400
600
800
1000
1200
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

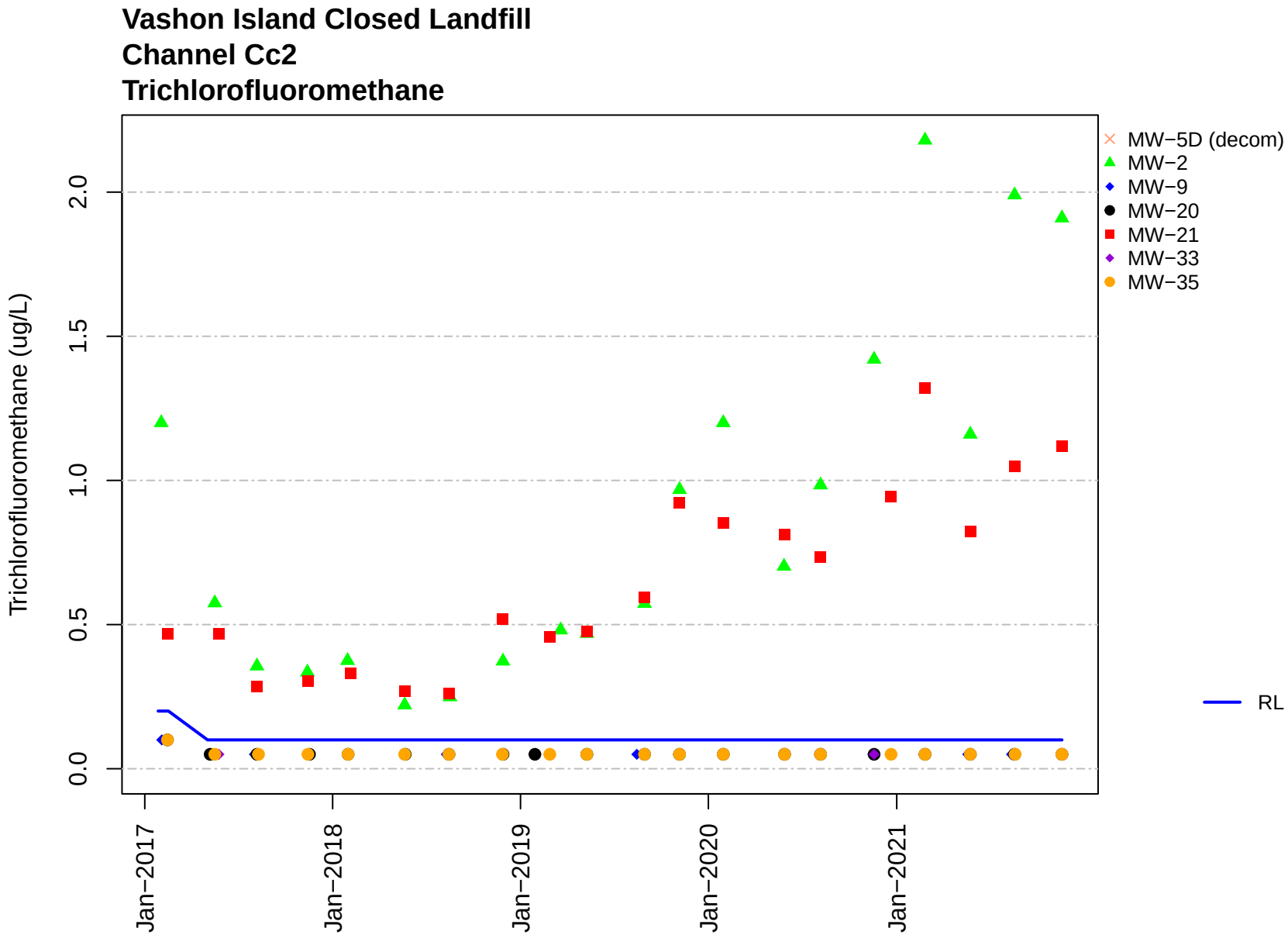

Vashon Island Closed Landfill
Channel Cc2
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

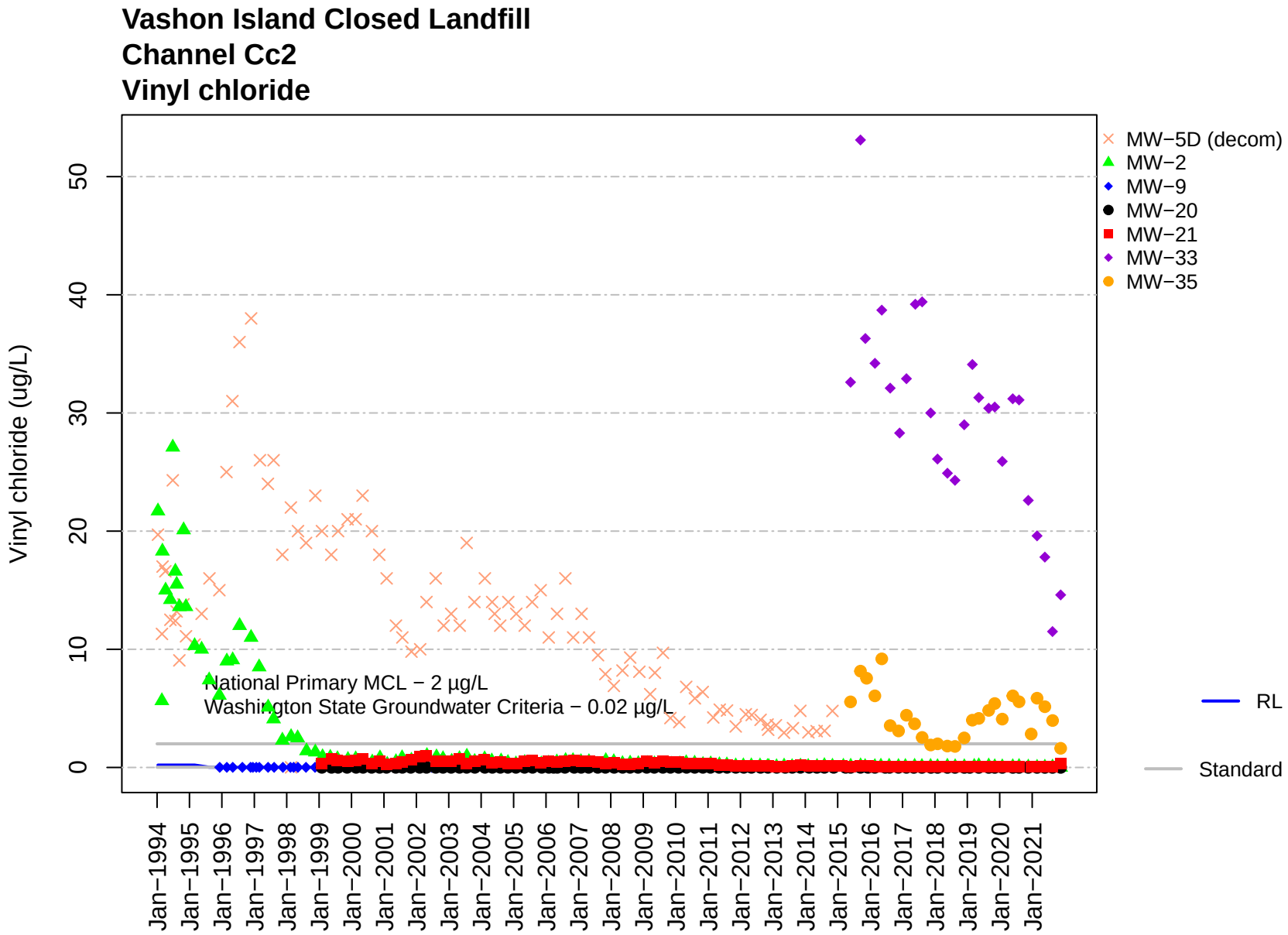

Vashon Island Closed Landfill
Channel Cc2
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

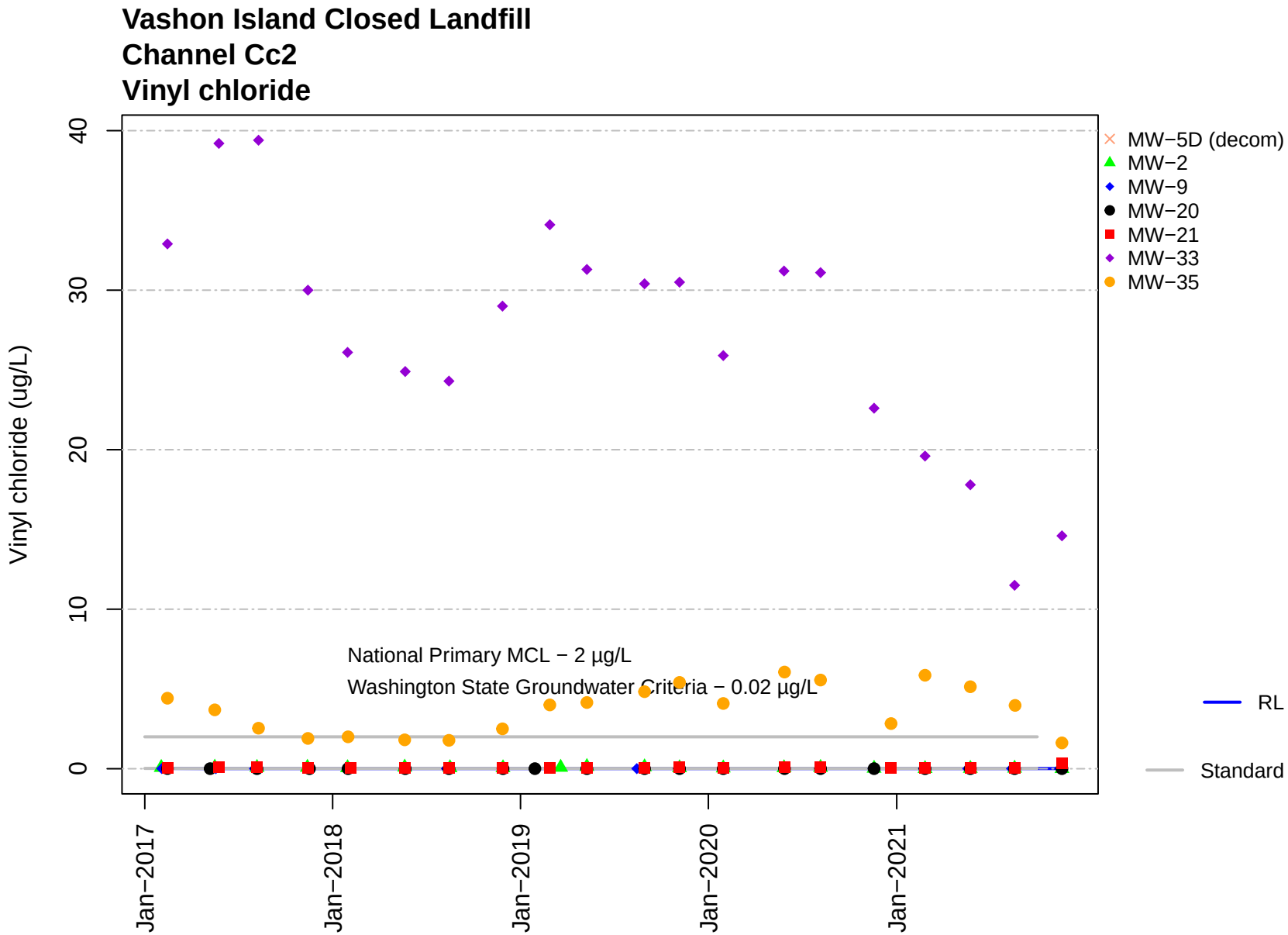

Vashon Island Closed Landfill
Channel Cc2
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021


Vashon Island Closed Landfill
Channel Cc2
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard


Vashon Island Closed Landfill
Channel Cc2
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0
5
10
15
20
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

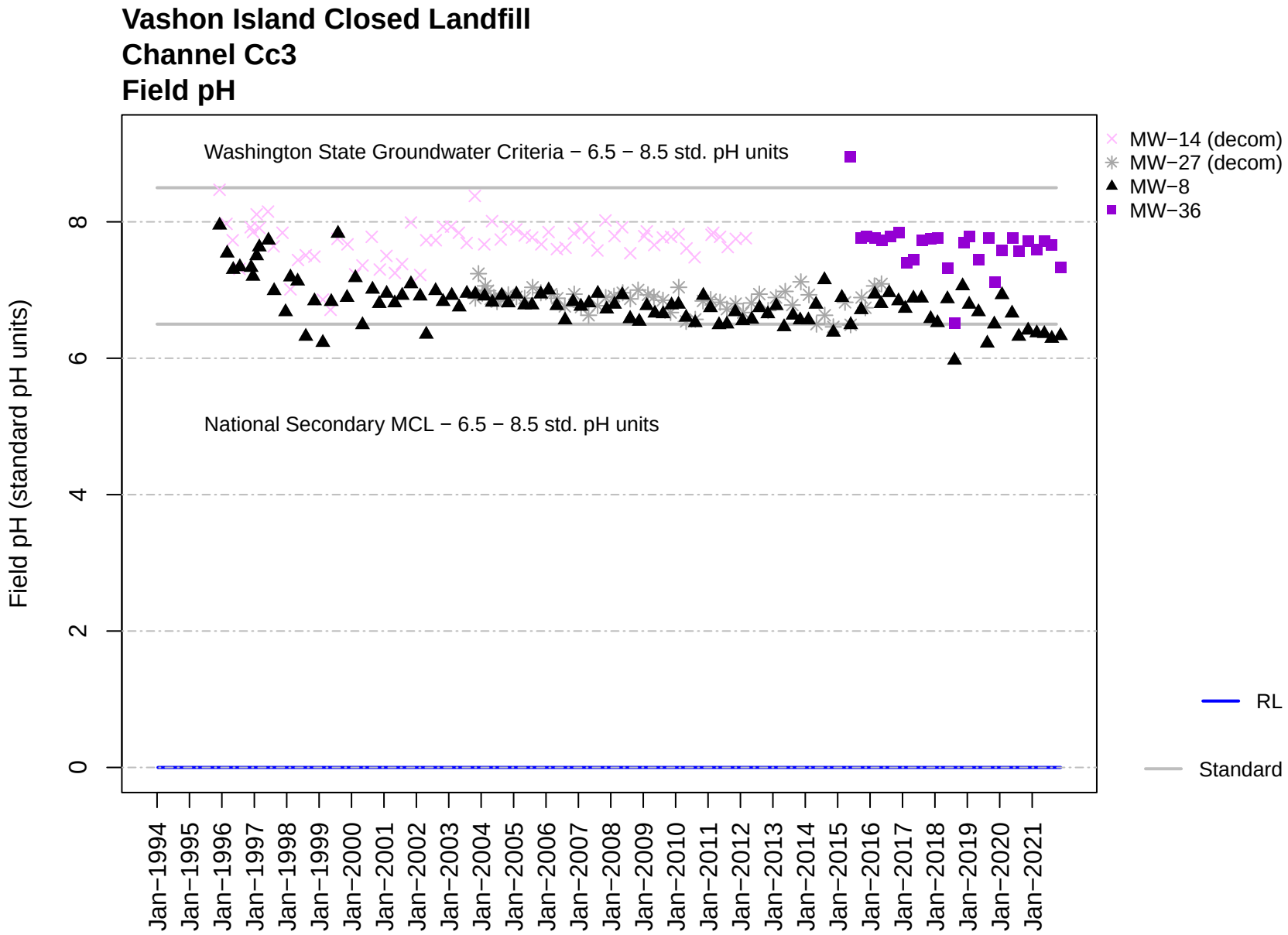

Vashon Island Closed Landfill
Channel Cc2
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL

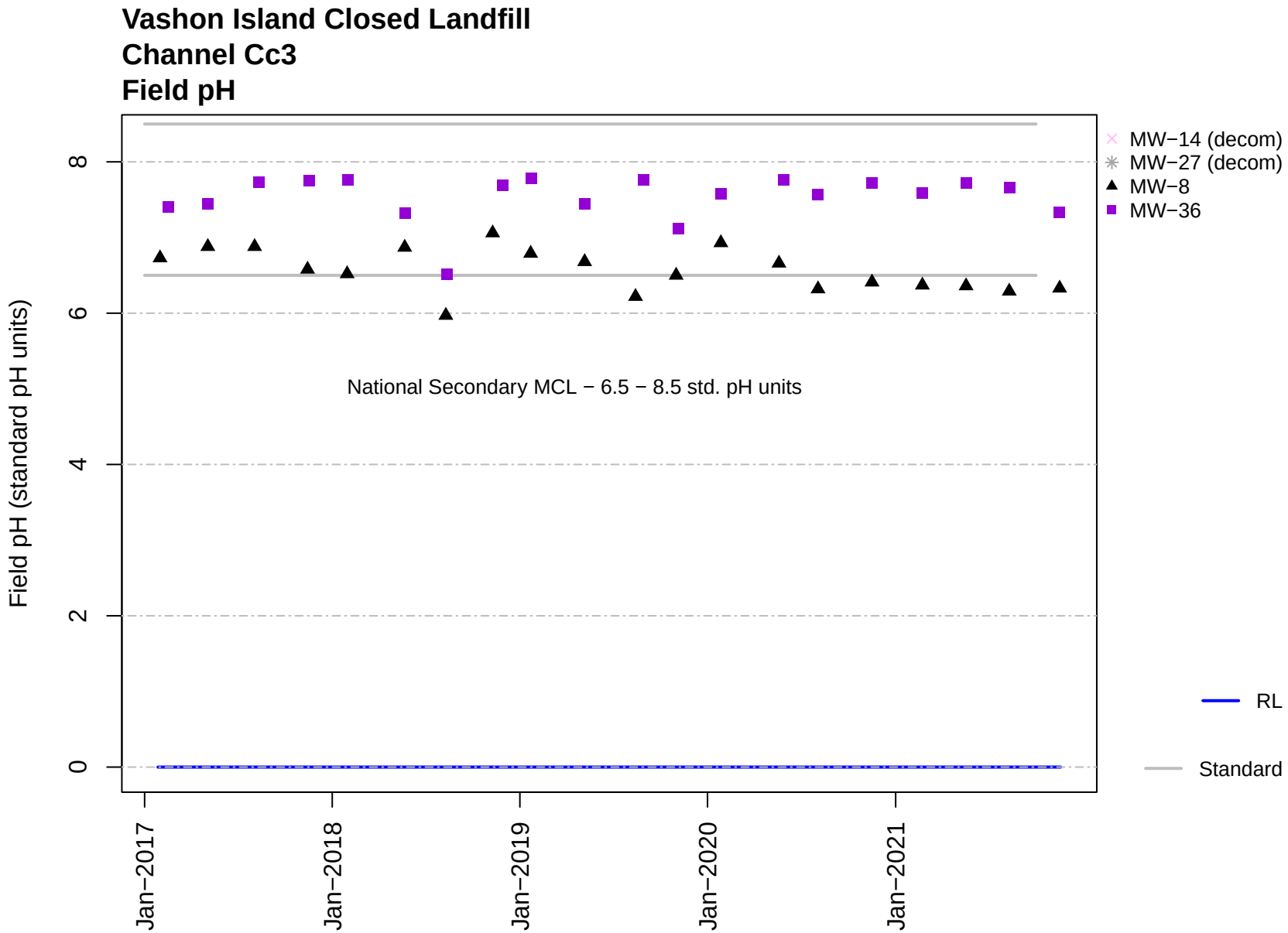

Vashon Island Closed Landfill
Channel Cc2
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
50
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

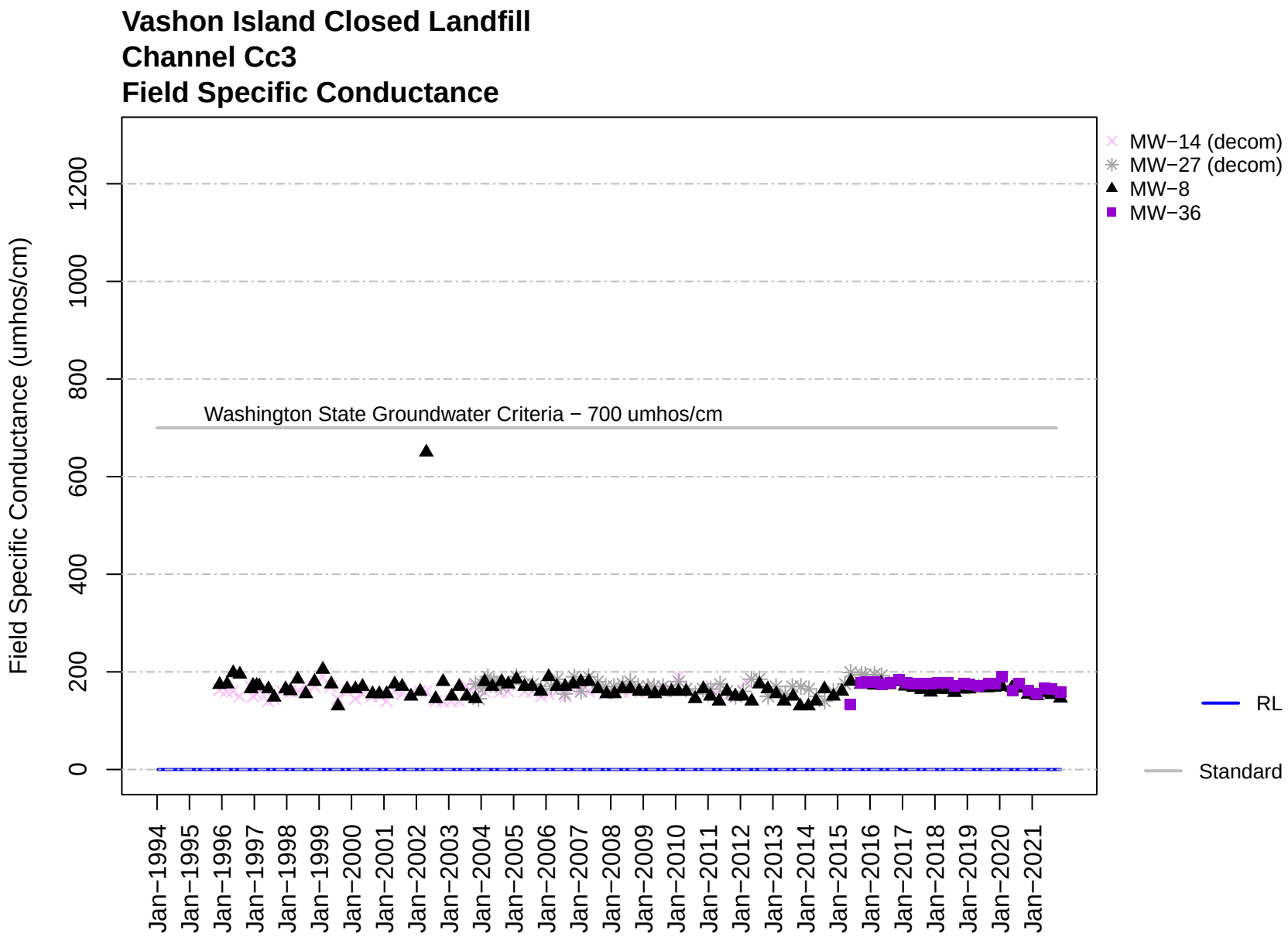

Vashon Island Closed Landfill
Channel Cc2
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

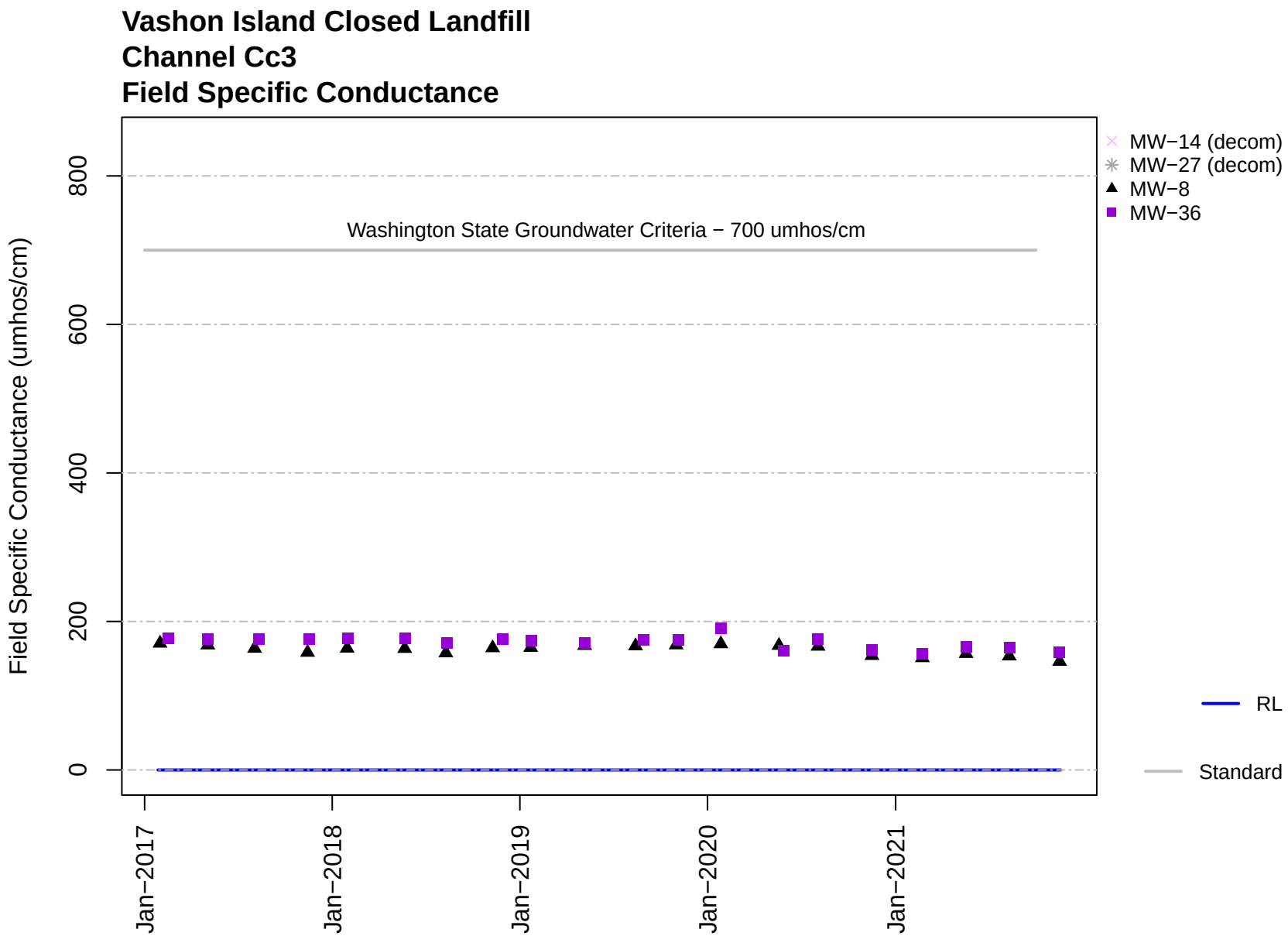
Appendix E

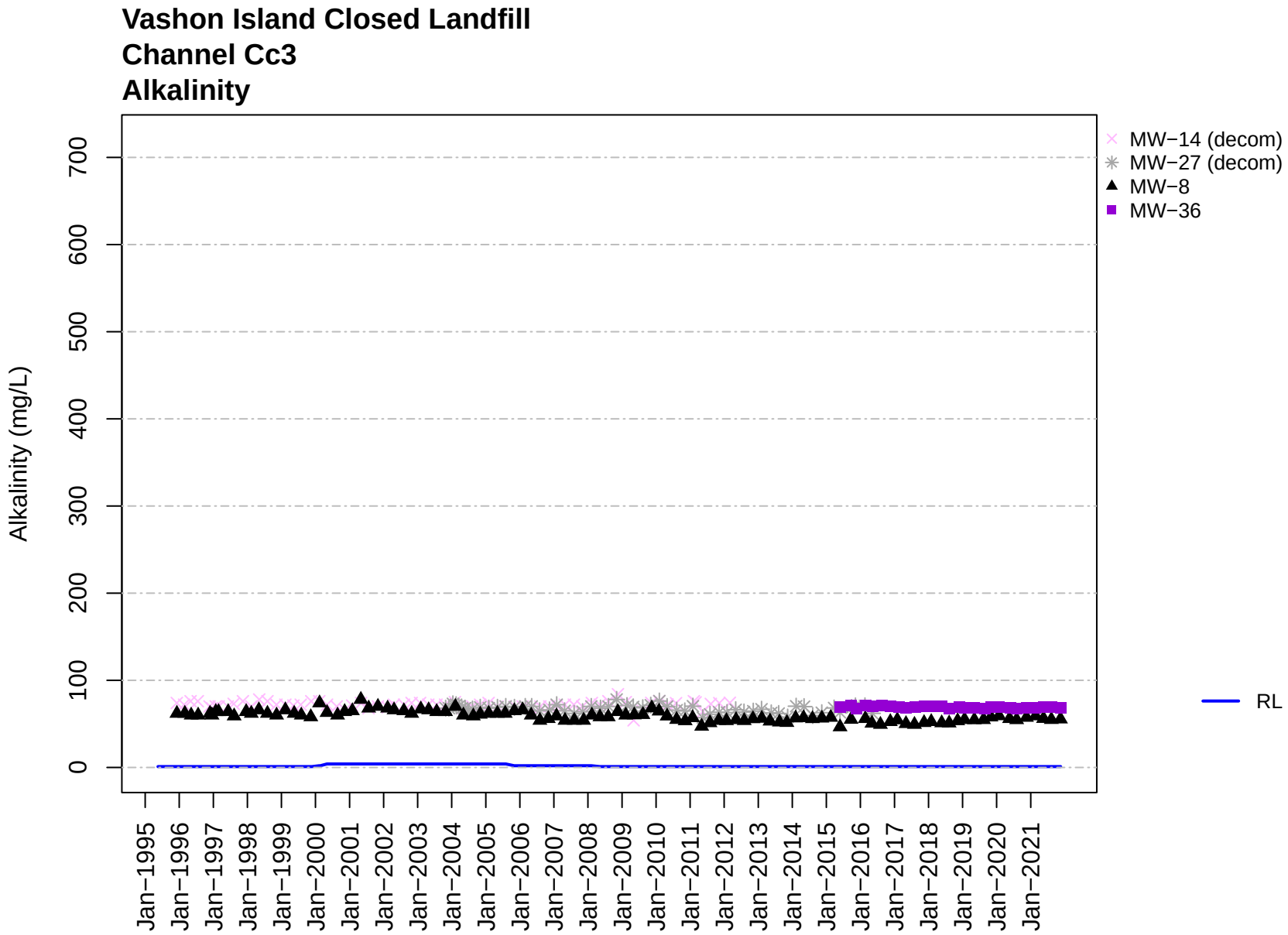
Time Concentration Plots for
Groundwater in Channel Cc3

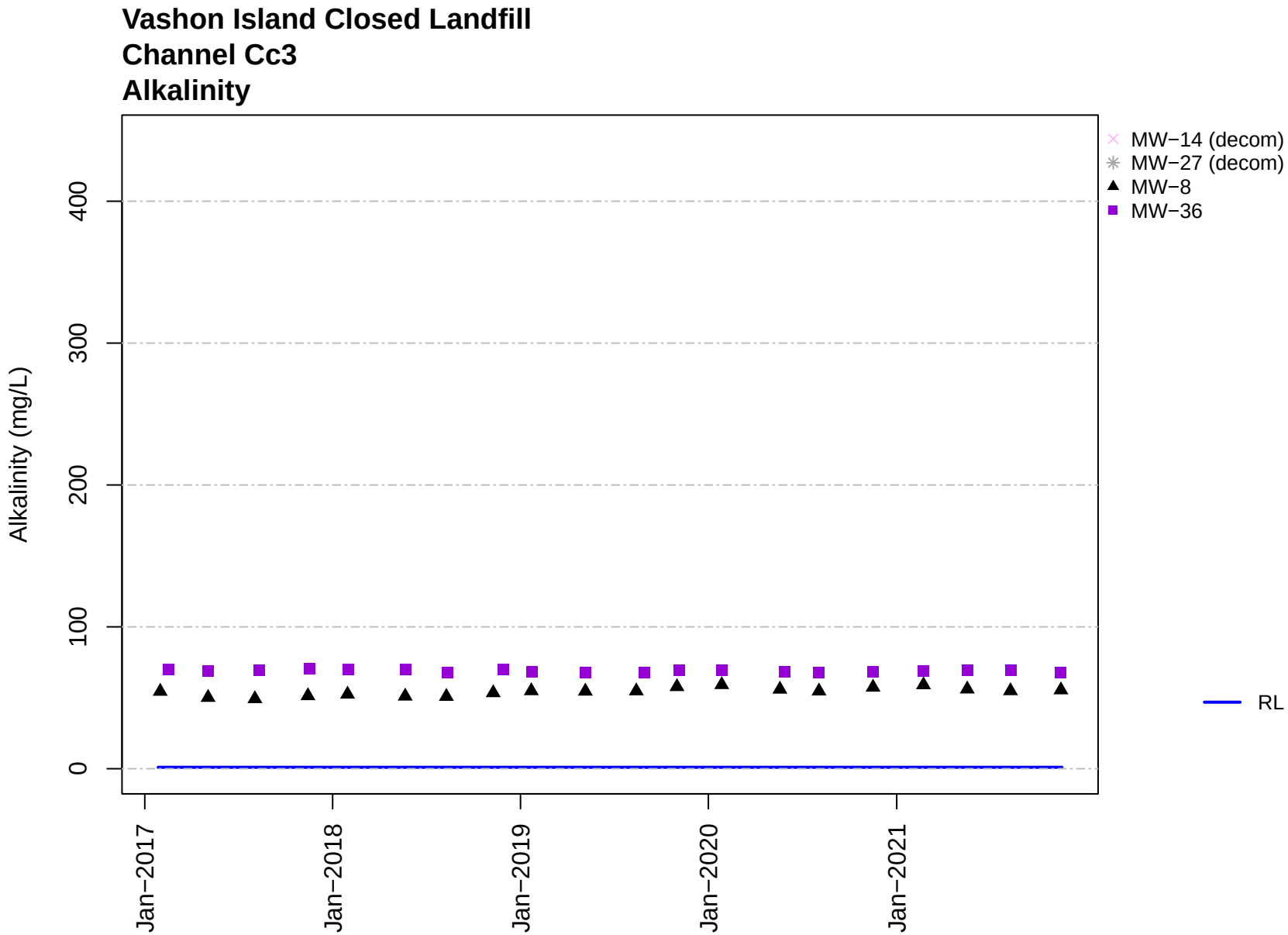

Vashon Island Closed Landfill
Channel Cc3
Field pH
Washington State Groundwater Criteria − 6.5 − 8.5 std. pH units
National Secondary MCL − 6.5 − 8.5 std. pH units
Field pH (standard pH units)
0
2
4
6
8
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

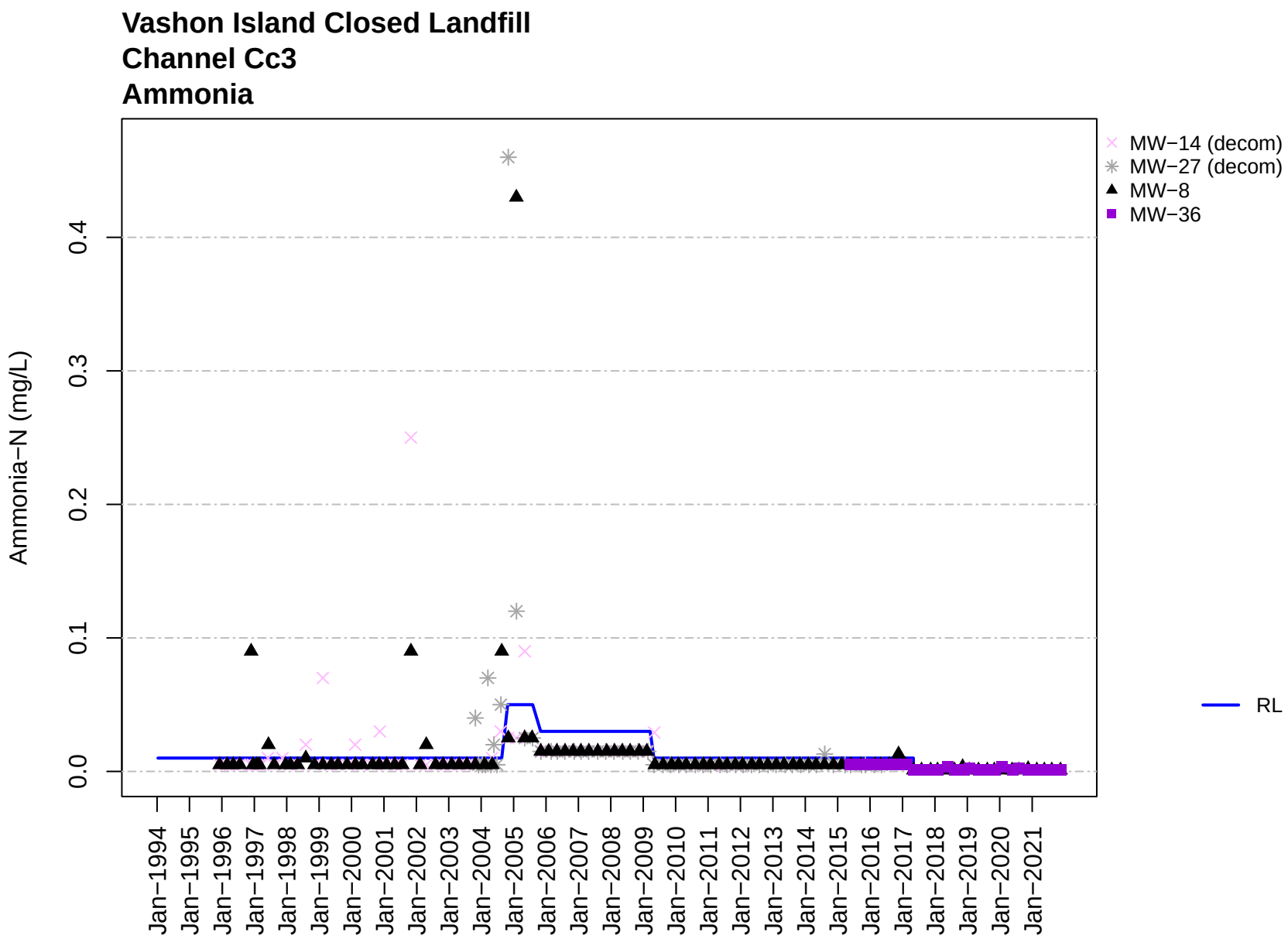

Vashon Island Closed Landfill
Channel Cc3
Field pH
Field pH (standard pH units)
0
2
4
6
8
National Secondary MCL − 6.5 − 8.5 std. pH units
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

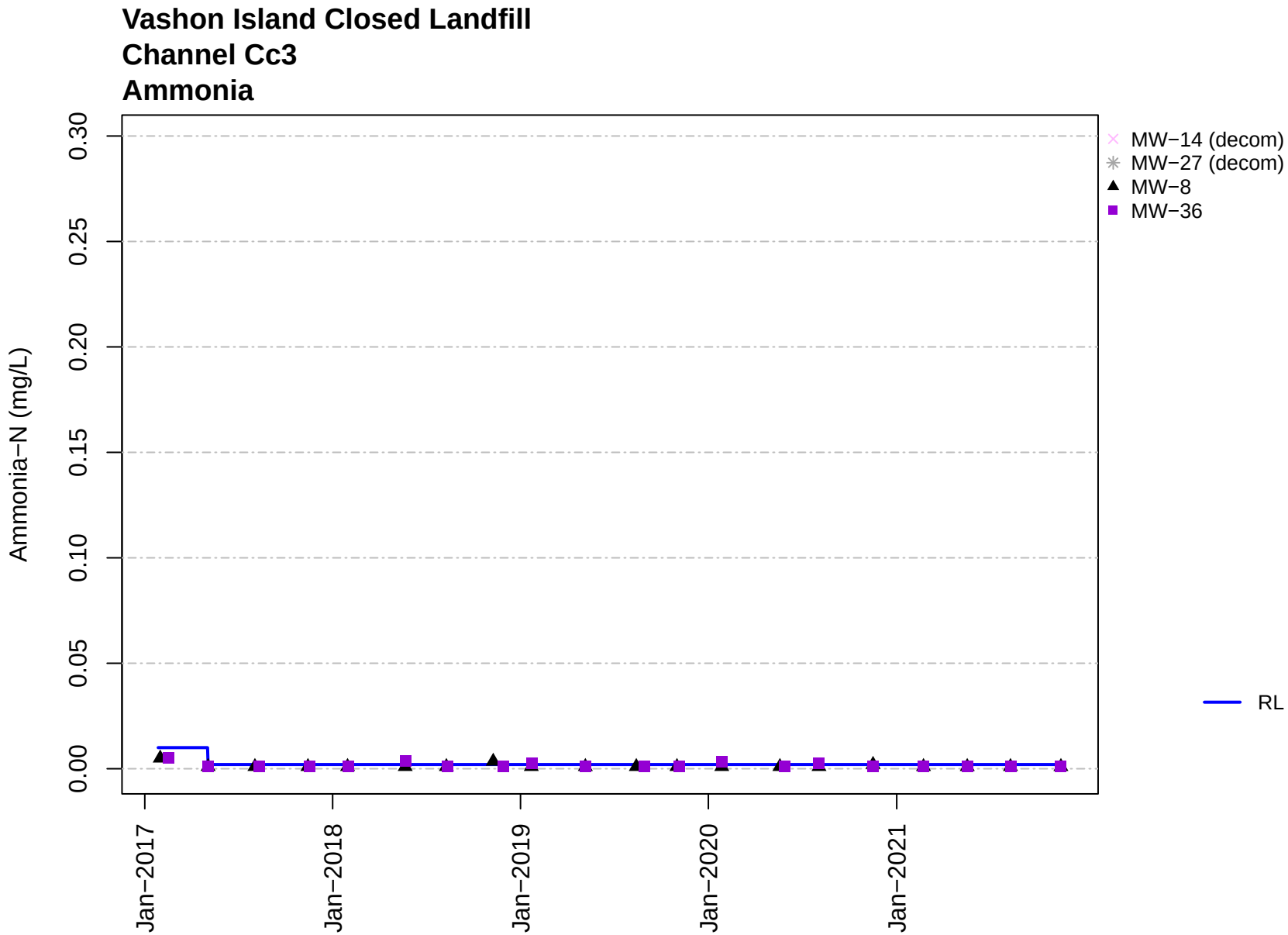

Vashon Island Closed Landfill
Channel Cc3
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
1000
1200
Washington State Groundwater Criteria − 700 umhos/cm
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

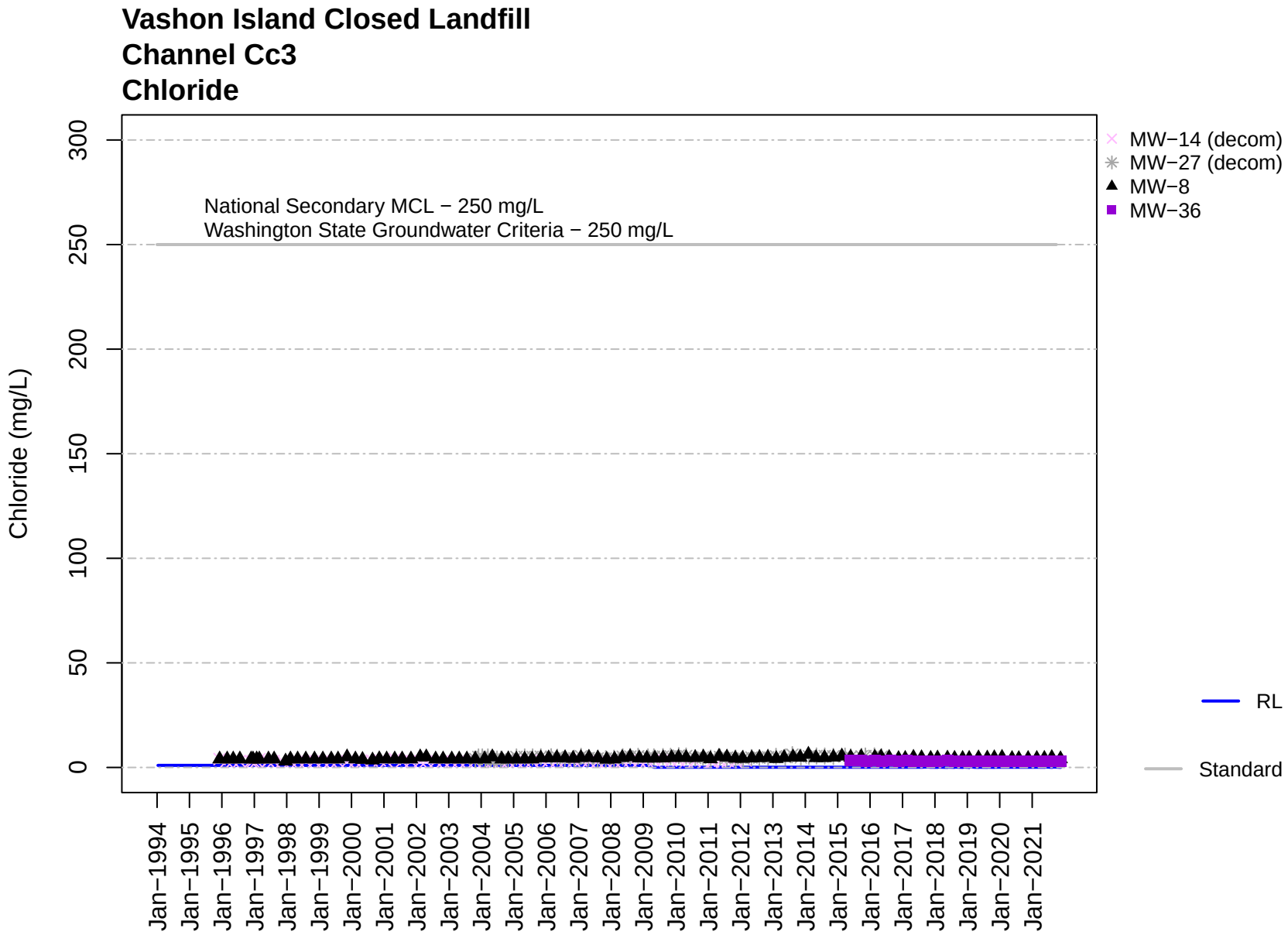

Vashon Island Closed Landfill
Channel Cc3
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
Washington State Groundwater Criteria − 700 umhos/cm
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

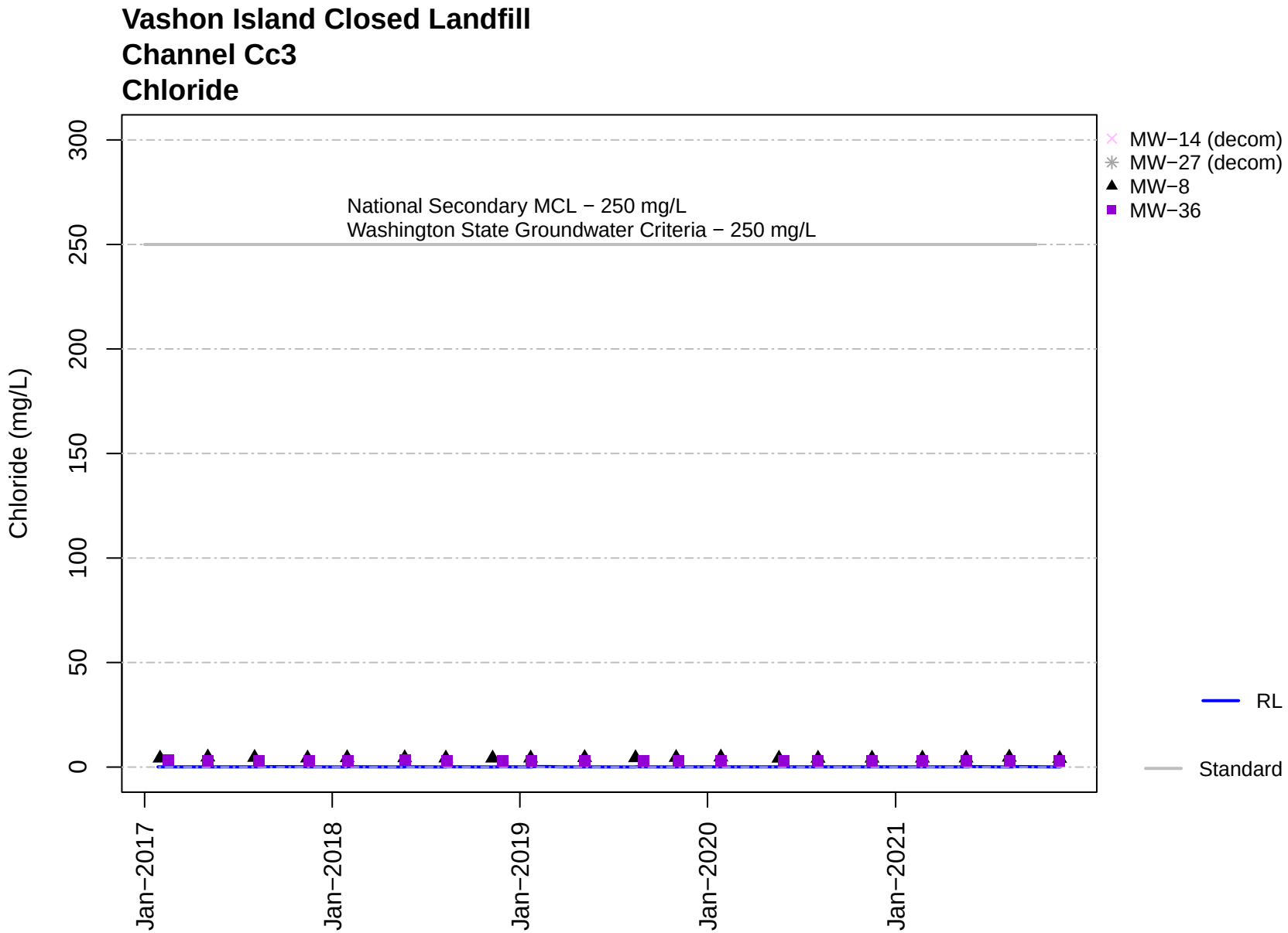

Vashon Island Closed Landfill
Channel Cc3
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
500
600
700
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

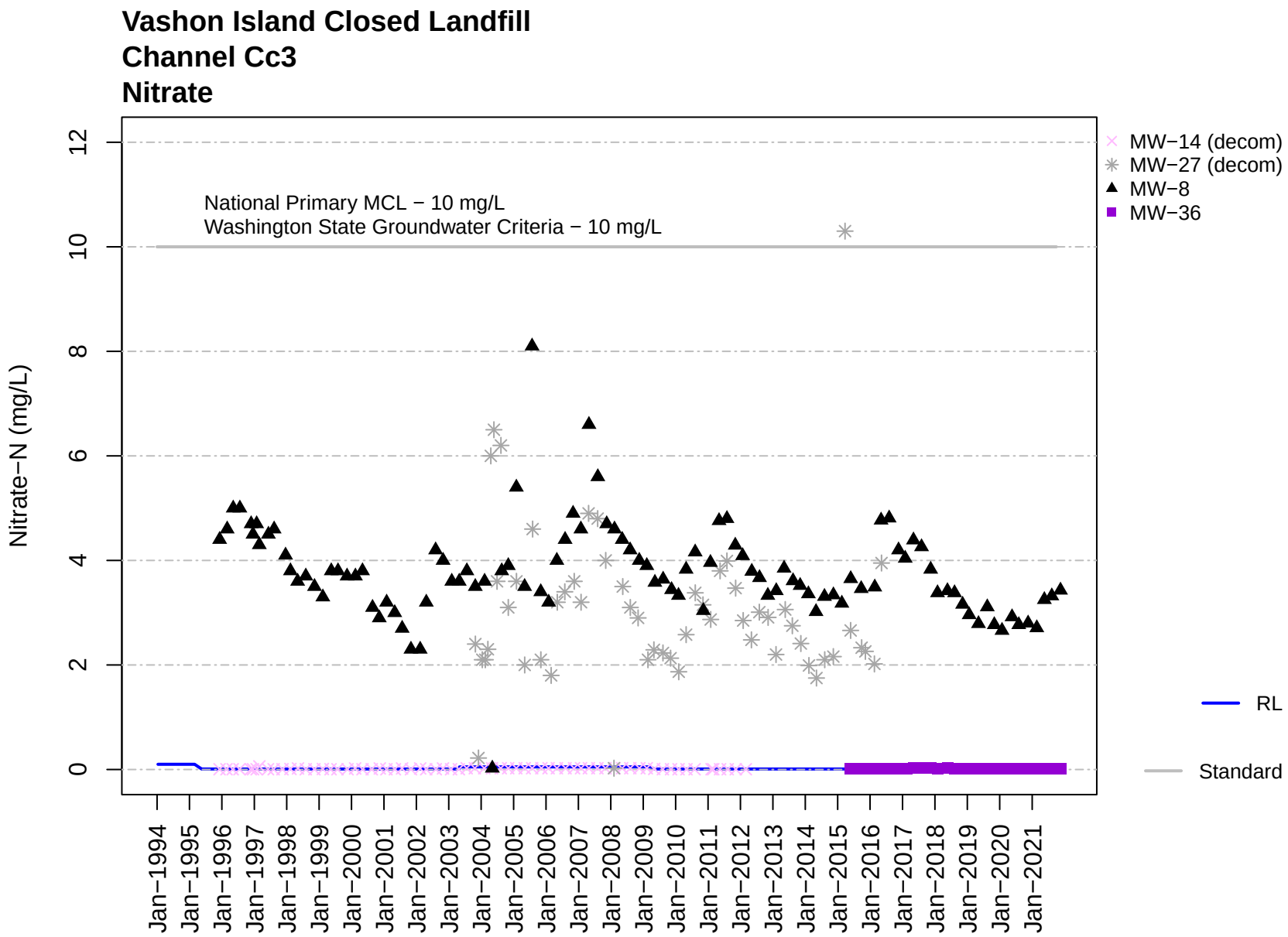

Vashon Island Closed Landfill
Channel Cc3
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

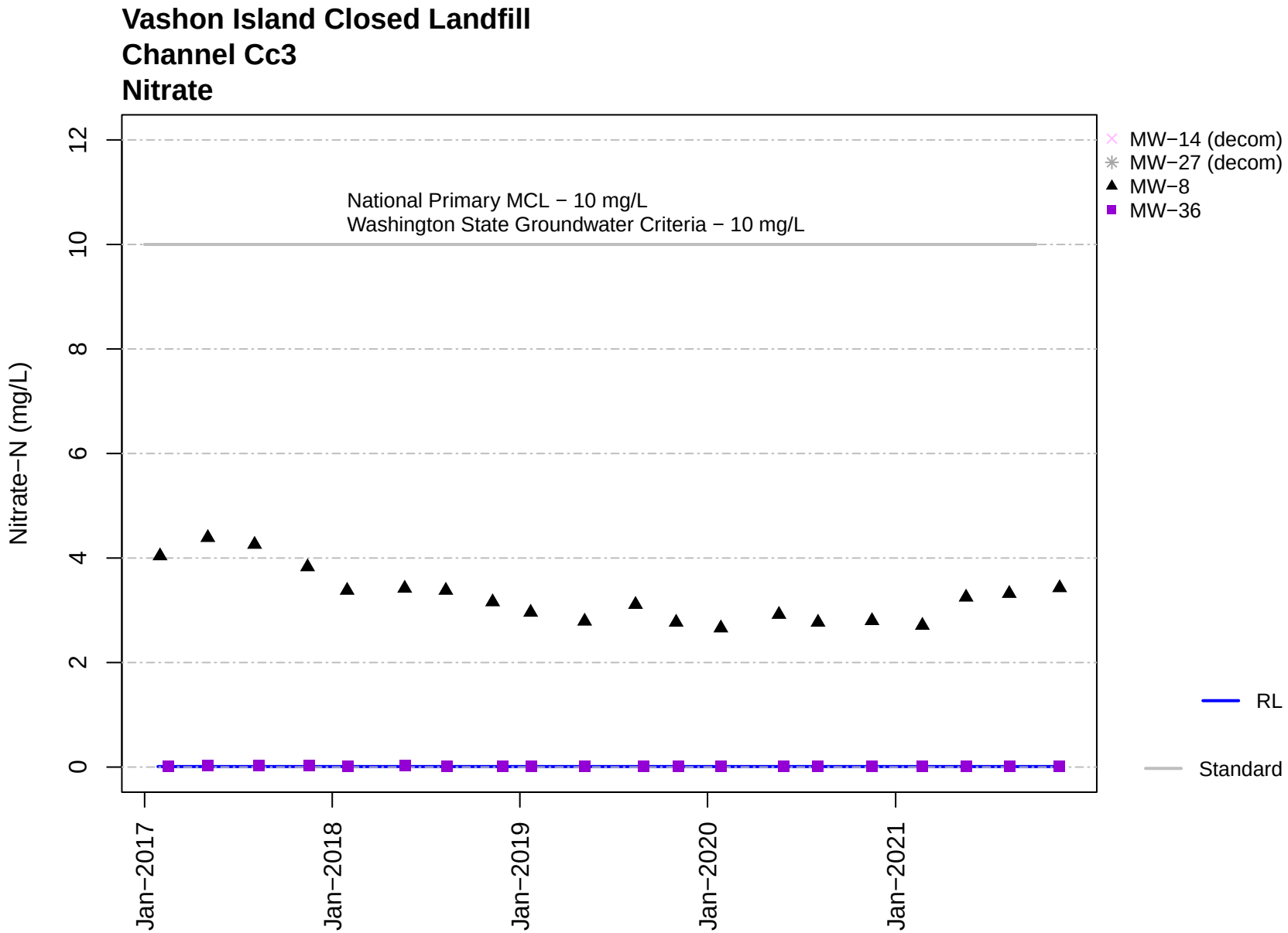

Vashon Island Closed Landfill
Channel Cc3
Ammonia
Ammonia−N (mg/L)
0.0
0.1
0.2
0.3
0.4
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

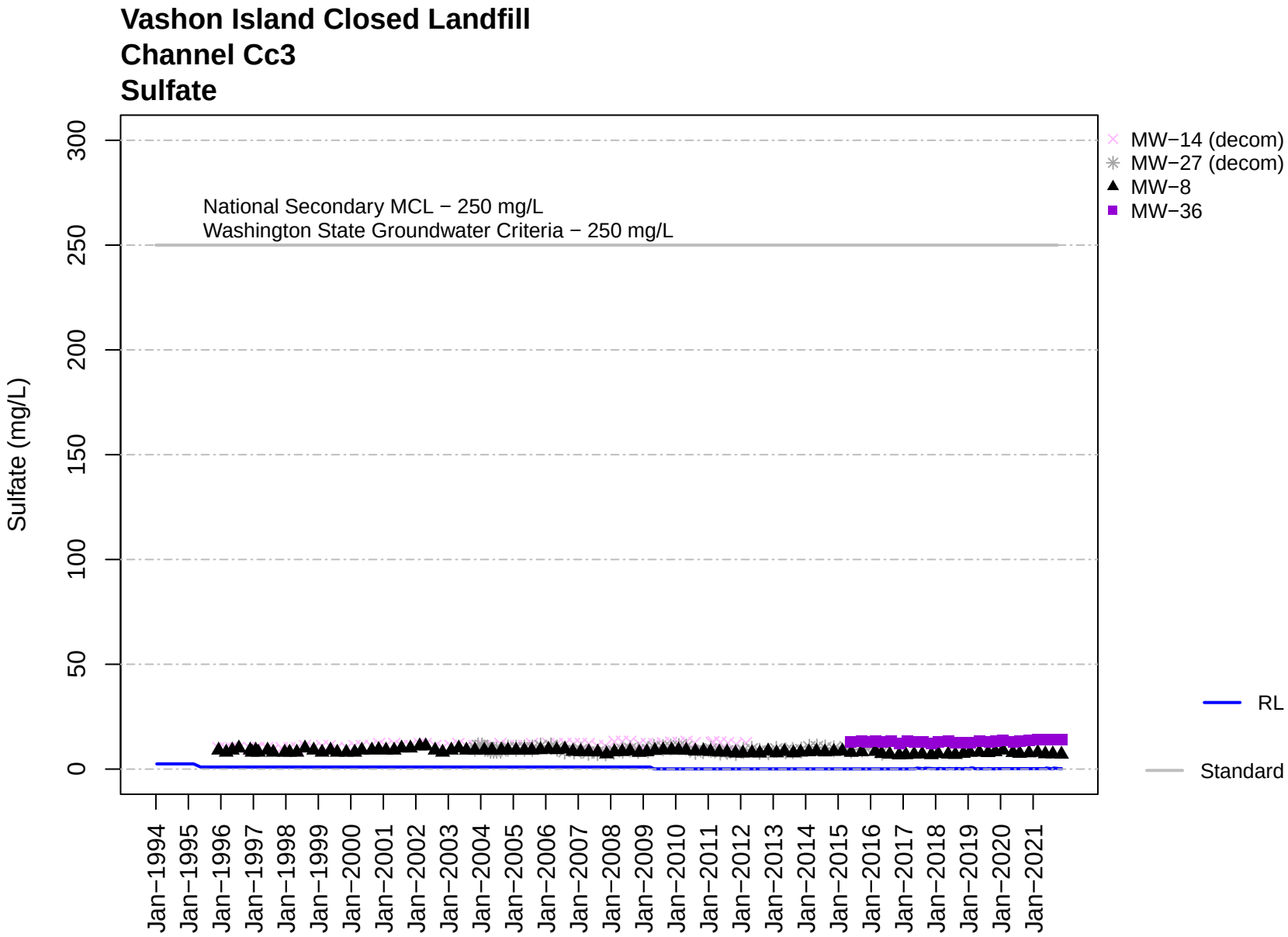

Vashon Island Closed Landfill
Channel Cc3
Ammonia
Ammonia−N (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

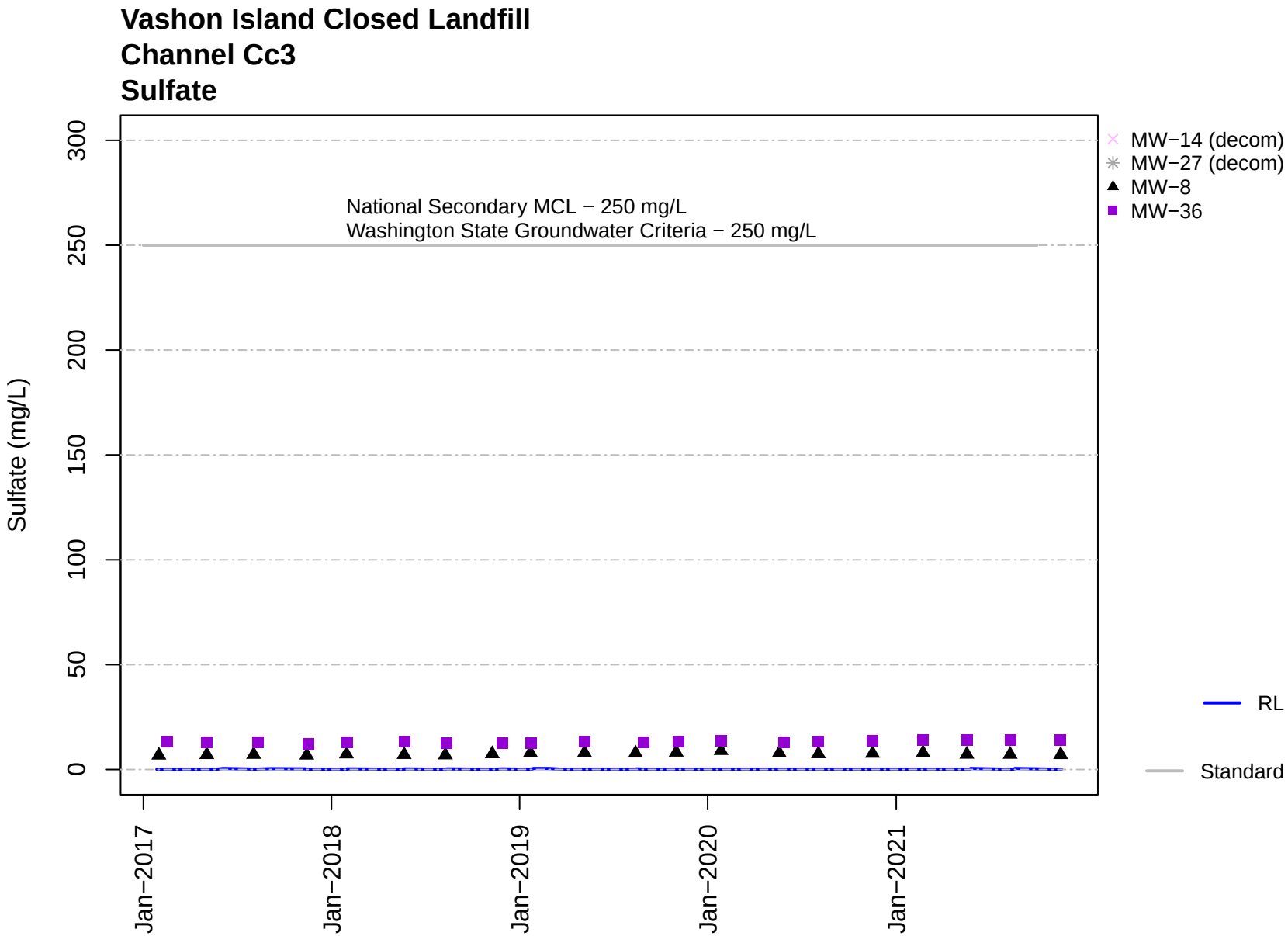

Vashon Island Closed Landfill
Channel Cc3
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

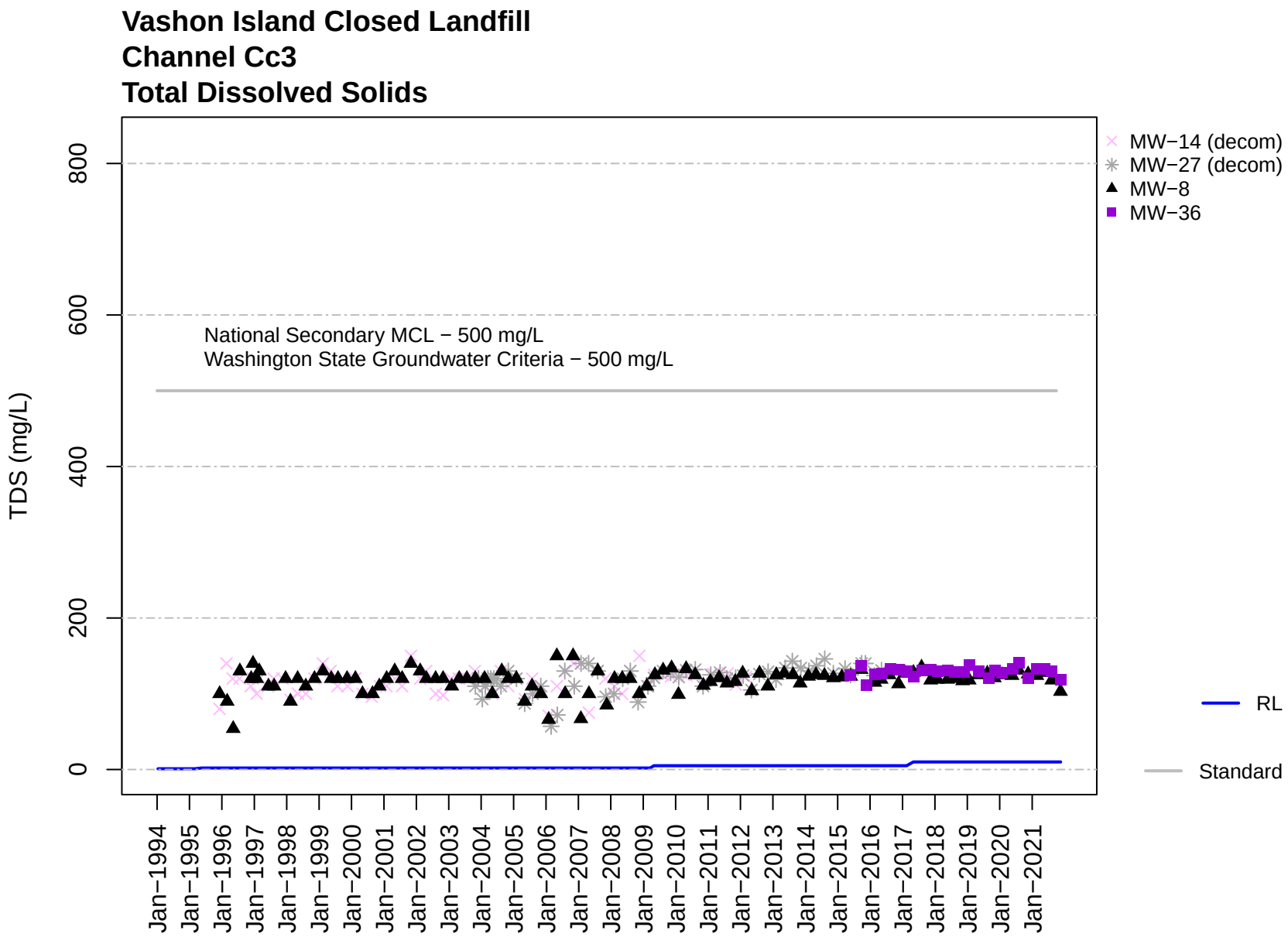

Vashon Island Closed Landfill
Channel Cc3
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021


Vashon Island Closed Landfill
Channel Cc3
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Total Dissolved Solids
TDS (mg/L)
0
200
400
600
800
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
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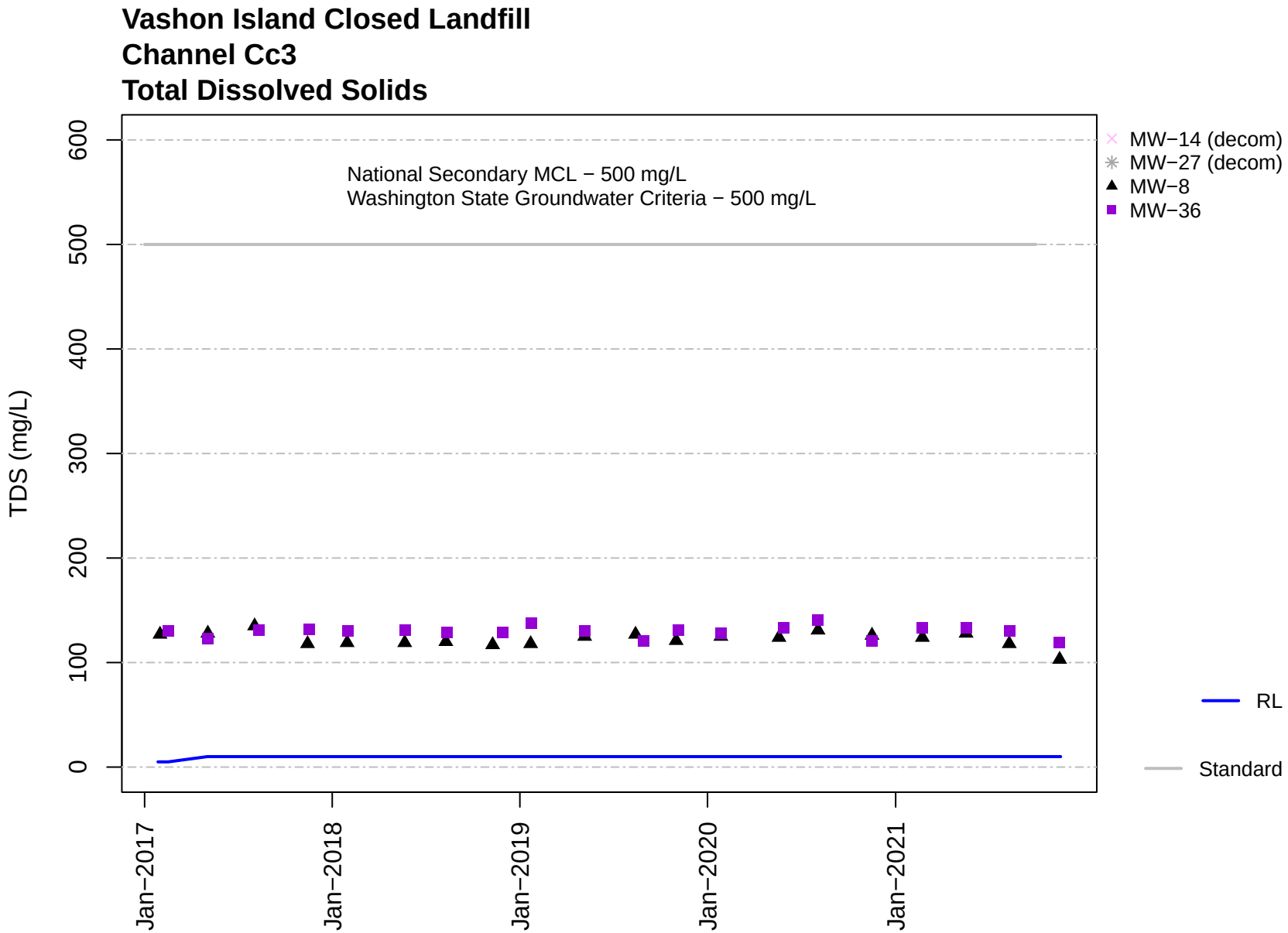
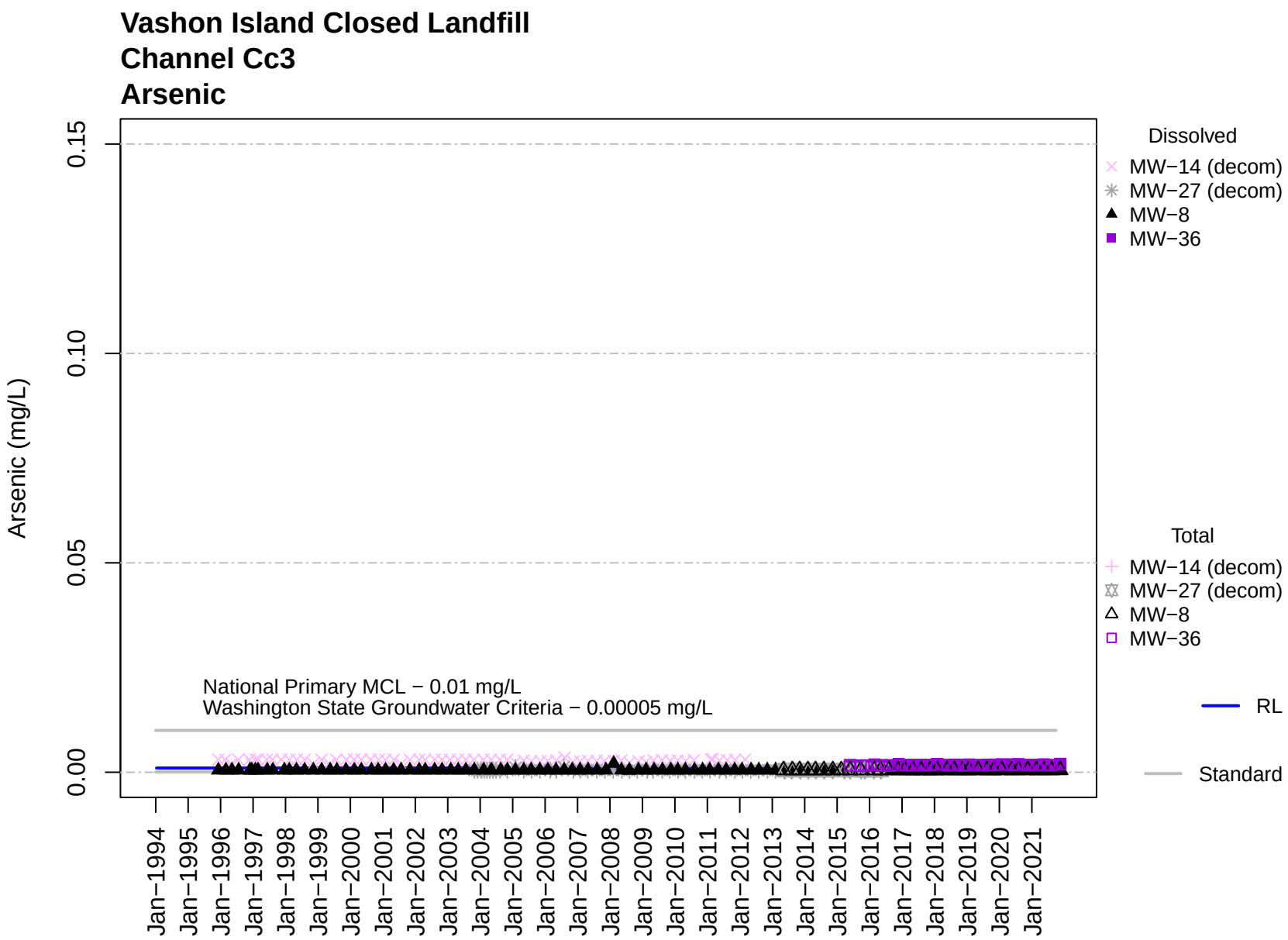
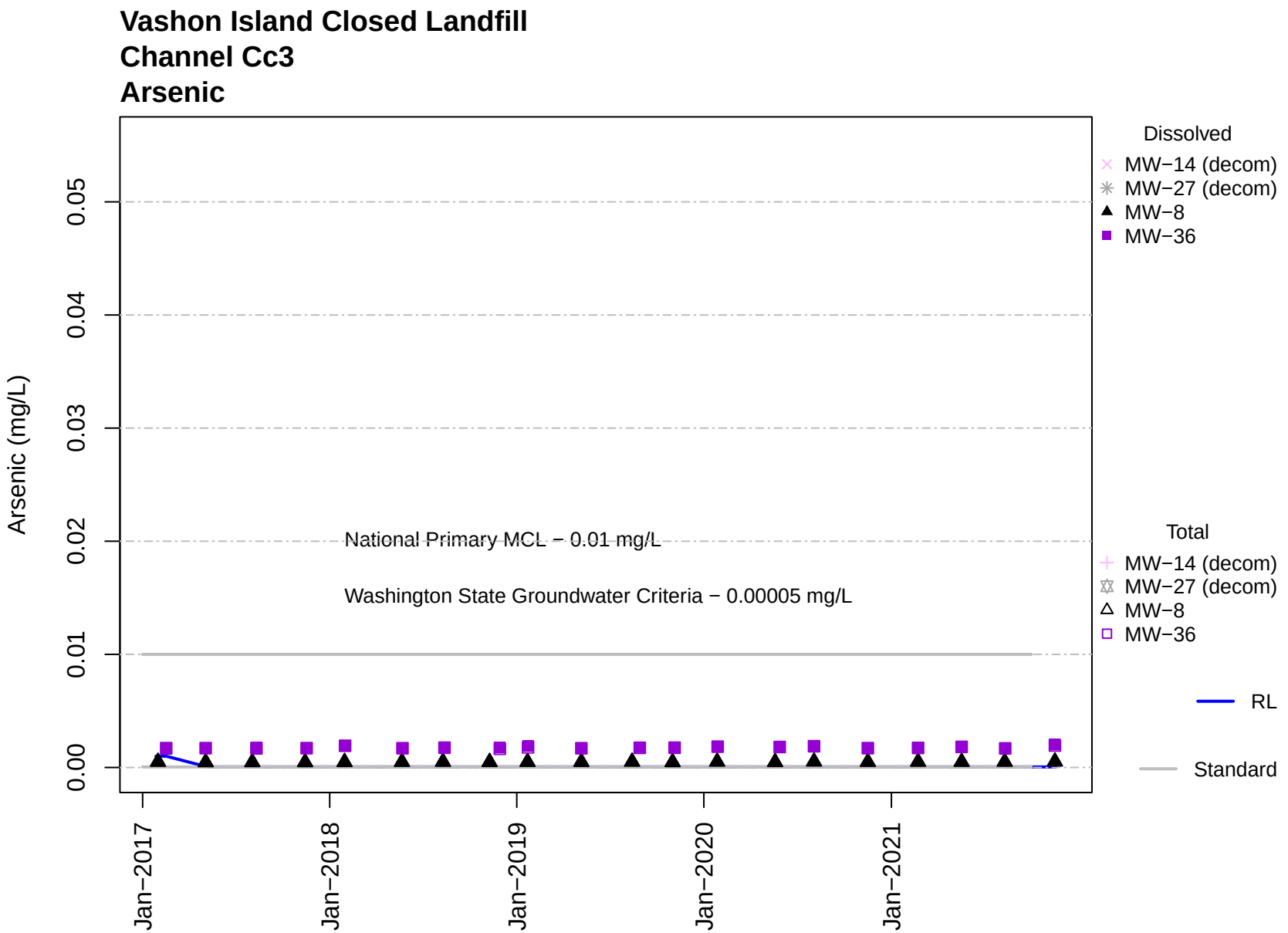
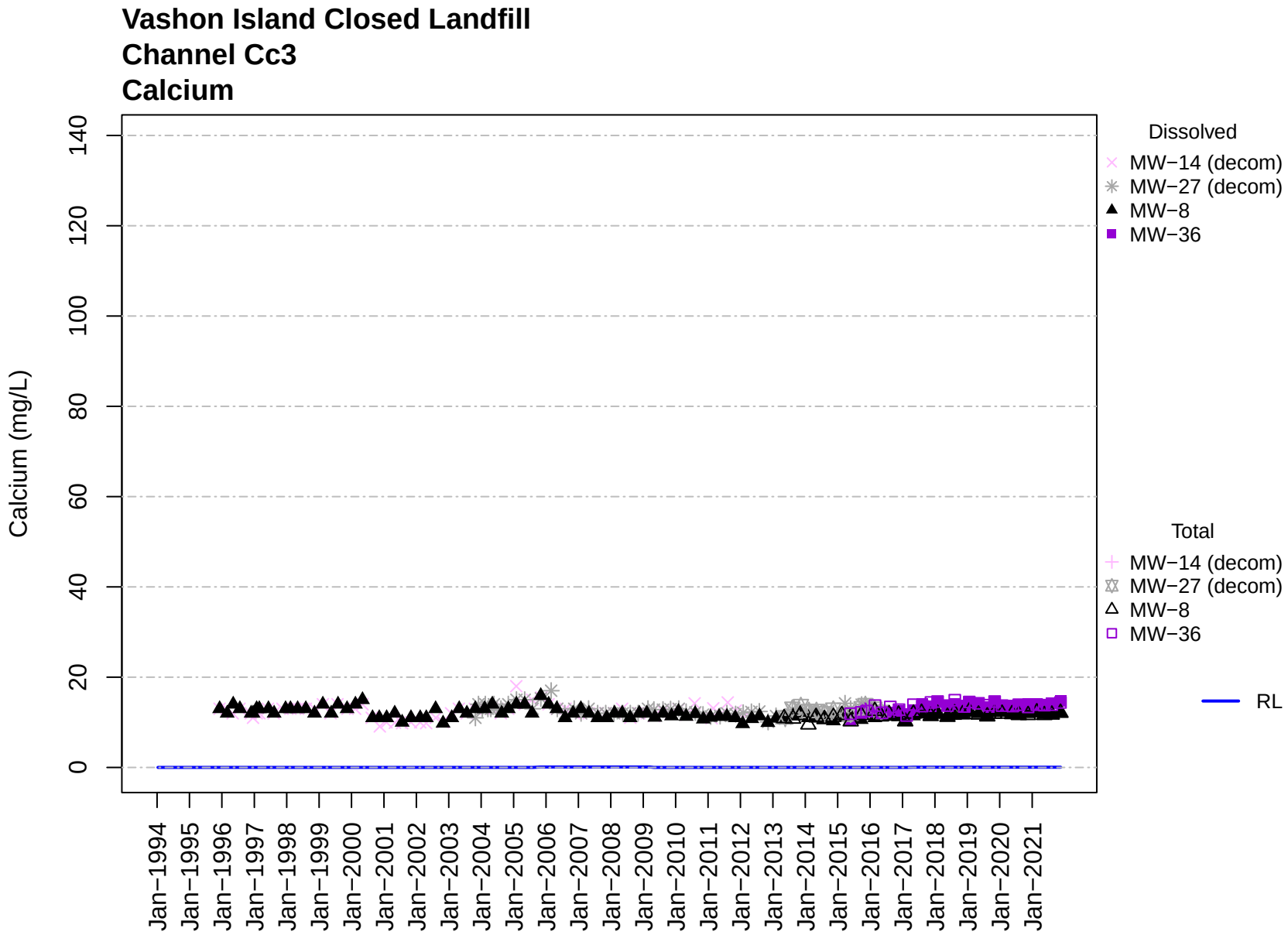
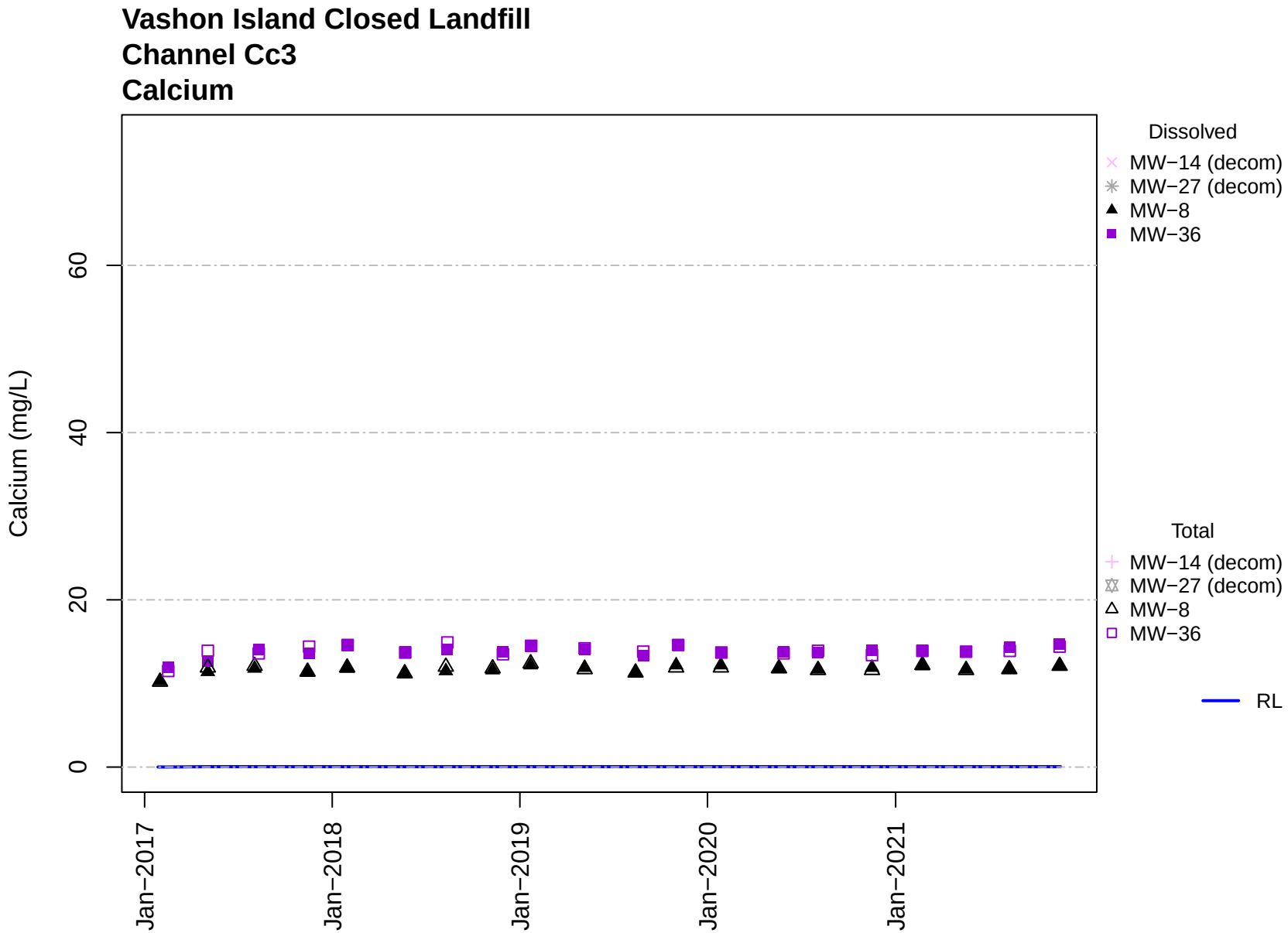
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

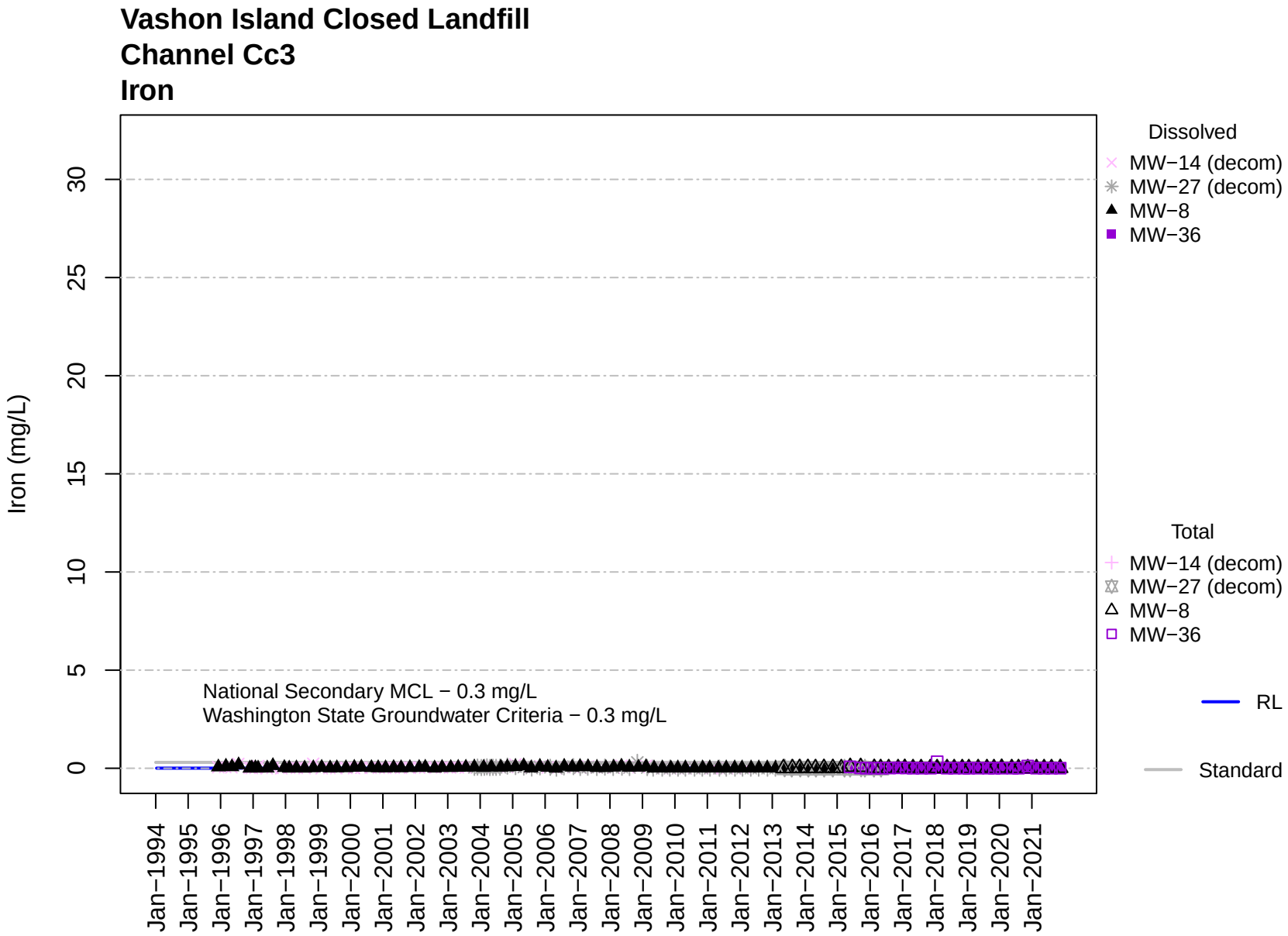

Vashon Island Closed Landfill
Channel Cc3
Total Dissolved Solids
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
TDS (mg/L)
0
100
200
300
400
500
600
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

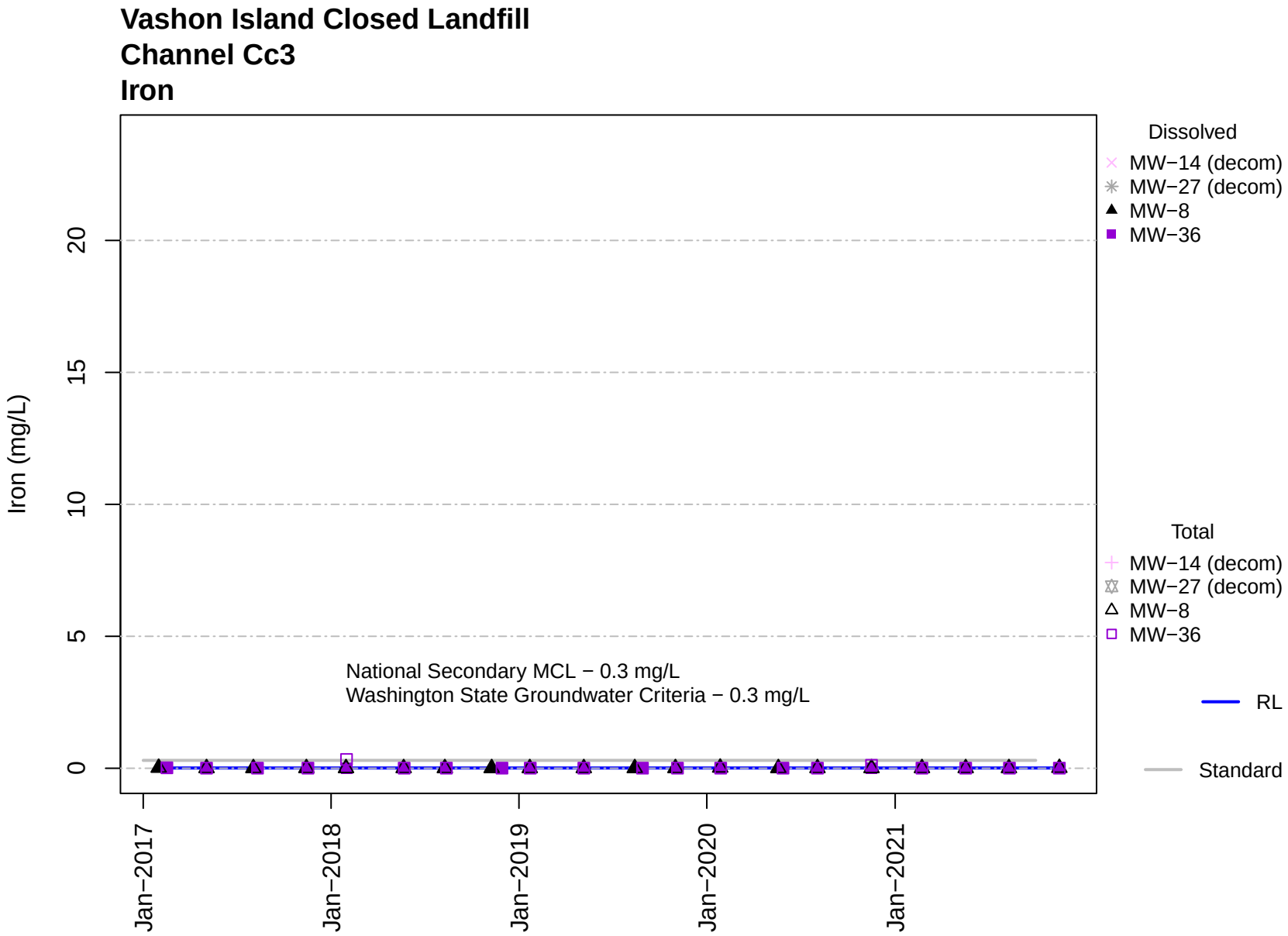

Vashon Island Closed Landfill
Channel Cc3
Arsenic
Arsenic (mg/L)
0.00
0.05
0.10
0.15
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

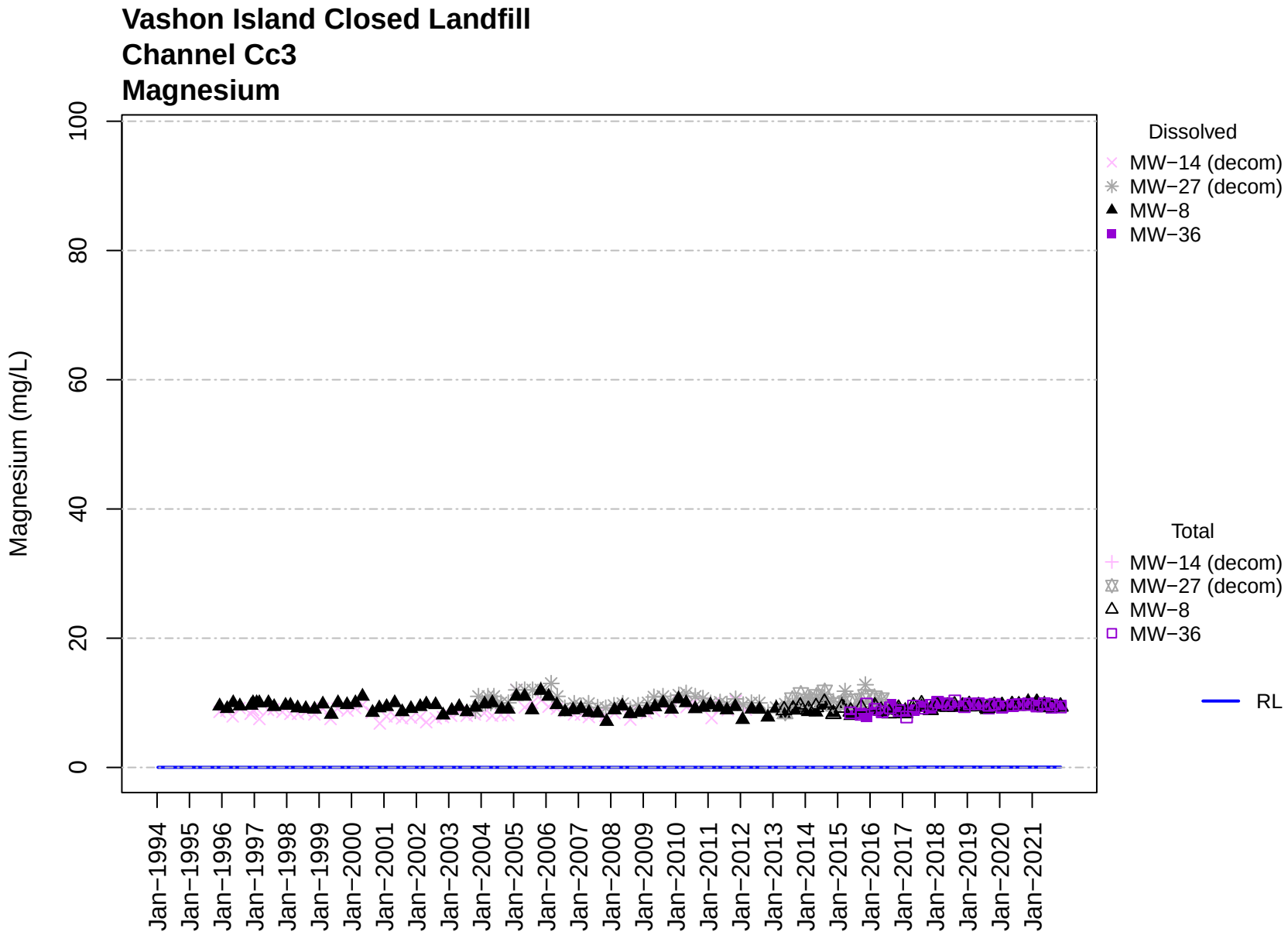

Vashon Island Closed Landfill
Channel Cc3
Arsenic
Arsenic (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

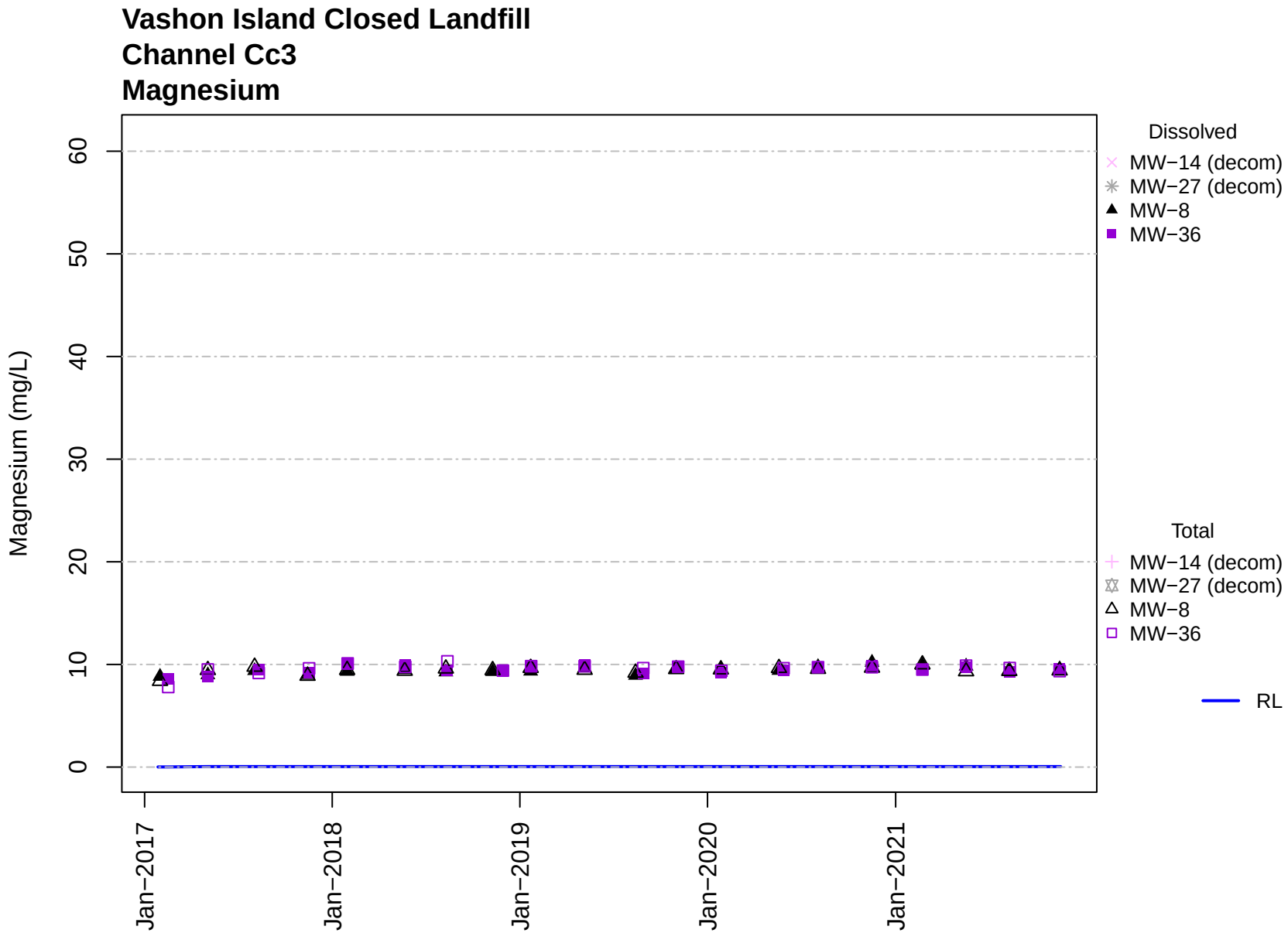

Vashon Island Closed Landfill
Channel Cc3
Calcium
Calcium (mg/L)
0
20
40
60
80
100
120
140
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

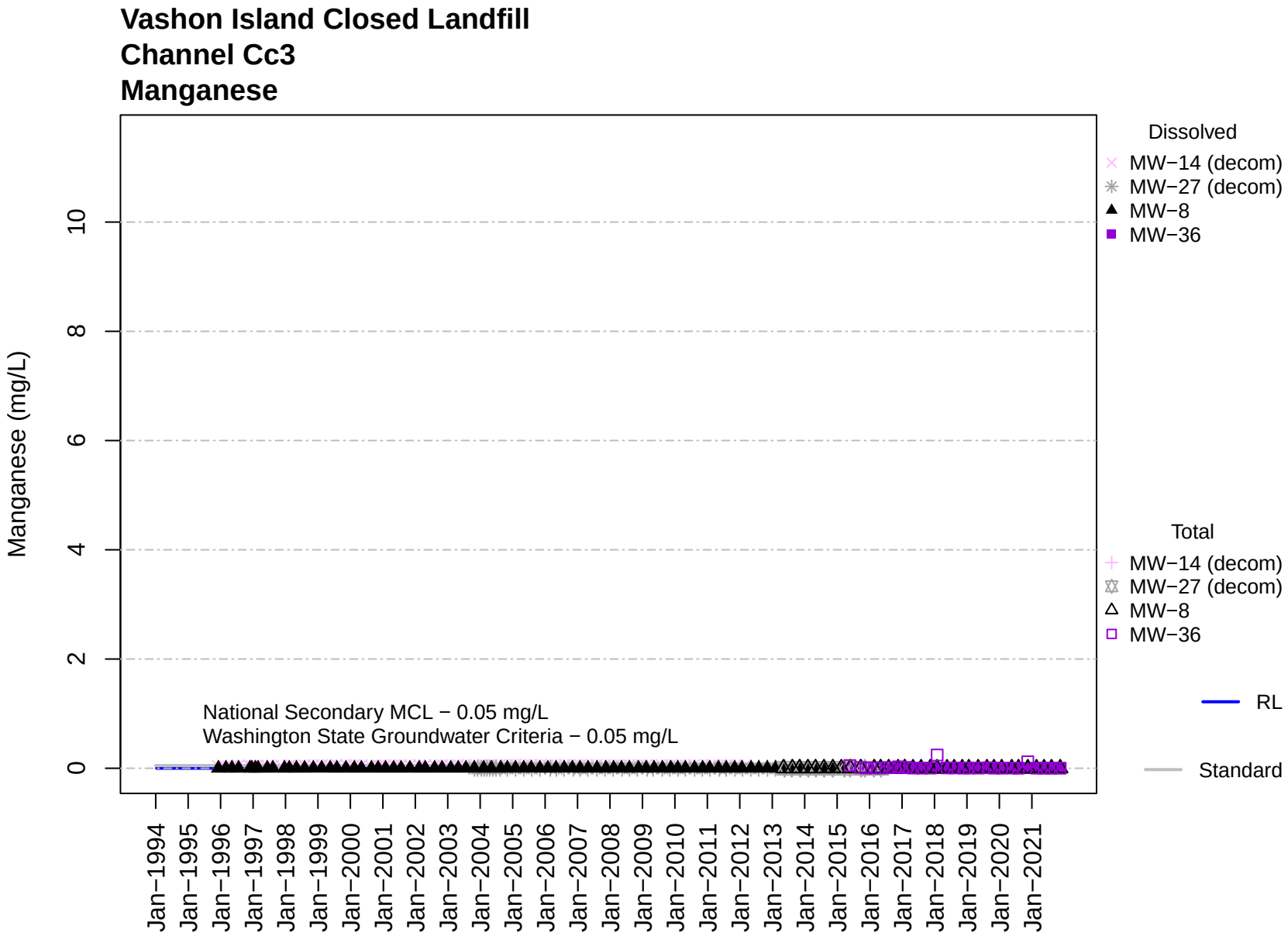

Vashon Island Closed Landfill
Channel Cc3
Calcium
Calcium (mg/L)
0
20
40
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

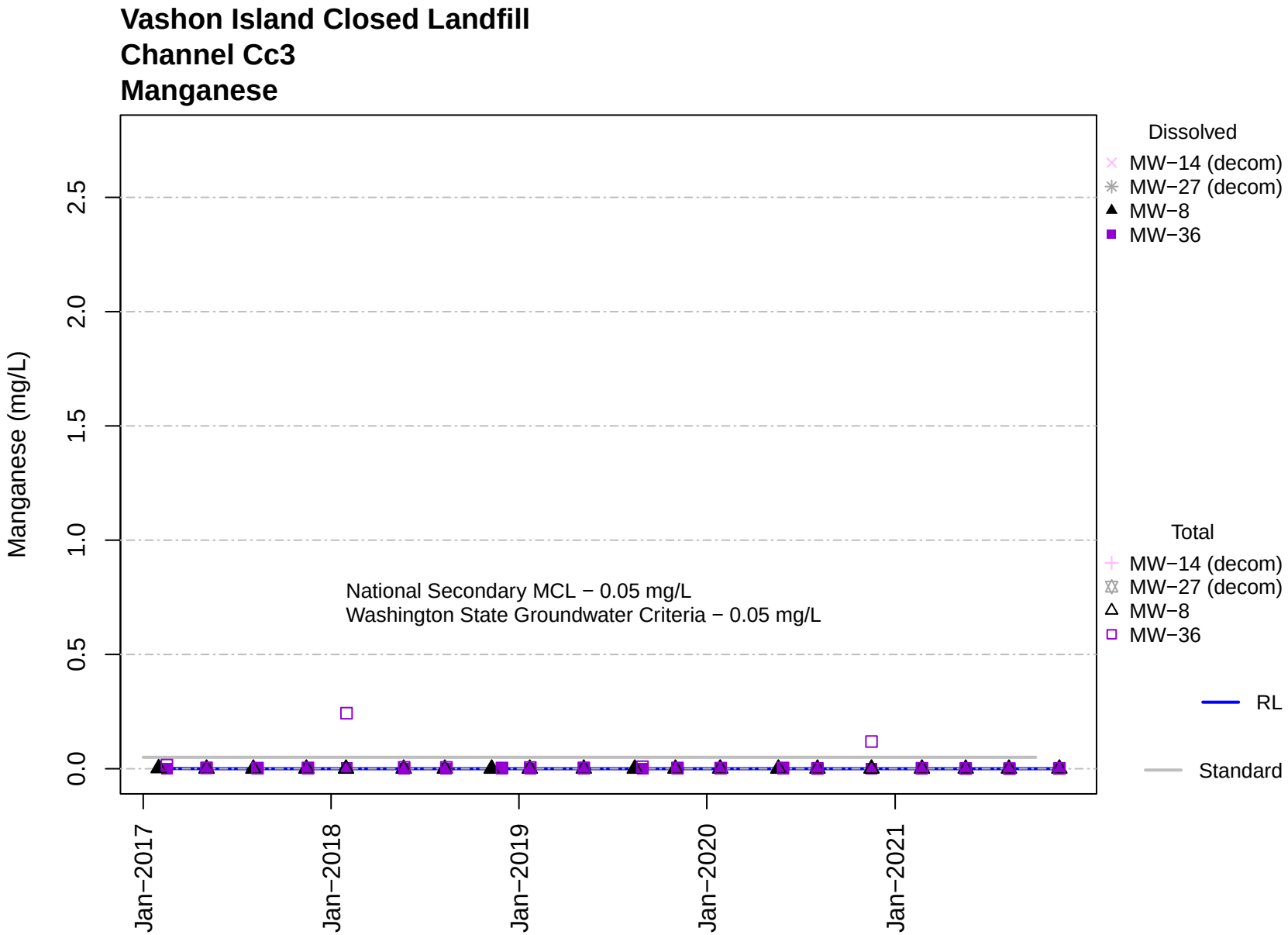

Vashon Island Closed Landfill
Channel Cc3
Iron
Iron (mg/L)
0
5
10
15
20
25
30
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

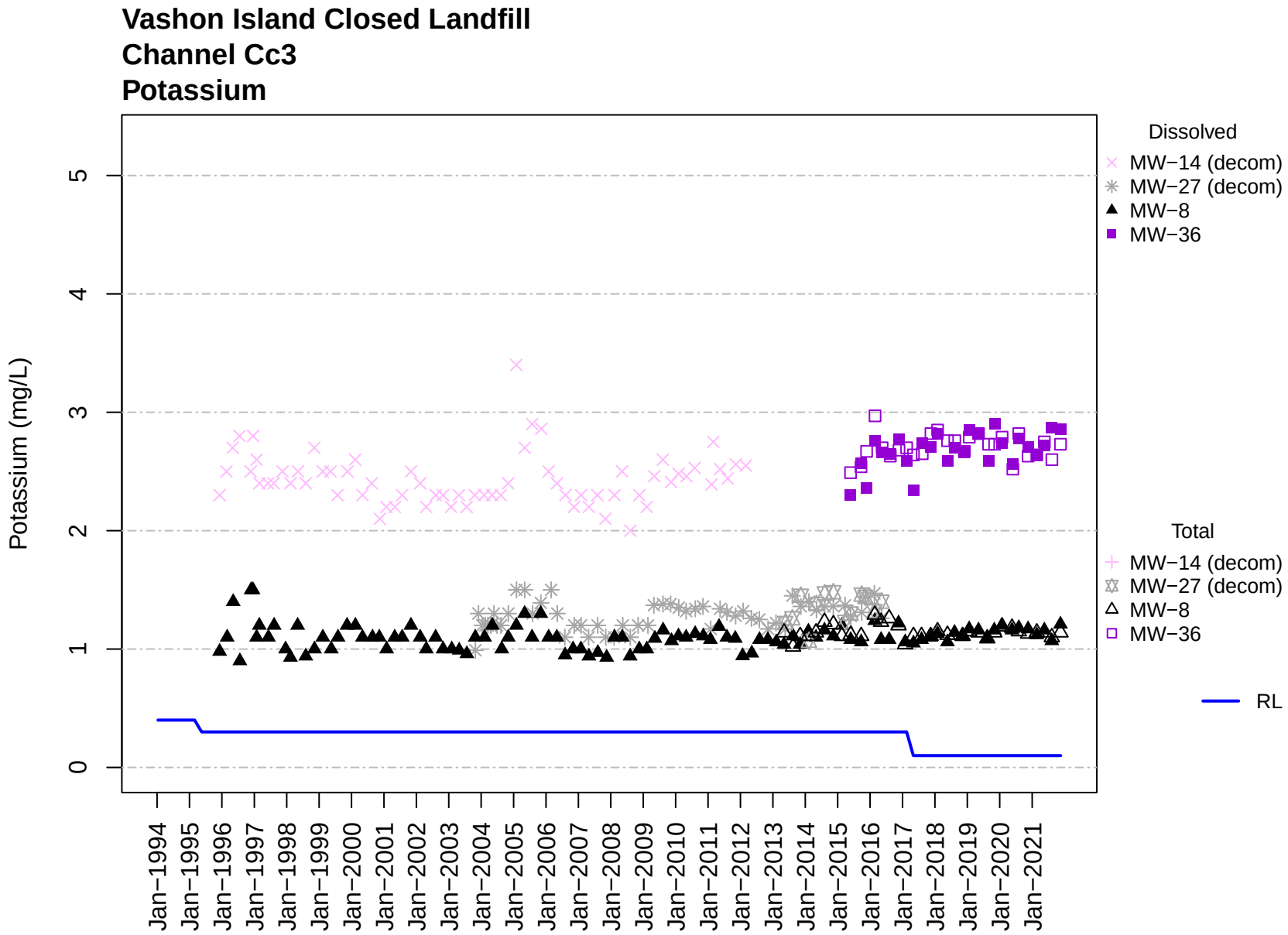

Vashon Island Closed Landfill
Channel Cc3
Iron
Iron (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Magnesium
Magnesium (mg/L)
0
20
40
60
80
100
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL


Vashon Island Closed Landfill
Channel Cc3
Magnesium
Magnesium (mg/L)
0
10
20
30
40
50
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL


Vashon Island Closed Landfill
Channel Cc3
Manganese
Manganese (mg/L)
0
2
4
6
8
10
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Manganese
Manganese (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Potassium
Potassium (mg/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
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Jan−2010
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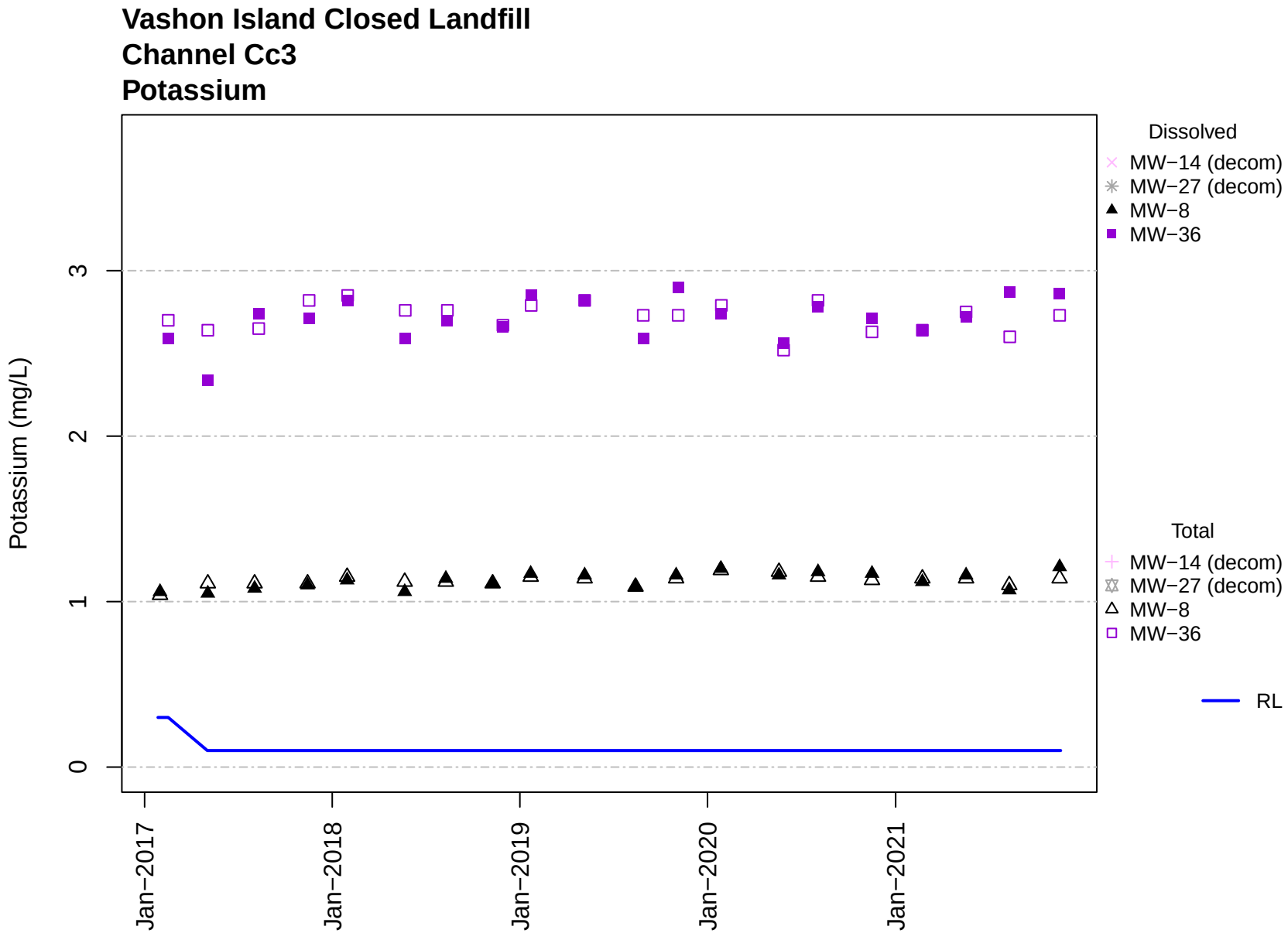
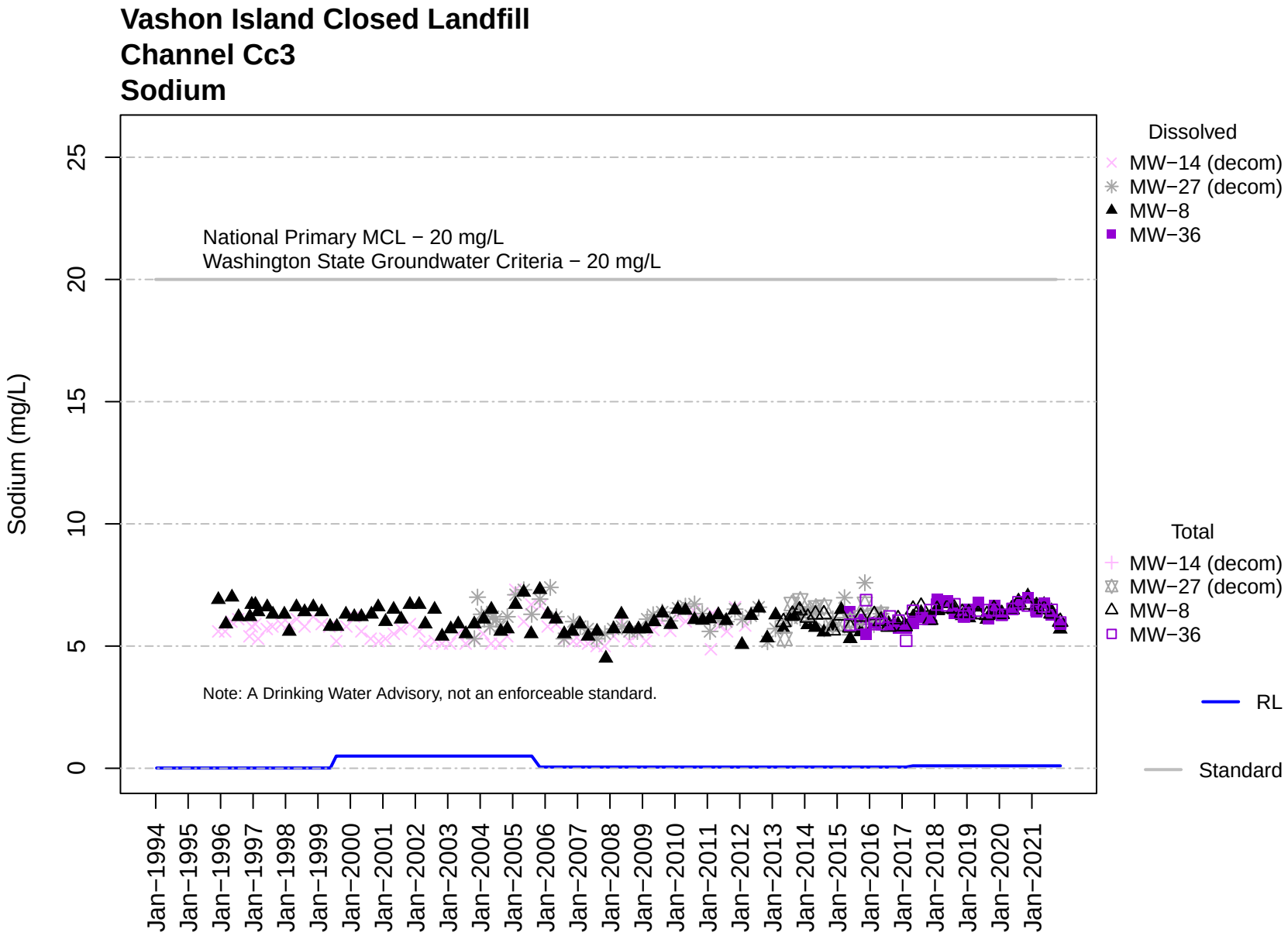
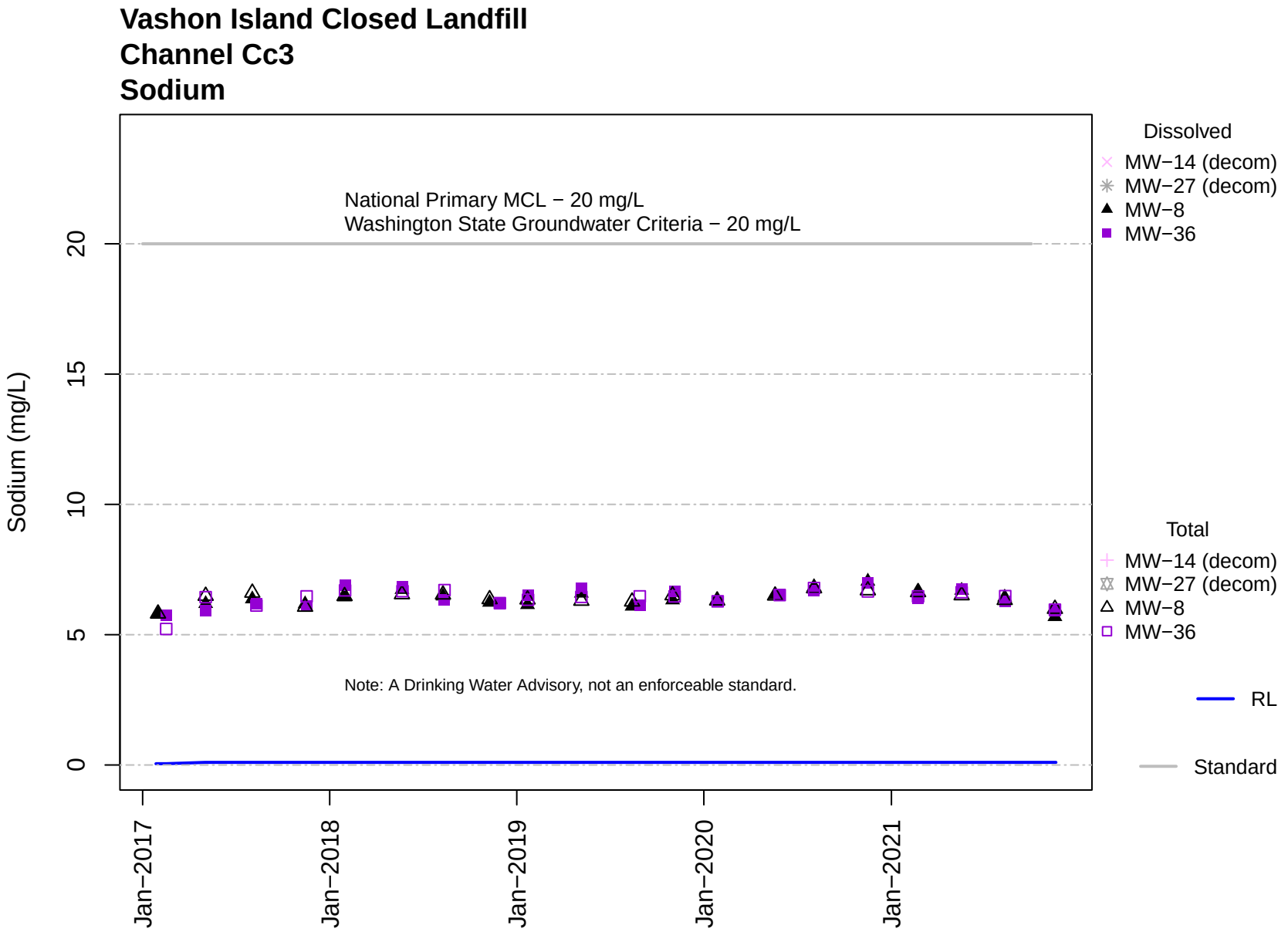
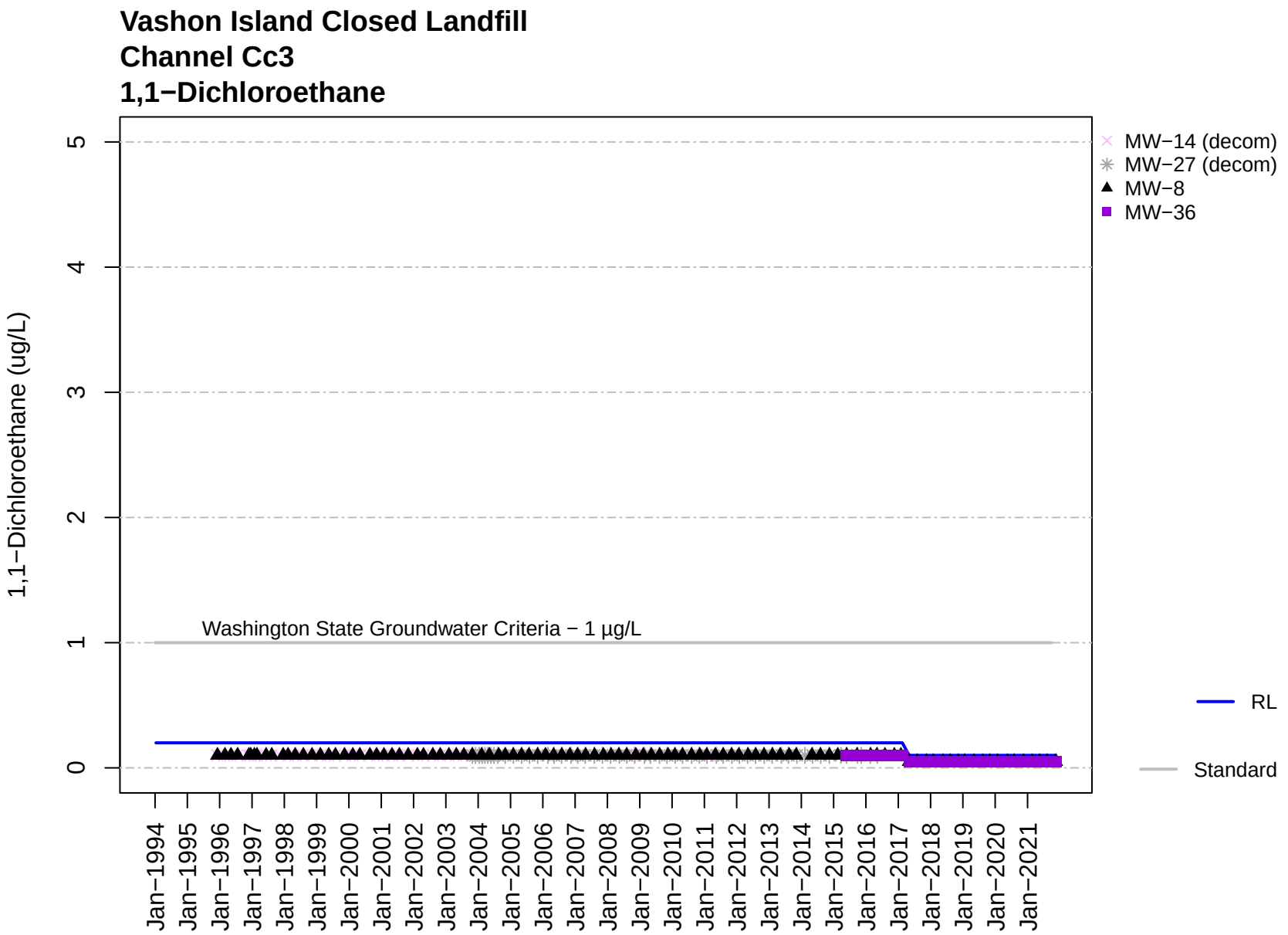
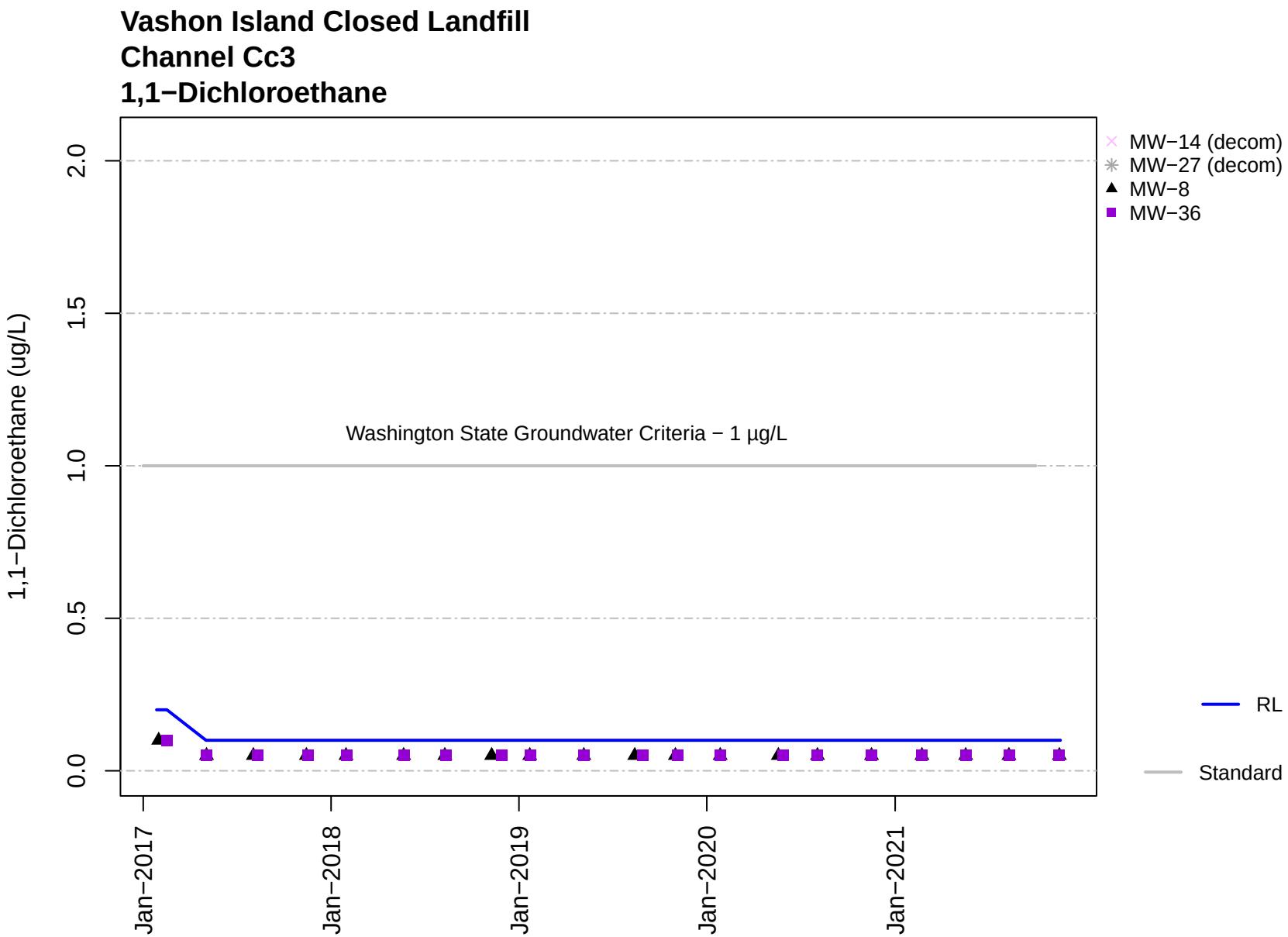
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

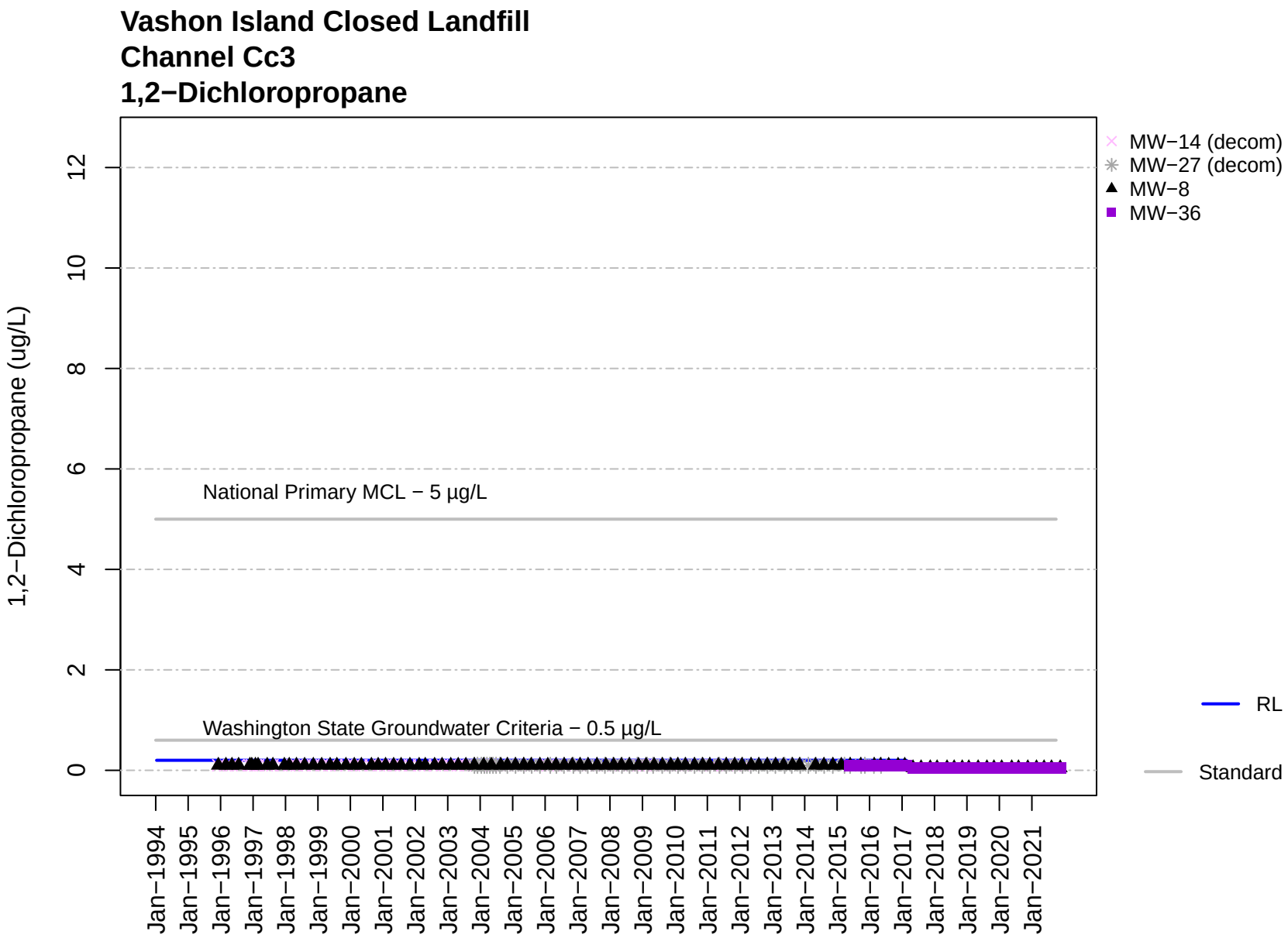

Vashon Island Closed Landfill
Channel Cc3
Potassium
Potassium (mg/L)
0
1
2
3
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

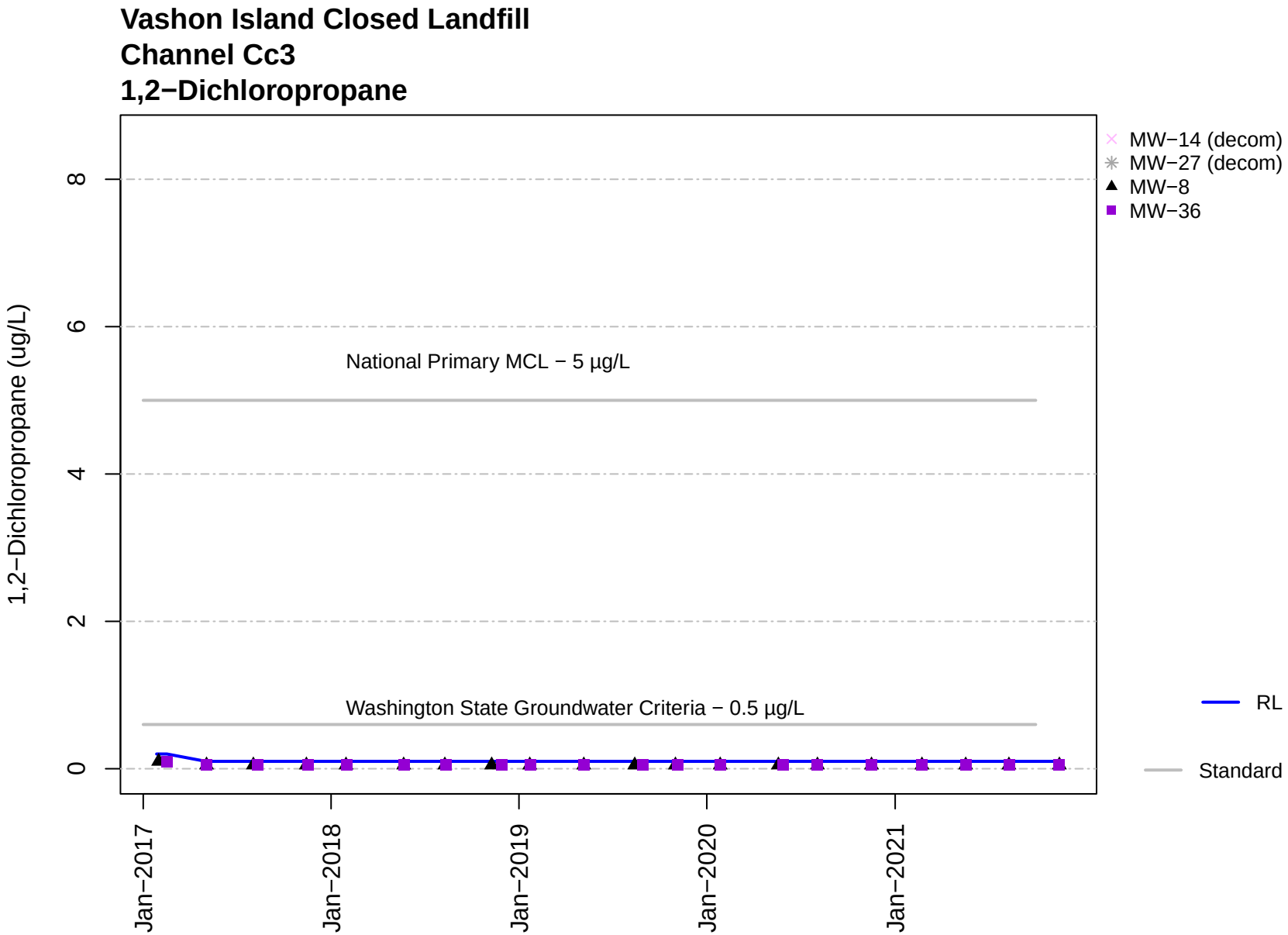

Vashon Island Closed Landfill
Channel Cc3
Sodium
Sodium (mg/L)
0
5
10
15
20
25
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

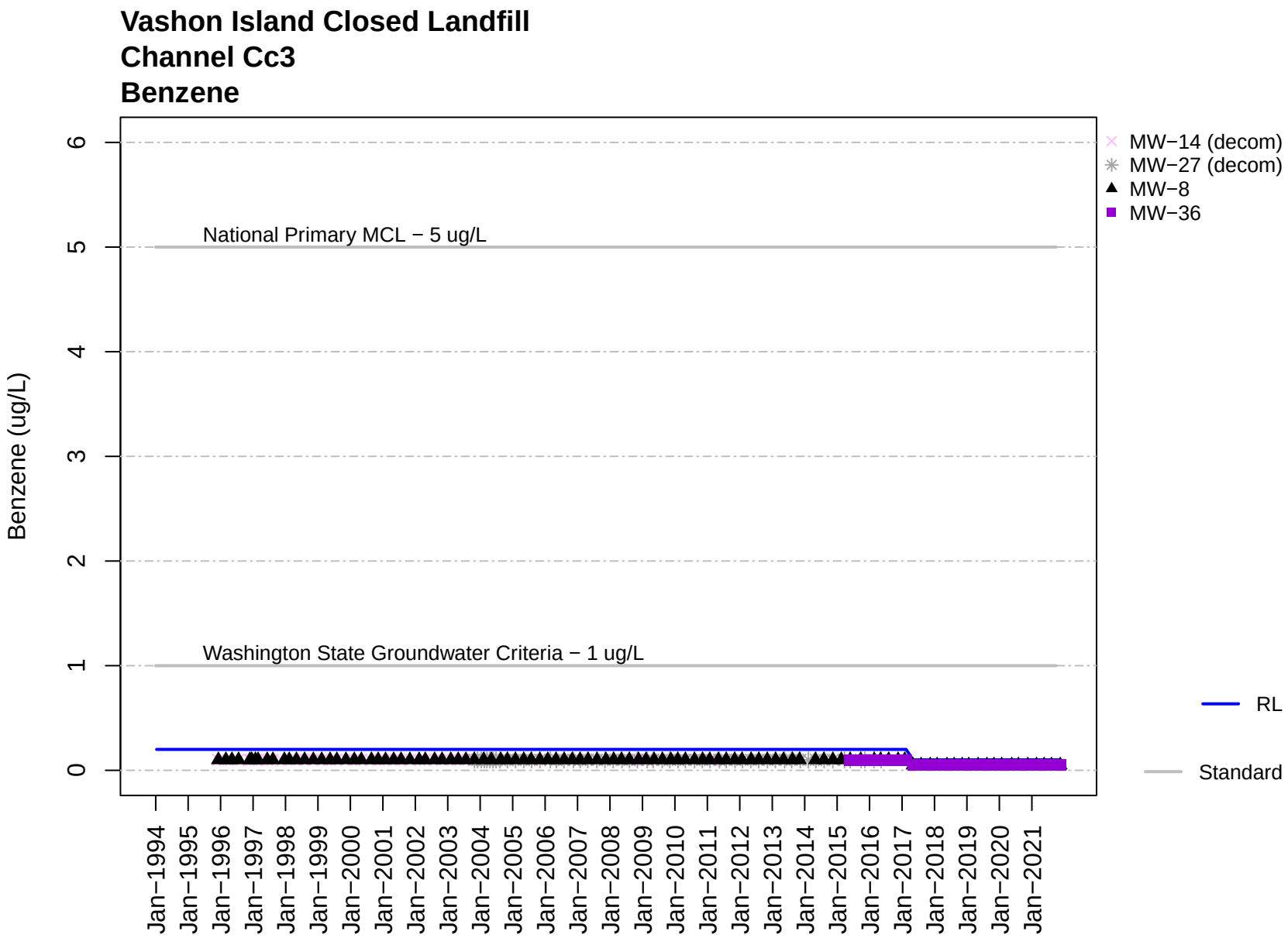

Vashon Island Closed Landfill
Channel Cc3
Sodium
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Sodium (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

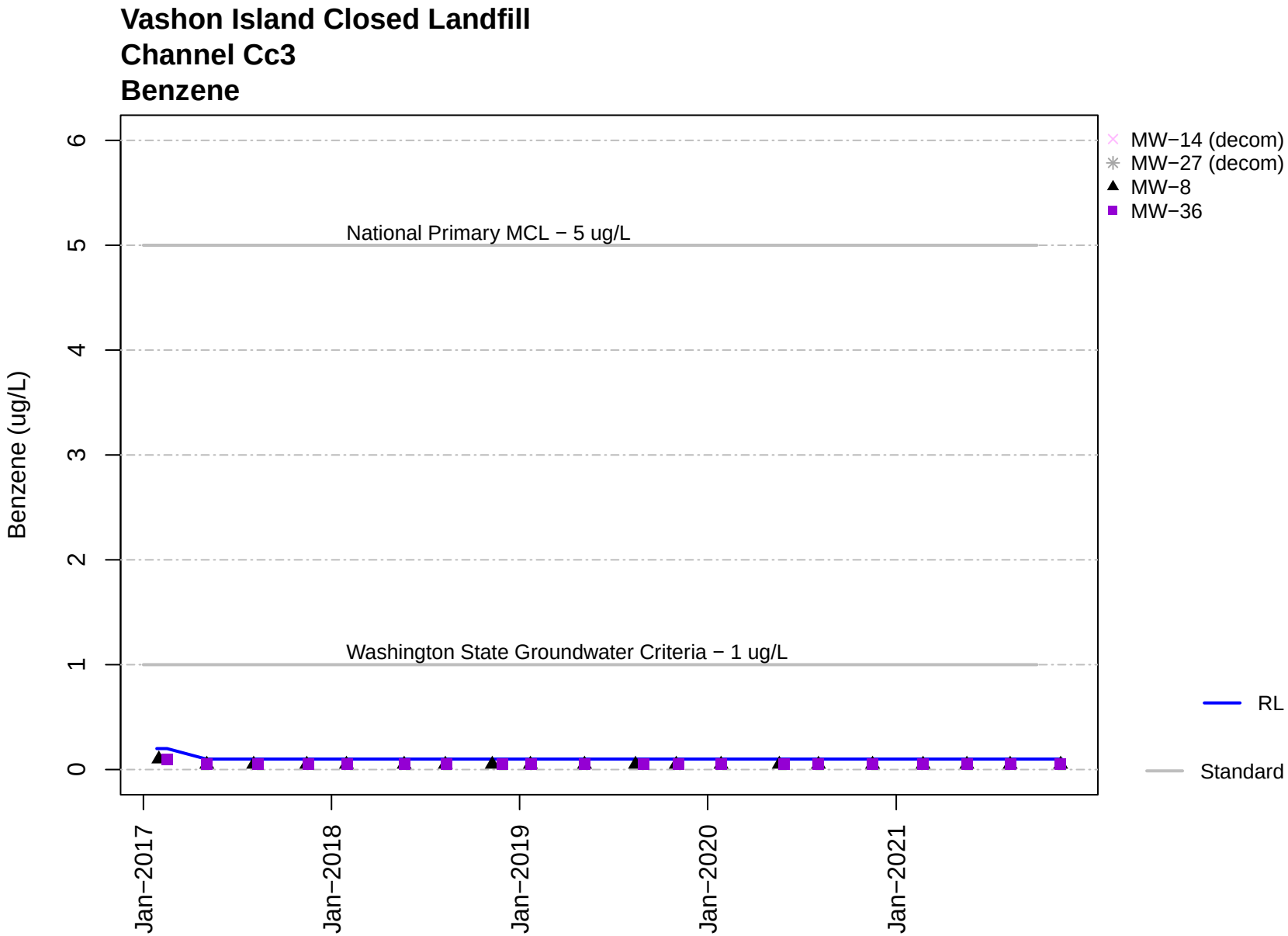

Vashon Island Closed Landfill
Channel Cc3
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0
1
2
3
4
5
Washington State Groundwater Criteria − 1 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

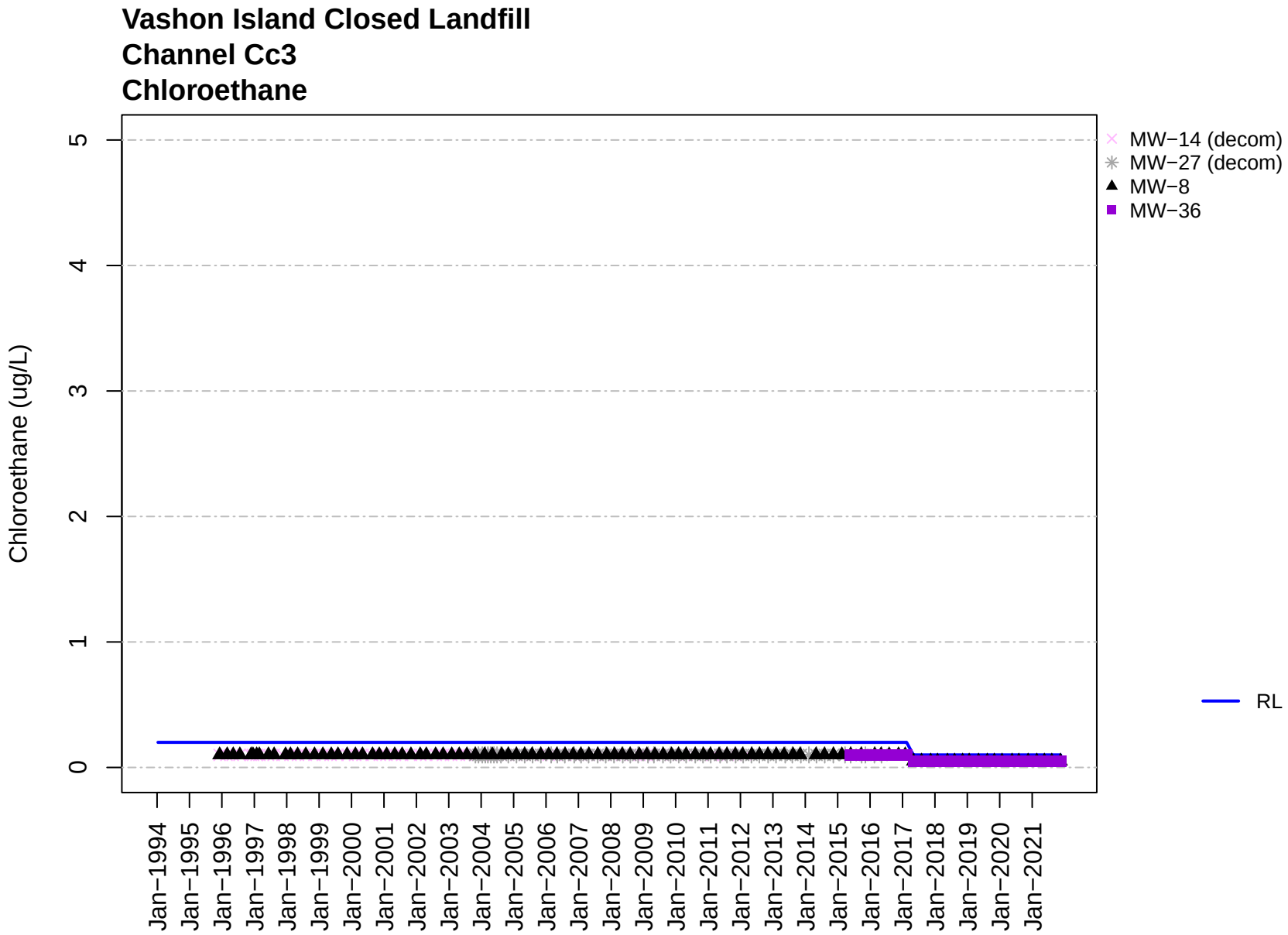

Vashon Island Closed Landfill
Channel Cc3
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Washington State Groundwater Criteria − 1 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

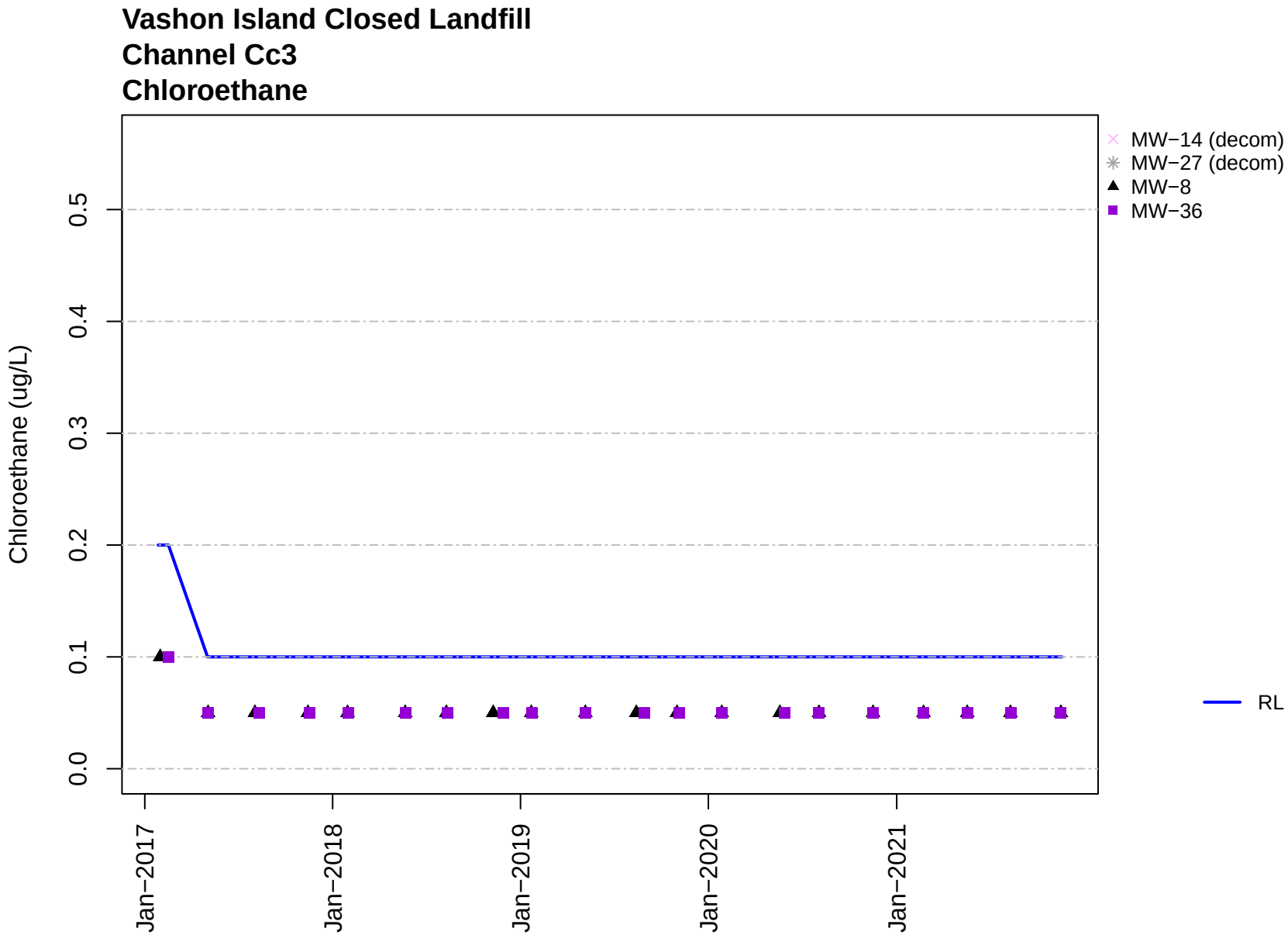

Vashon Island Closed Landfill
Channel Cc3
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
10
12
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

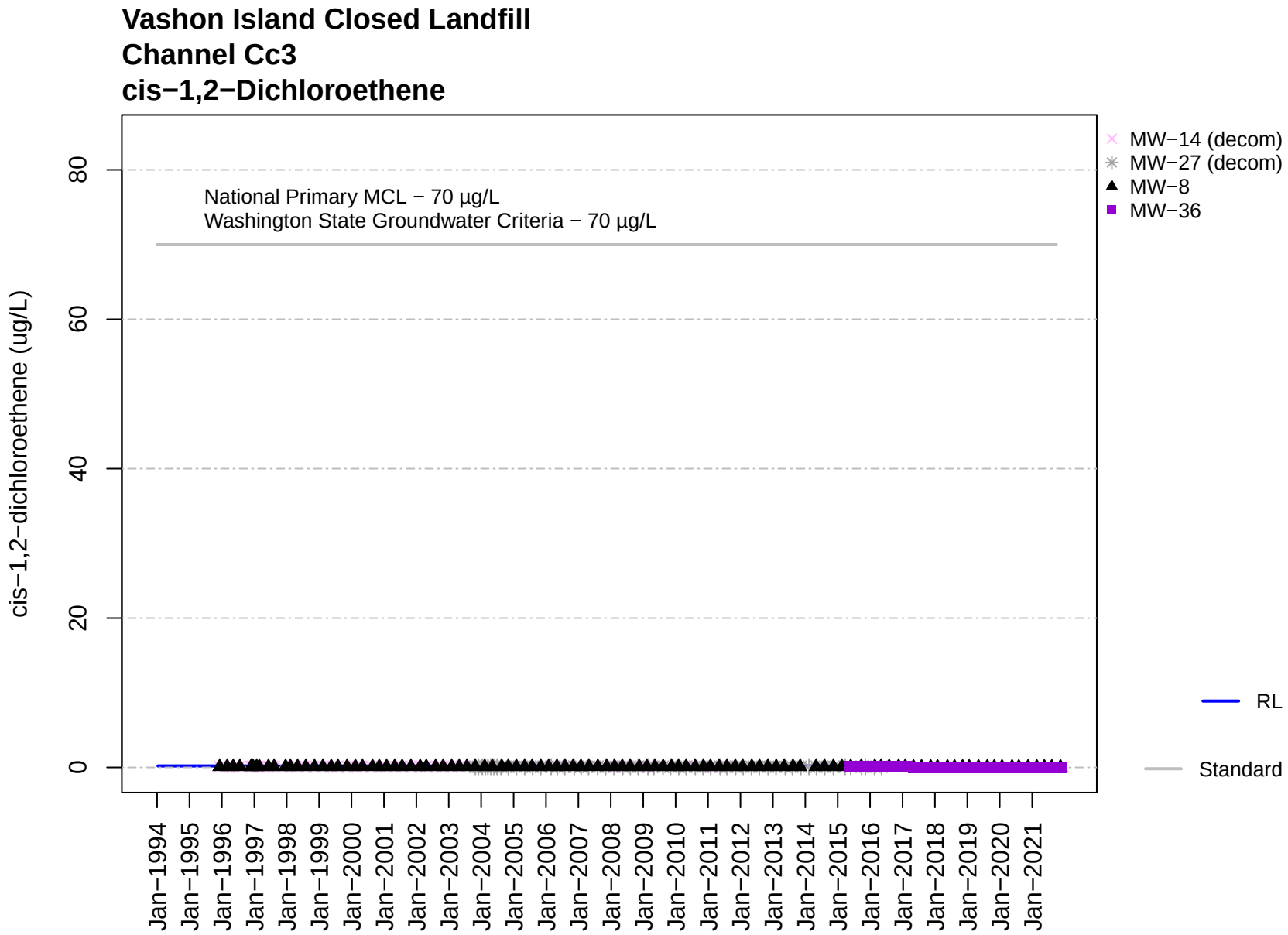

Vashon Island Closed Landfill
Channel Cc3
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

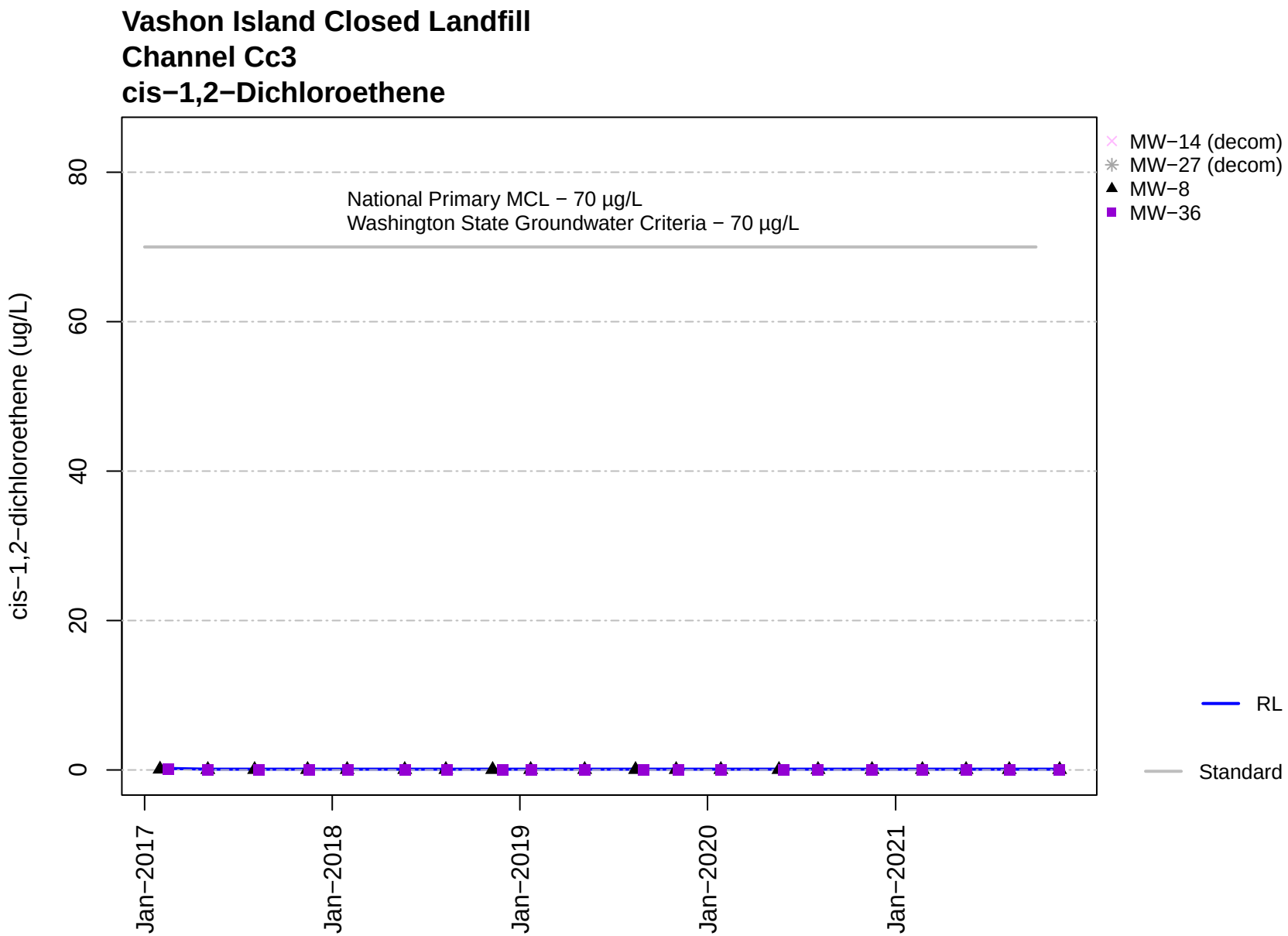

Vashon Island Closed Landfill
Channel Cc3
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

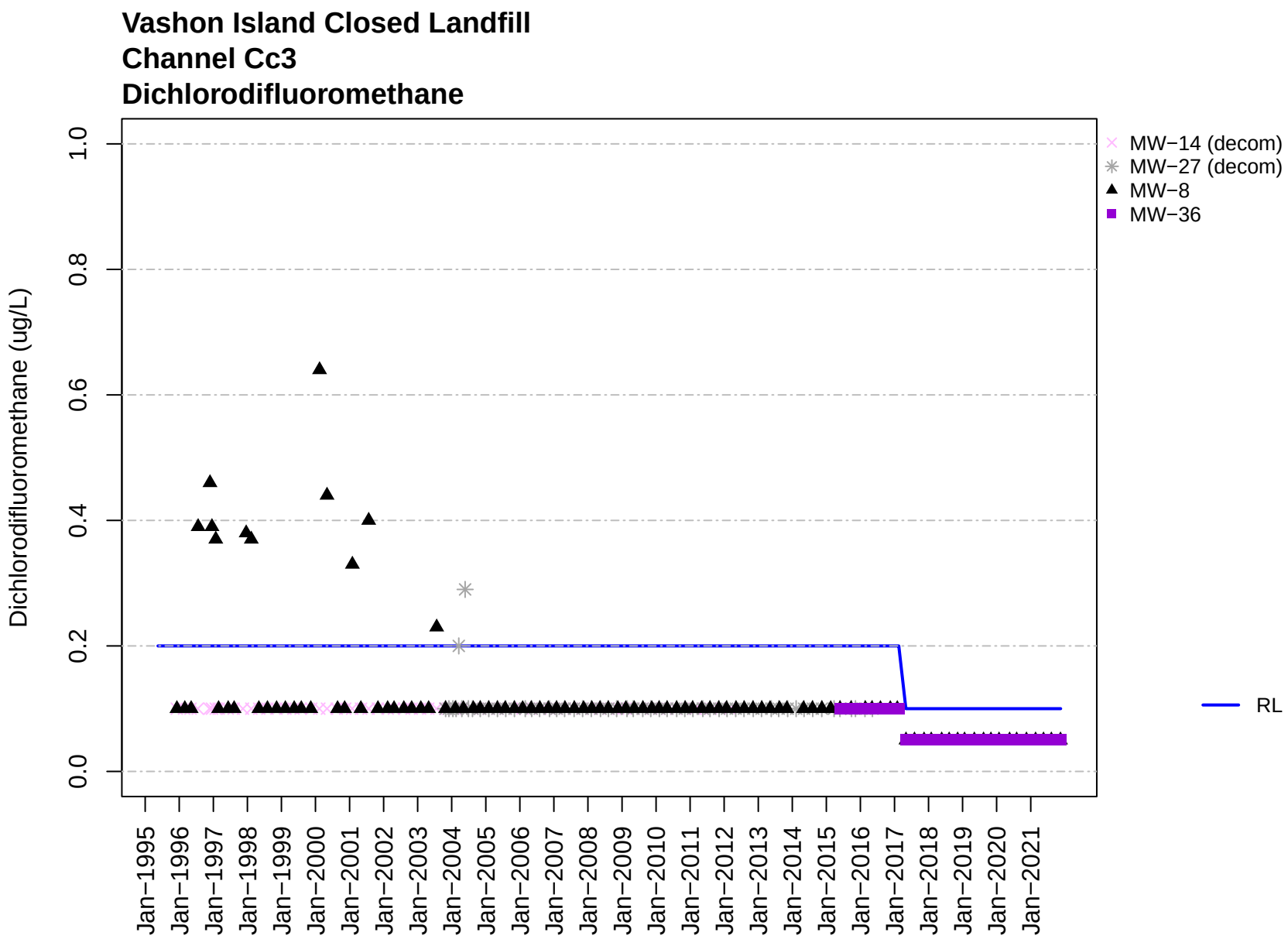

Vashon Island Closed Landfill
Channel Cc3
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

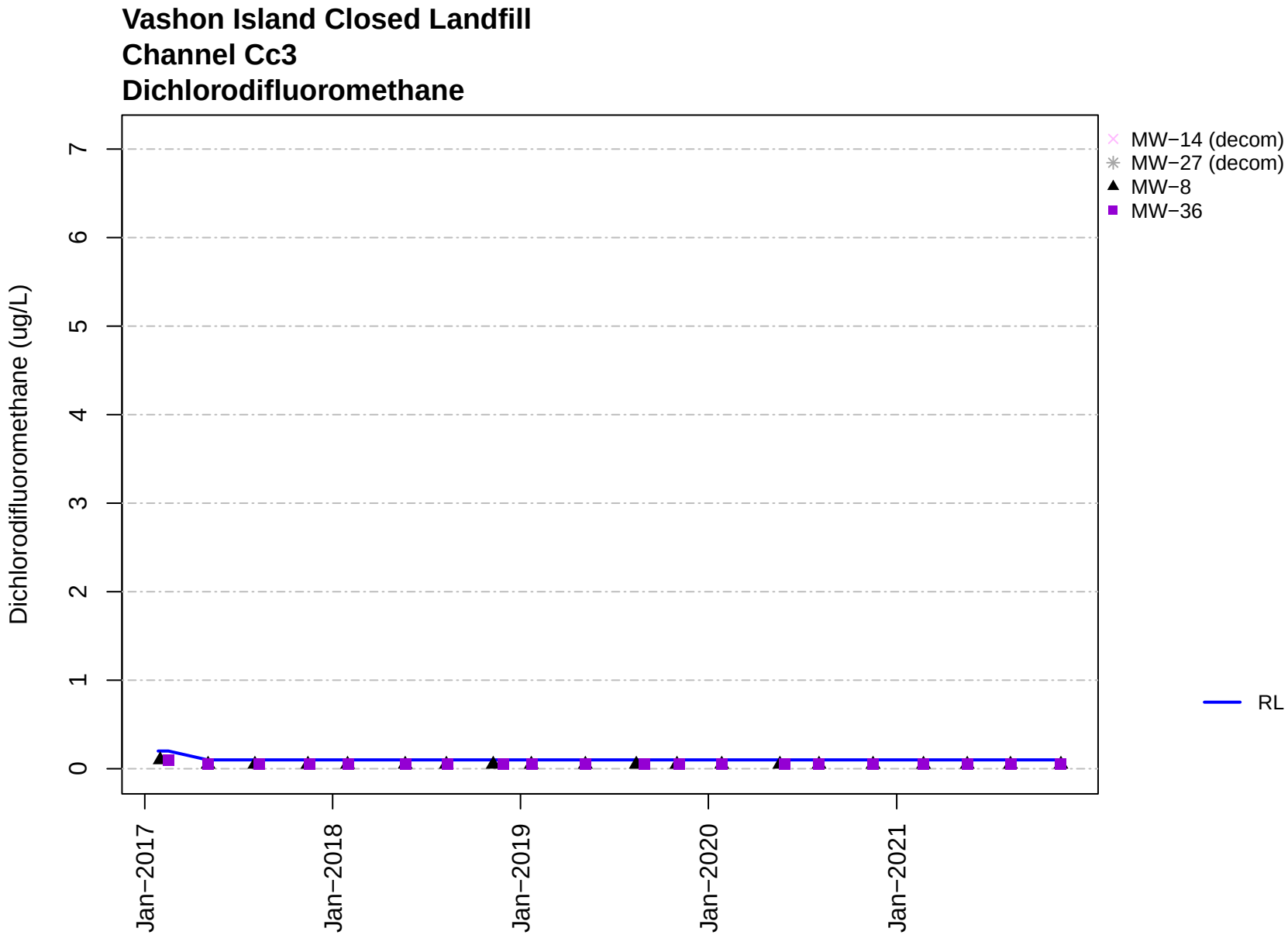

Vashon Island Closed Landfill
Channel Cc3
Chloroethane
Chloroethane (ug/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

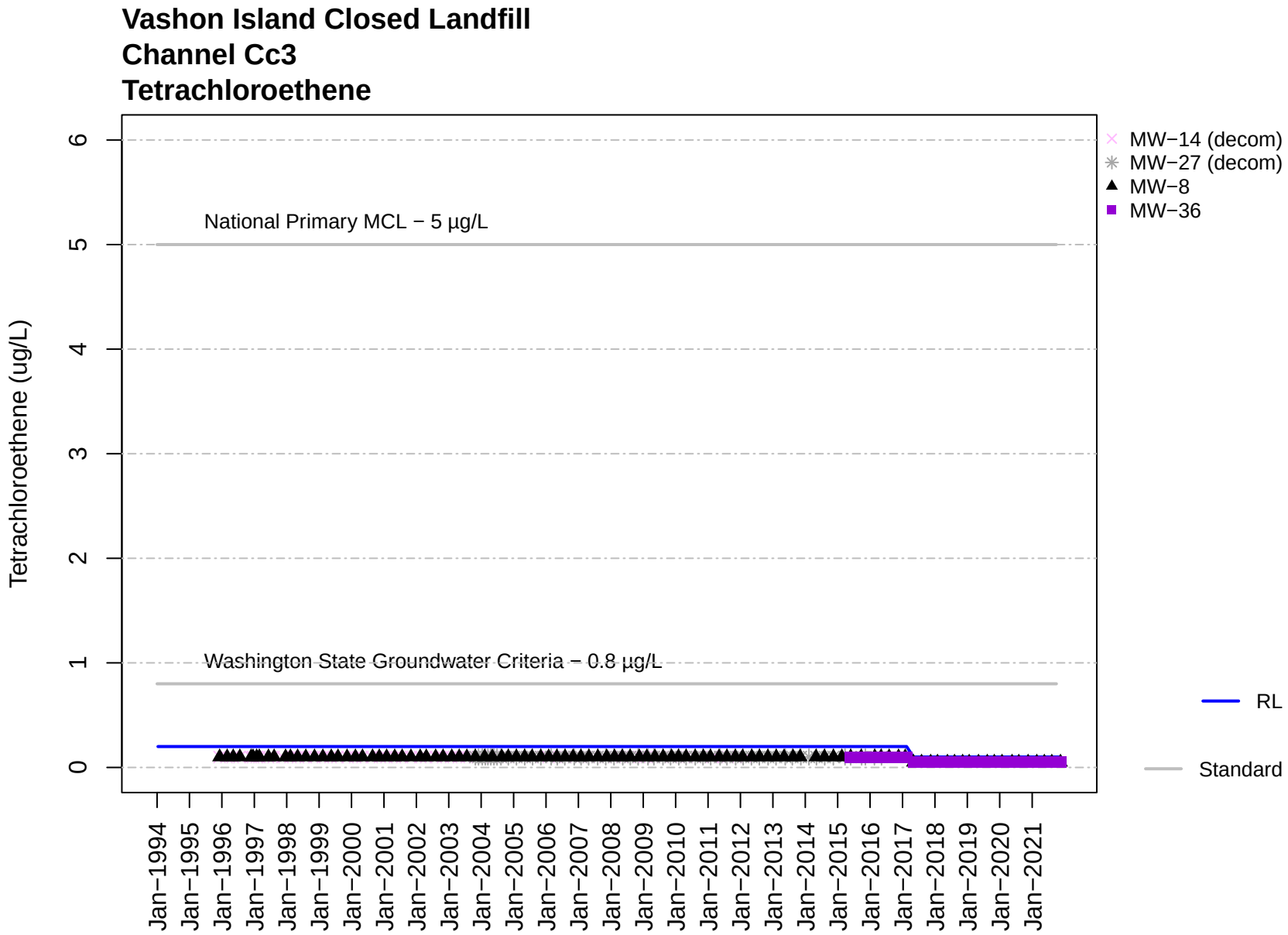

Vashon Island Closed Landfill
Channel Cc3
Chloroethane
Chloroethane (ug/L)
0.0
0.1
0.2
0.3
0.4
0.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

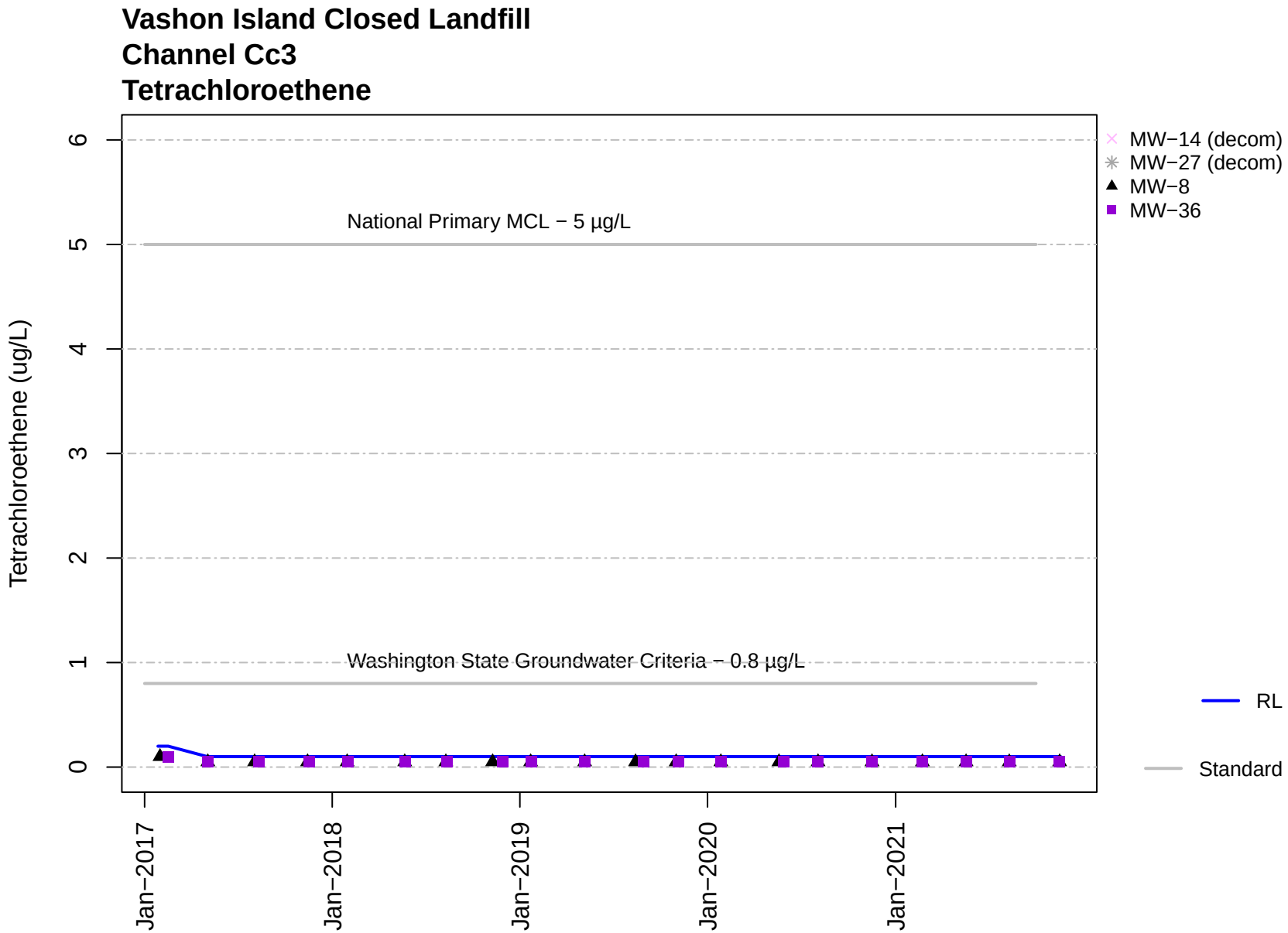

Vashon Island Closed Landfill
Channel Cc3
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

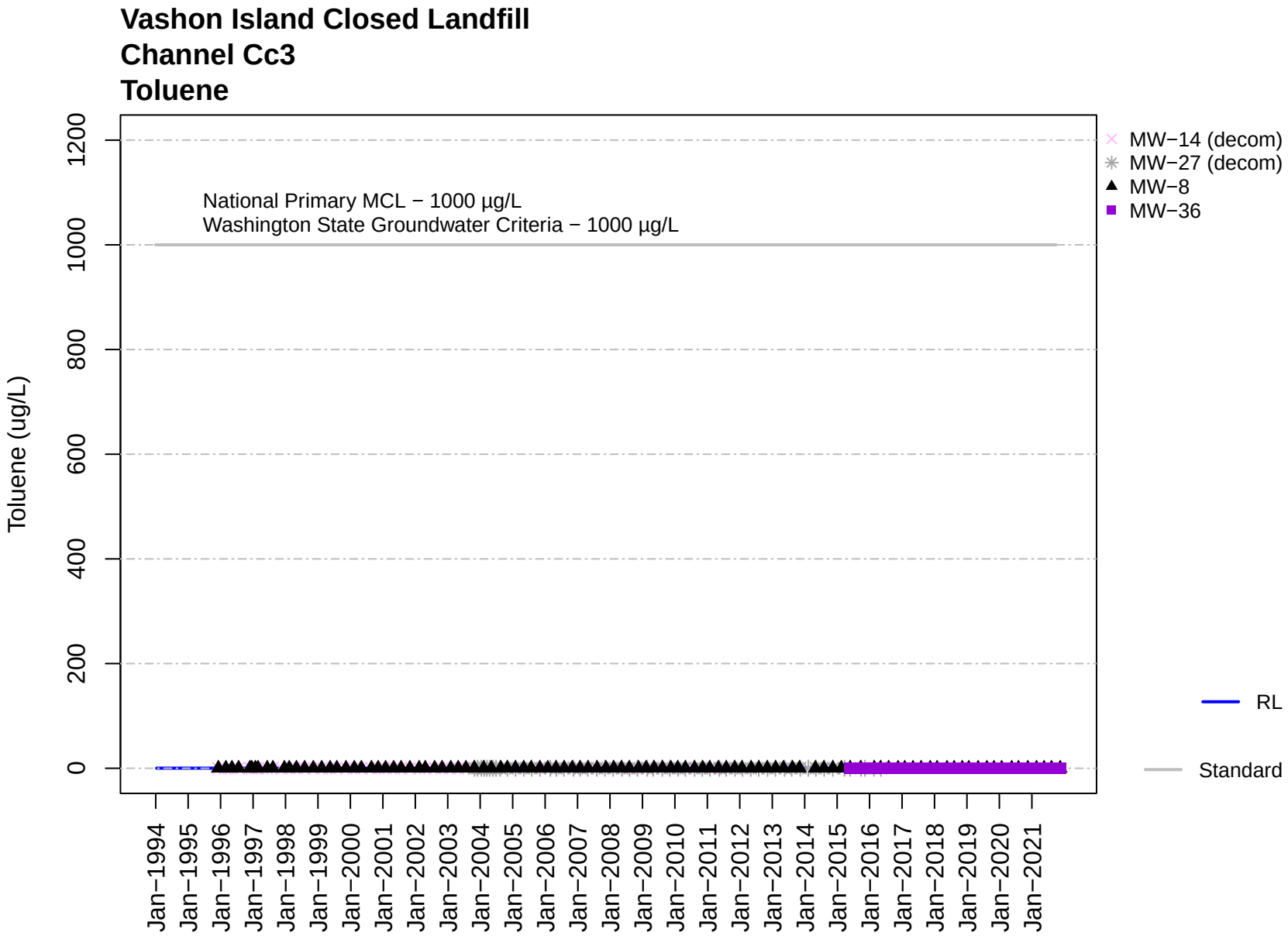

Vashon Island Closed Landfill
Channel Cc3
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

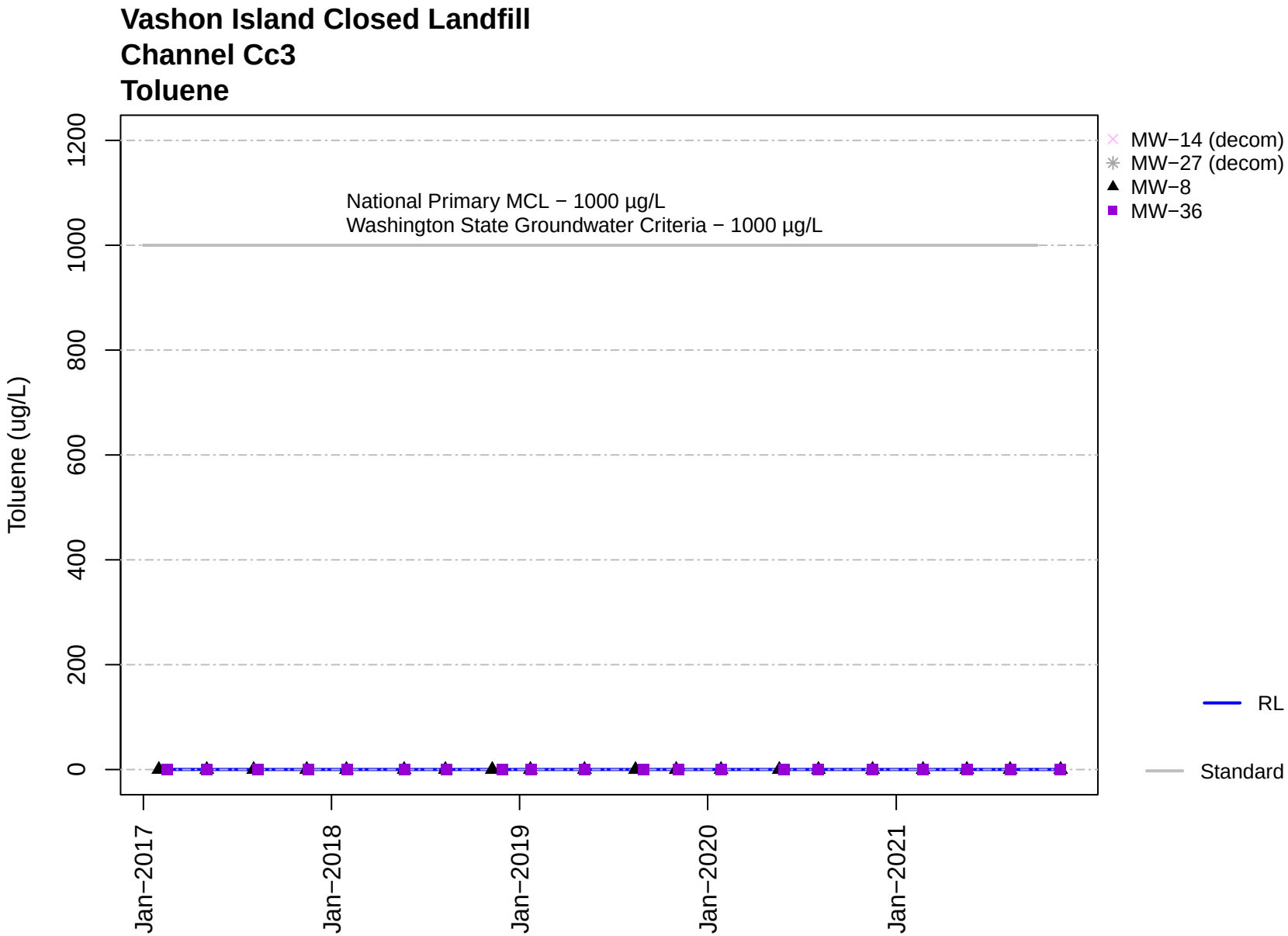

Vashon Island Closed Landfill
Channel Cc3
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0.0
0.2
0.4
0.6
0.8
1.0
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

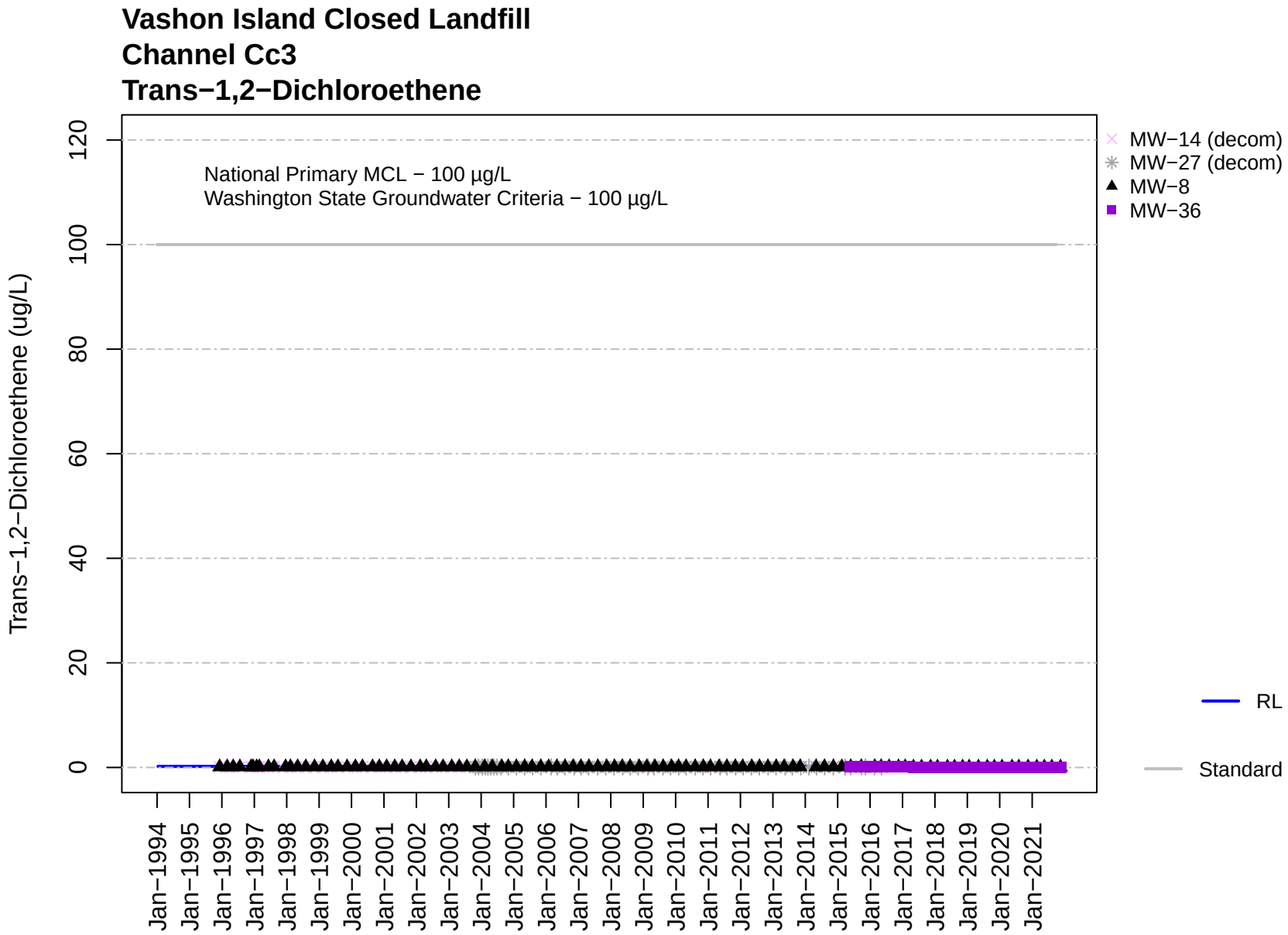

Vashon Island Closed Landfill
Channel Cc3
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0
1
2
3
4
5
6
7
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

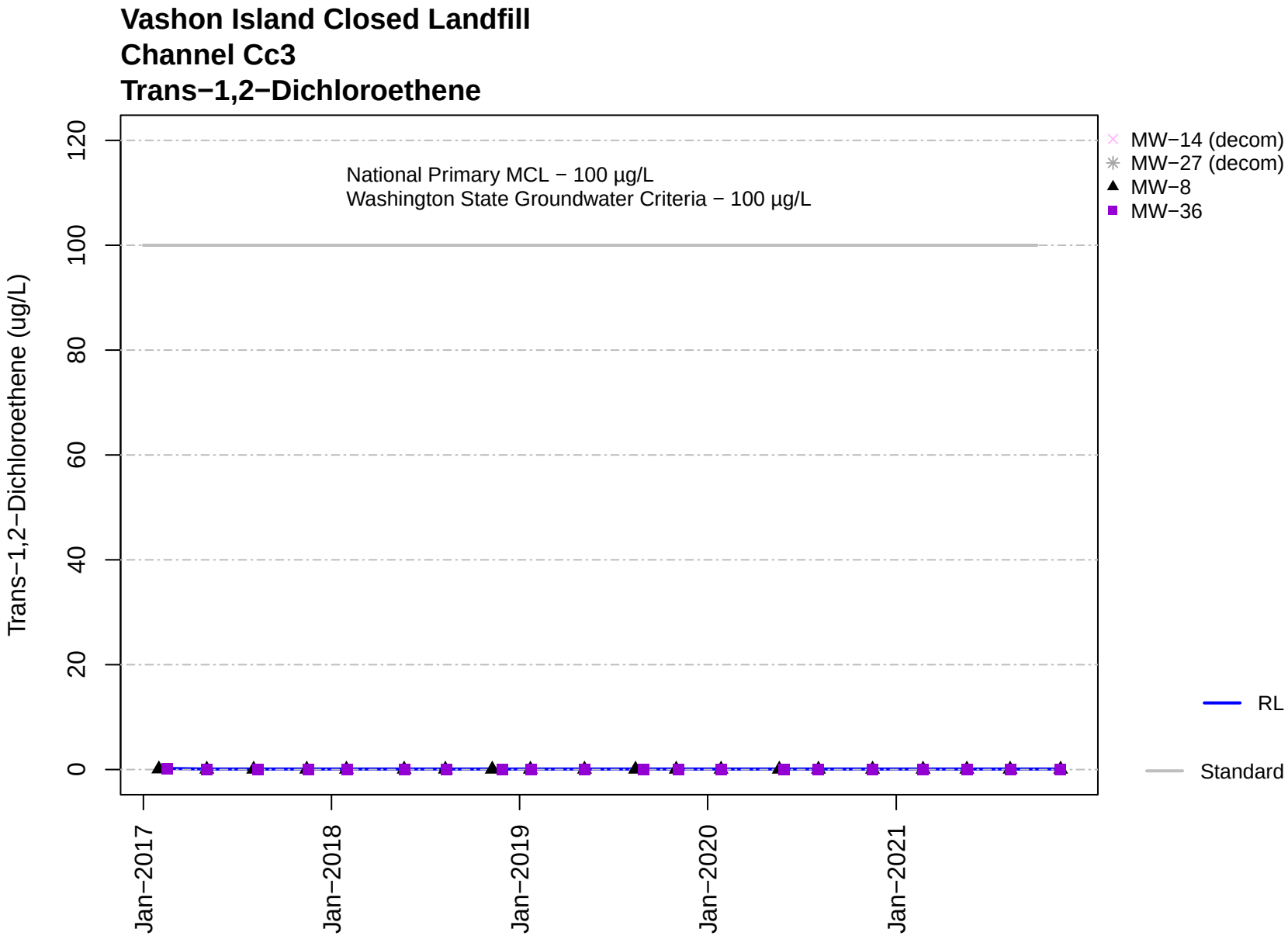

Vashon Island Closed Landfill
Channel Cc3
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

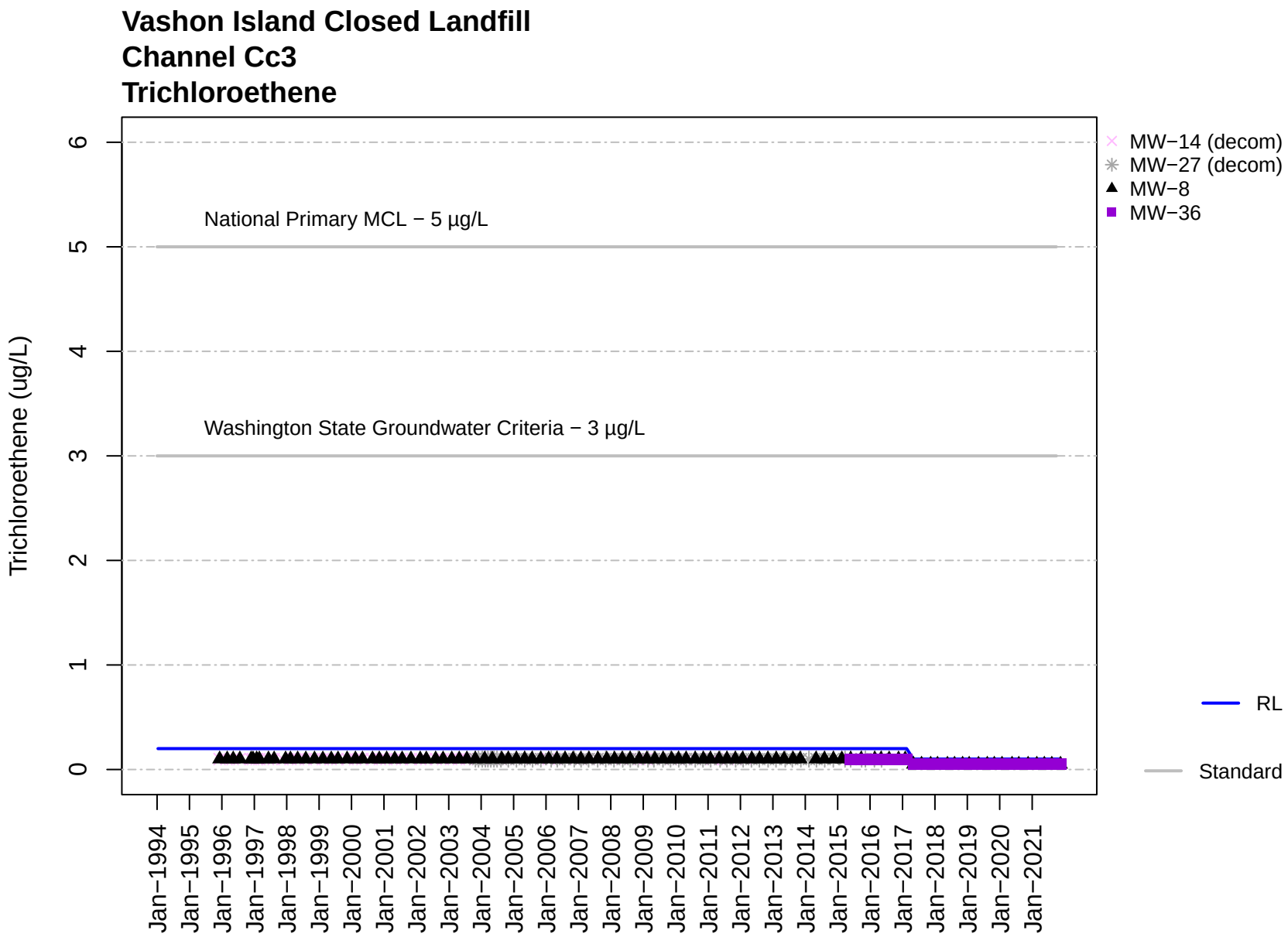

Vashon Island Closed Landfill
Channel Cc3
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

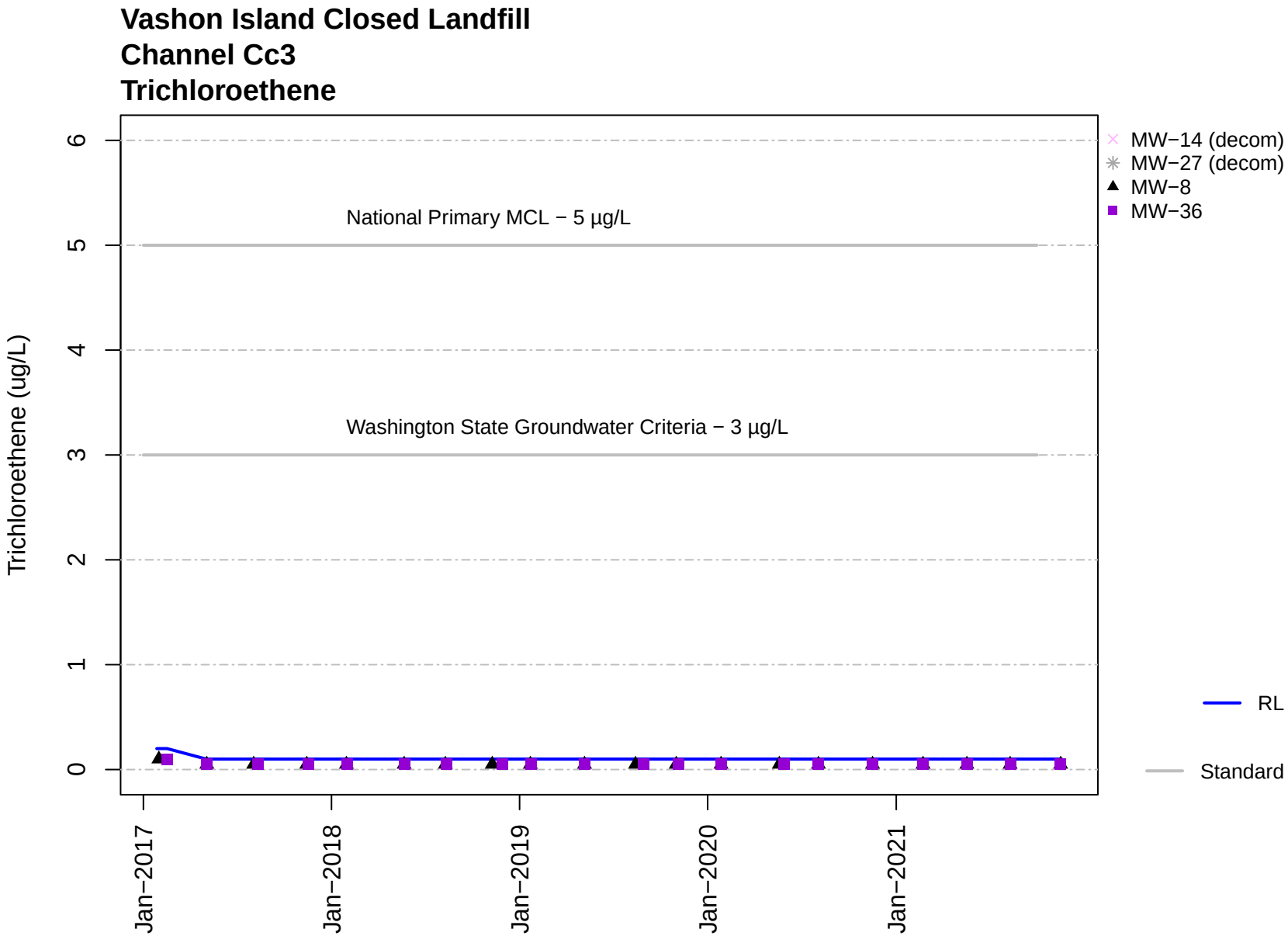

Vashon Island Closed Landfill
Channel Cc3
Toluene
Toluene (ug/L)
0
200
400
600
800
1000
1200
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

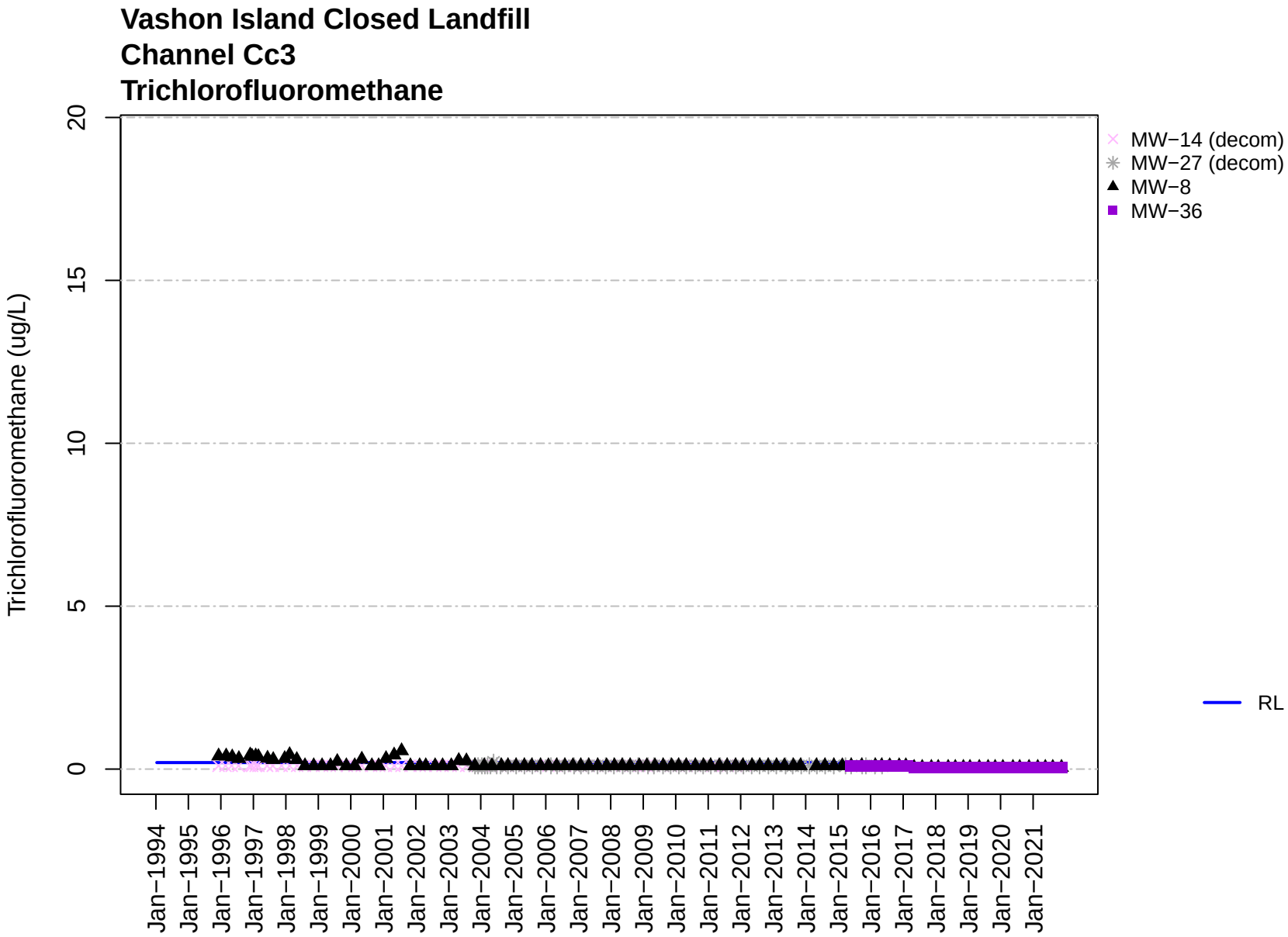

Vashon Island Closed Landfill
Channel Cc3
Toluene
Toluene (ug/L)
0
200
400
600
800
1000
1200
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

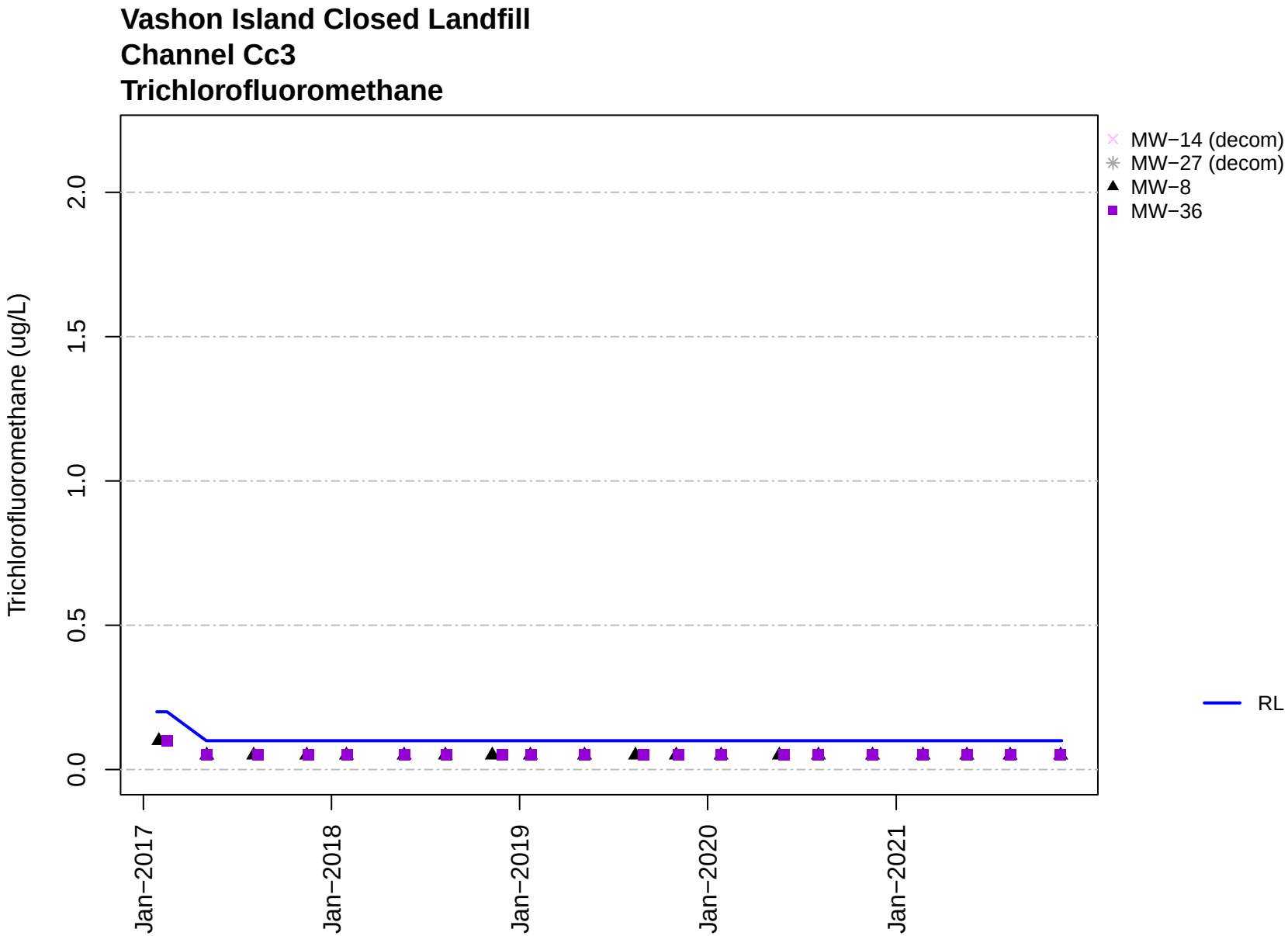

Vashon Island Closed Landfill
Channel Cc3
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

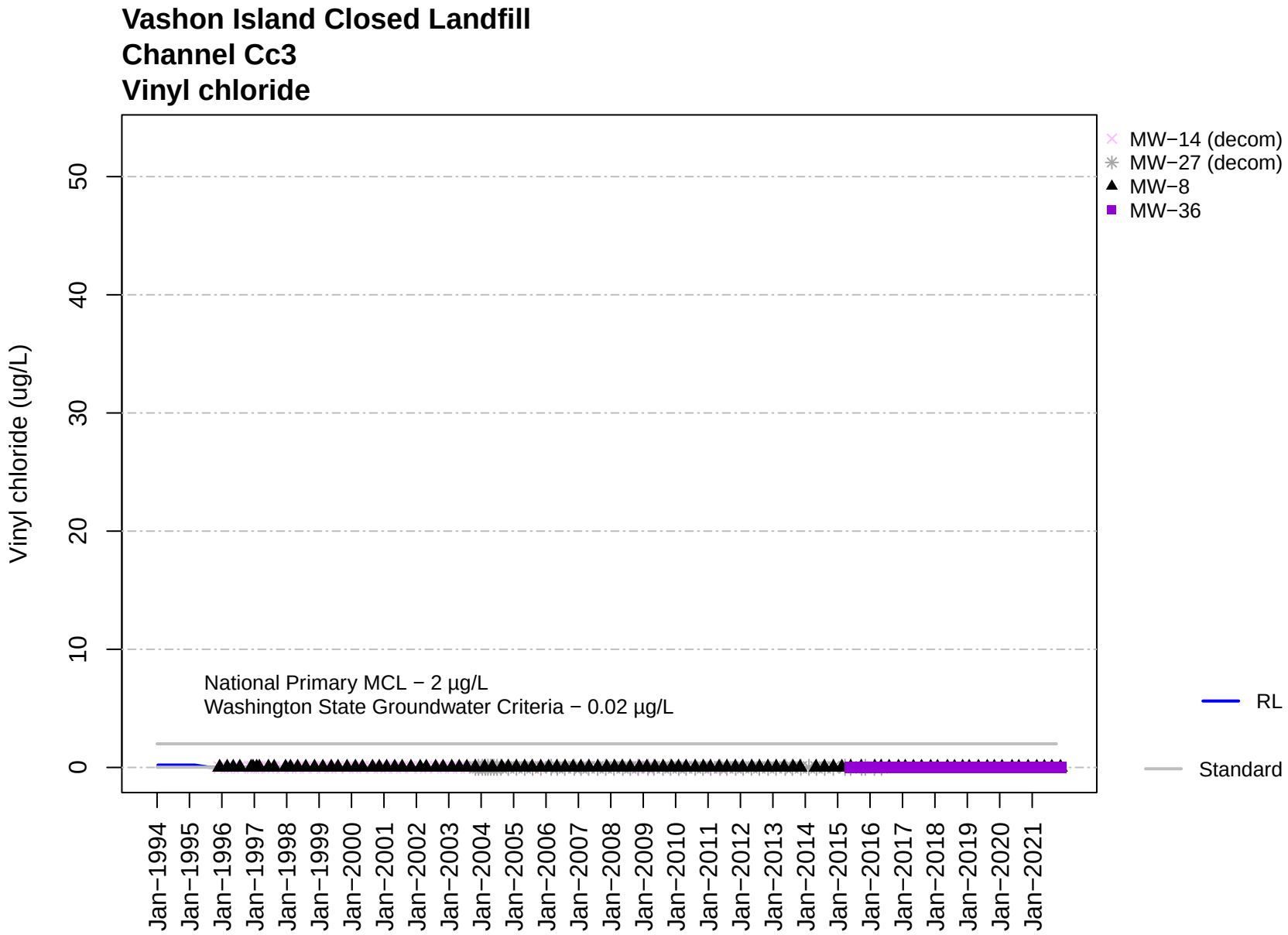

Vashon Island Closed Landfill
Channel Cc3
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

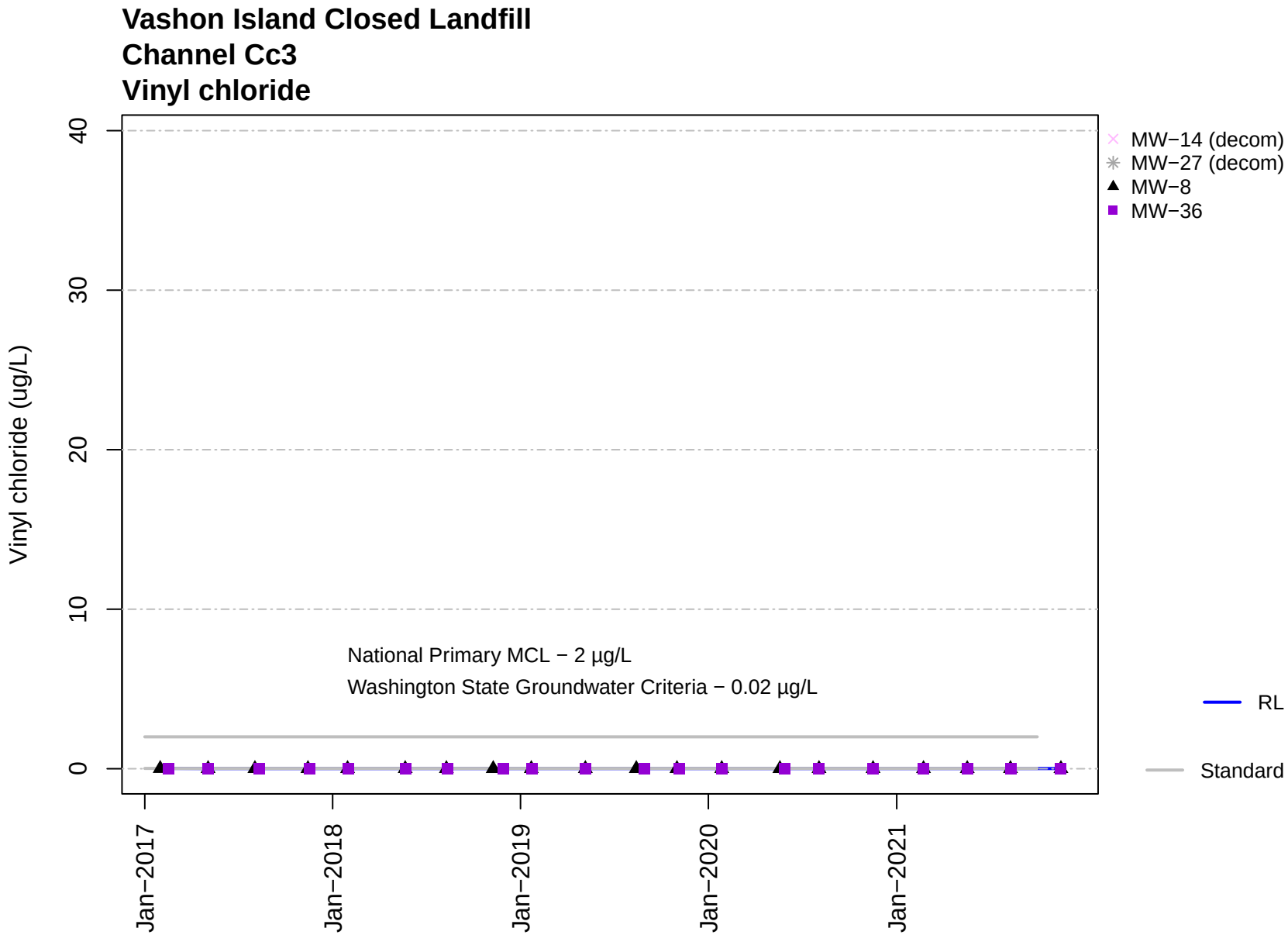

Vashon Island Closed Landfill
Channel Cc3
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021


Vashon Island Closed Landfill
Channel Cc3
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard


Vashon Island Closed Landfill
Channel Cc3
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0
5
10
15
20
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

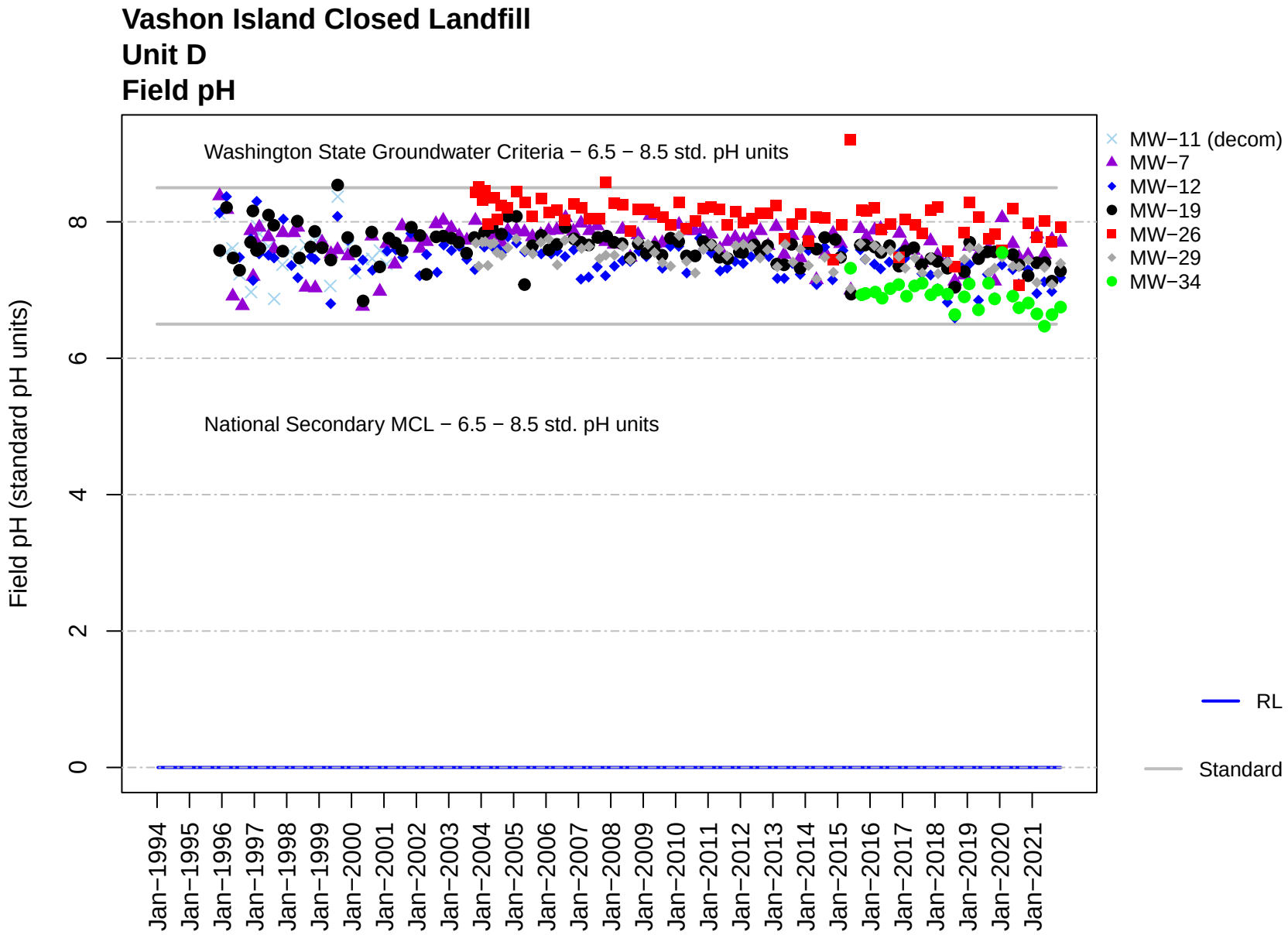

Vashon Island Closed Landfill
Channel Cc3
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

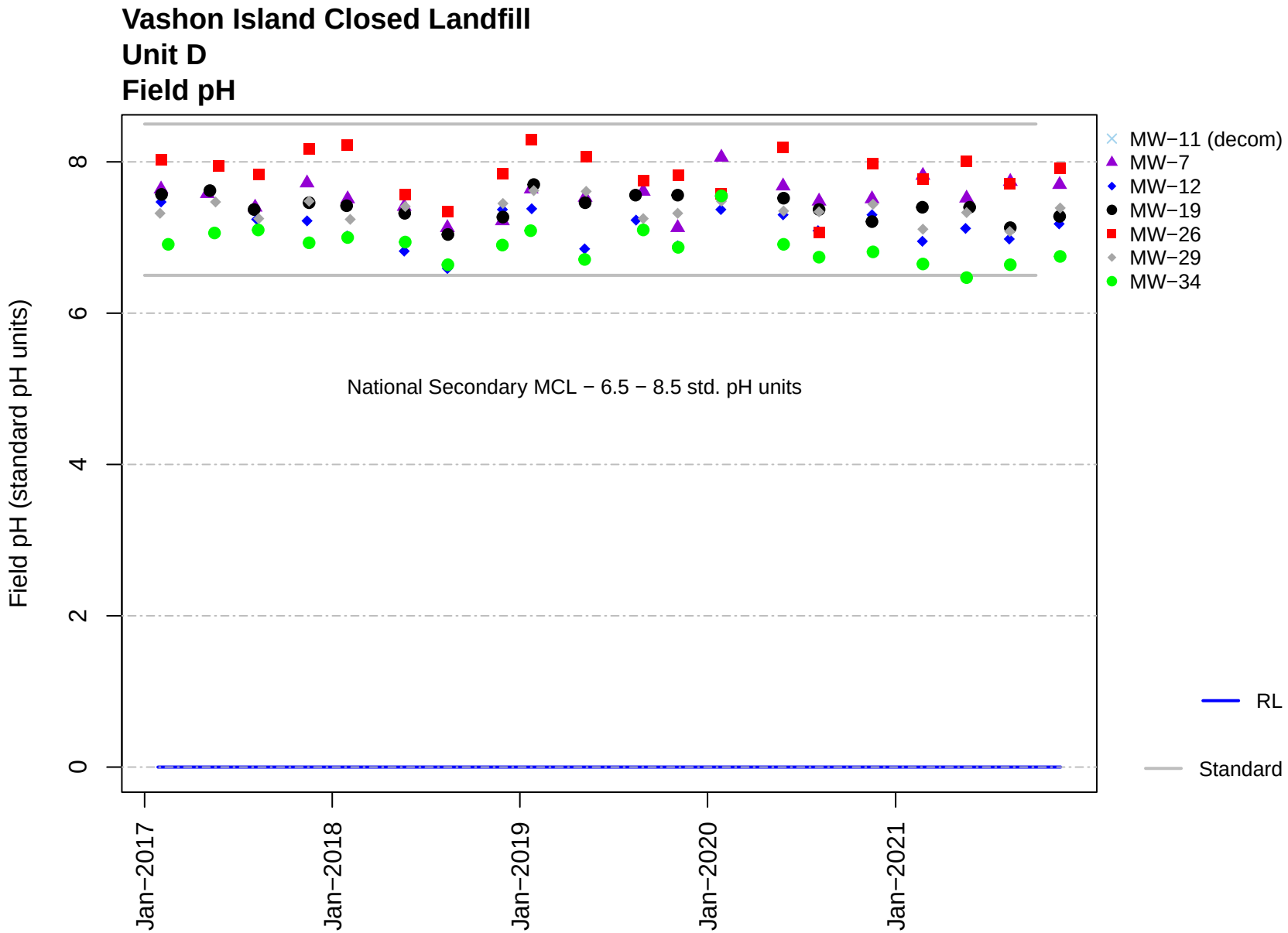

Vashon Island Closed Landfill
Channel Cc3
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
50
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

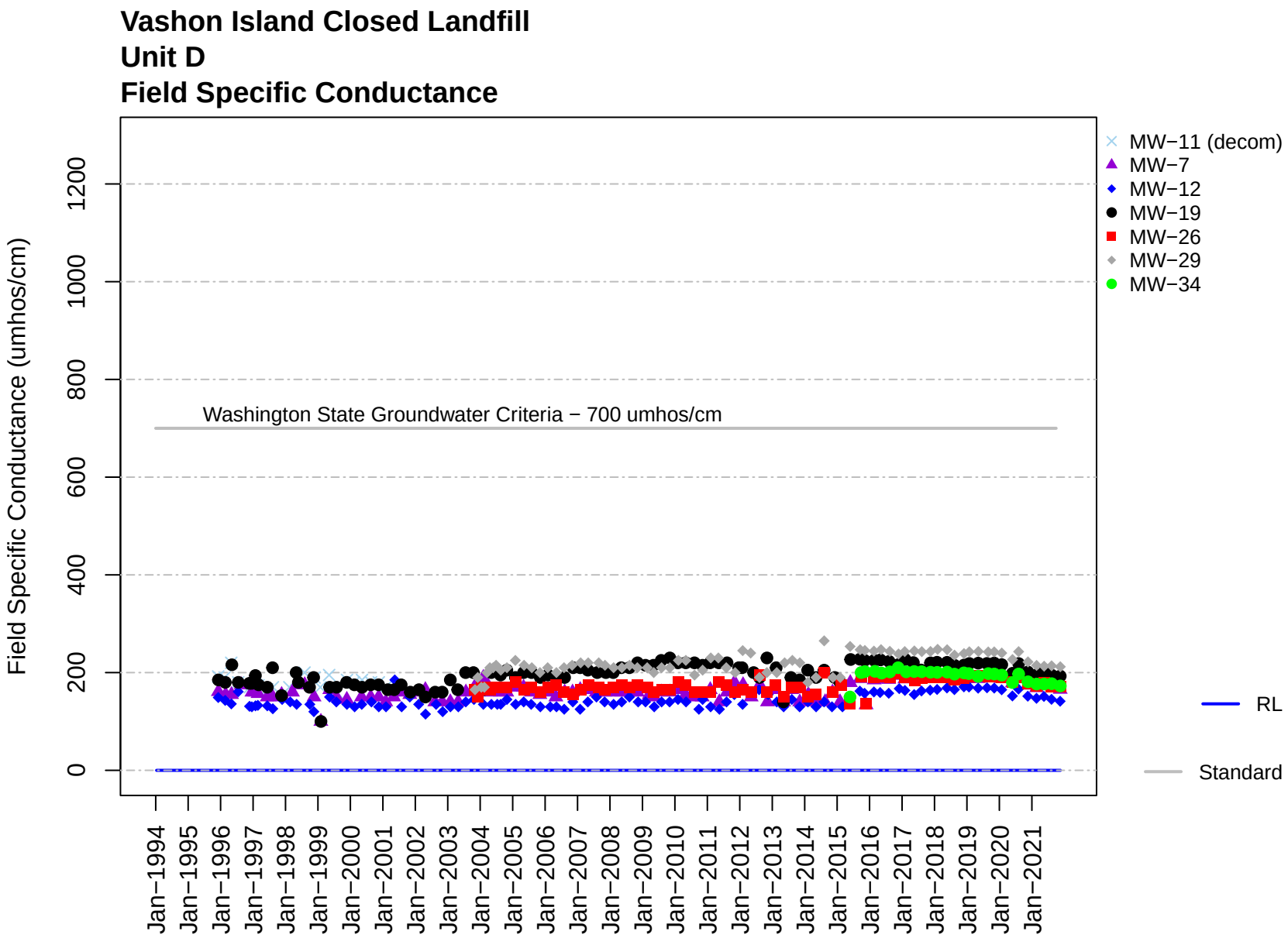

Vashon Island Closed Landfill
Channel Cc3
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

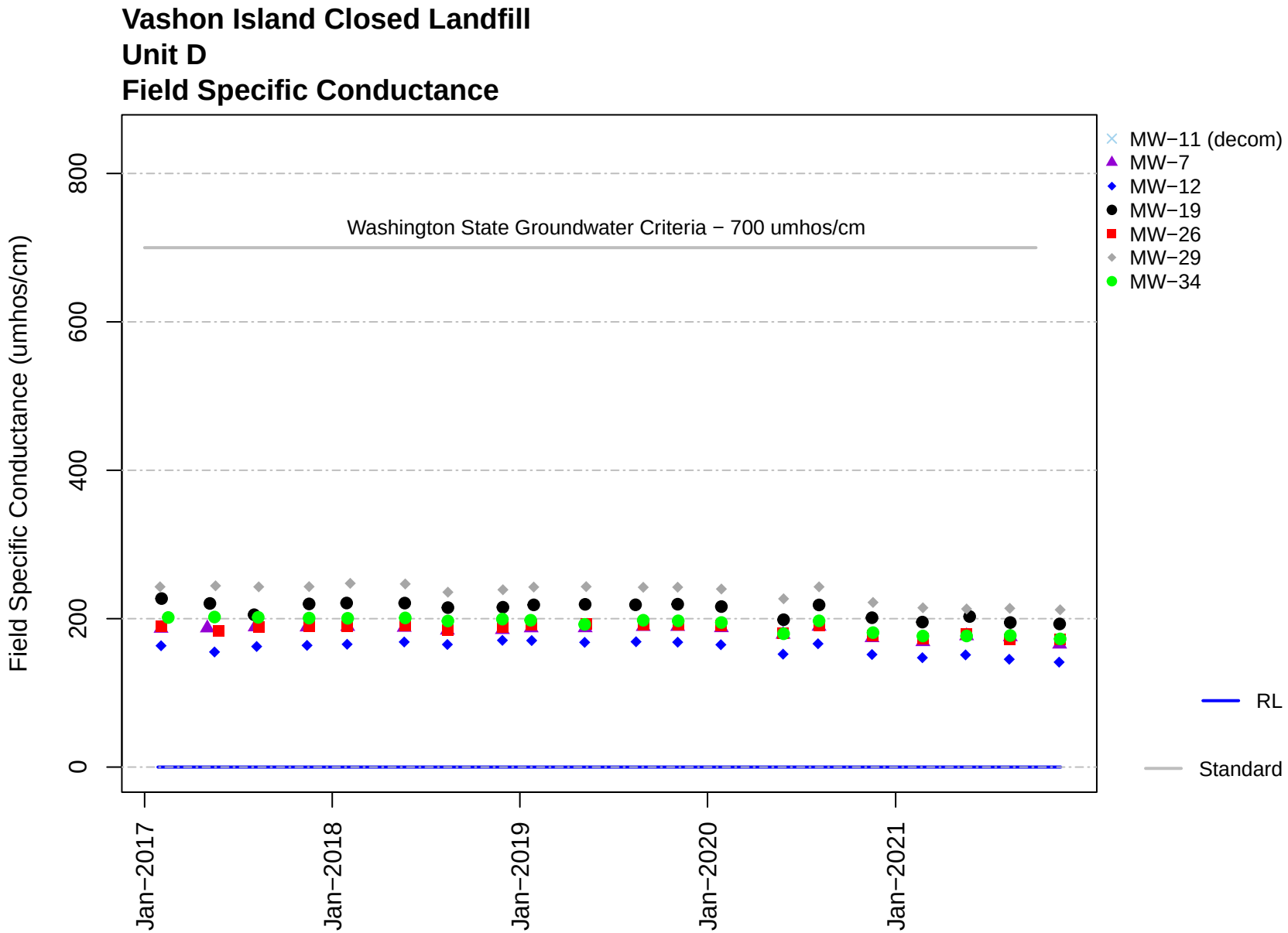
Appendix F

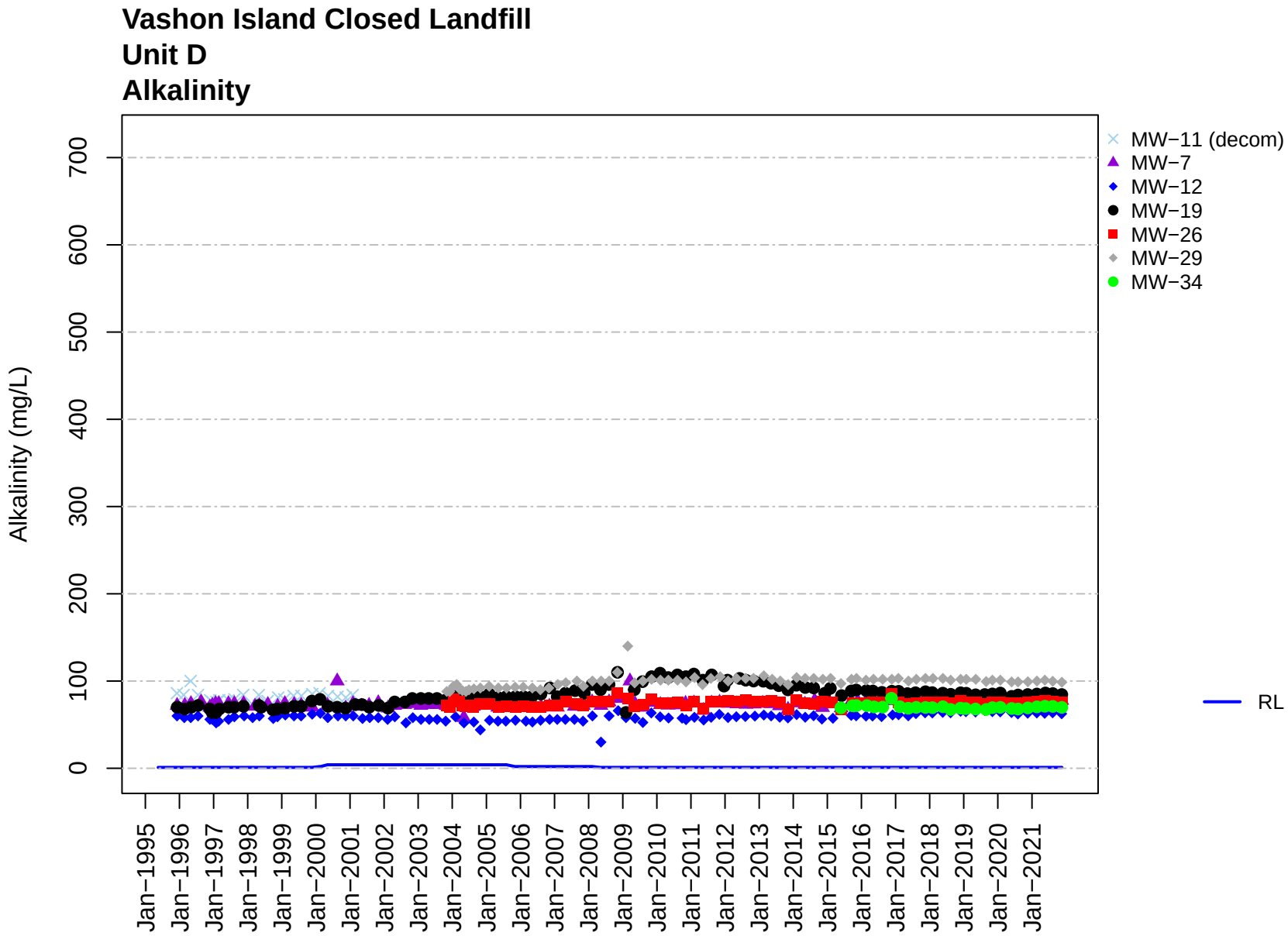
Time Concentration Plots for
Groundwater in Unit D Aquifer

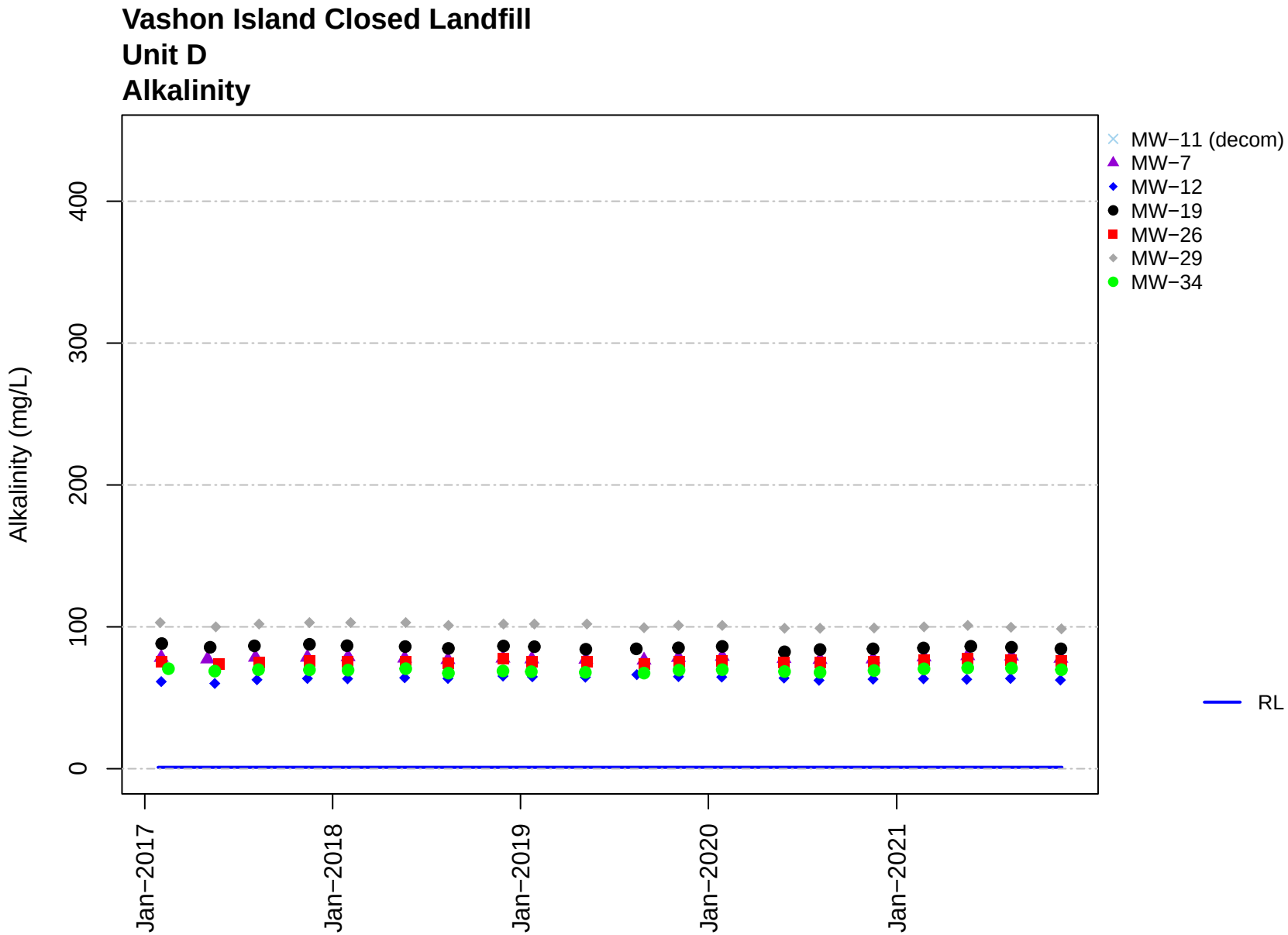

Vashon Island Closed Landfill
Unit D
Field pH
Washington State Groundwater Criteria − 6.5 − 8.5 std. pH units
National Secondary MCL − 6.5 − 8.5 std. pH units
Field pH (standard pH units)
0
2
4
6
8
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

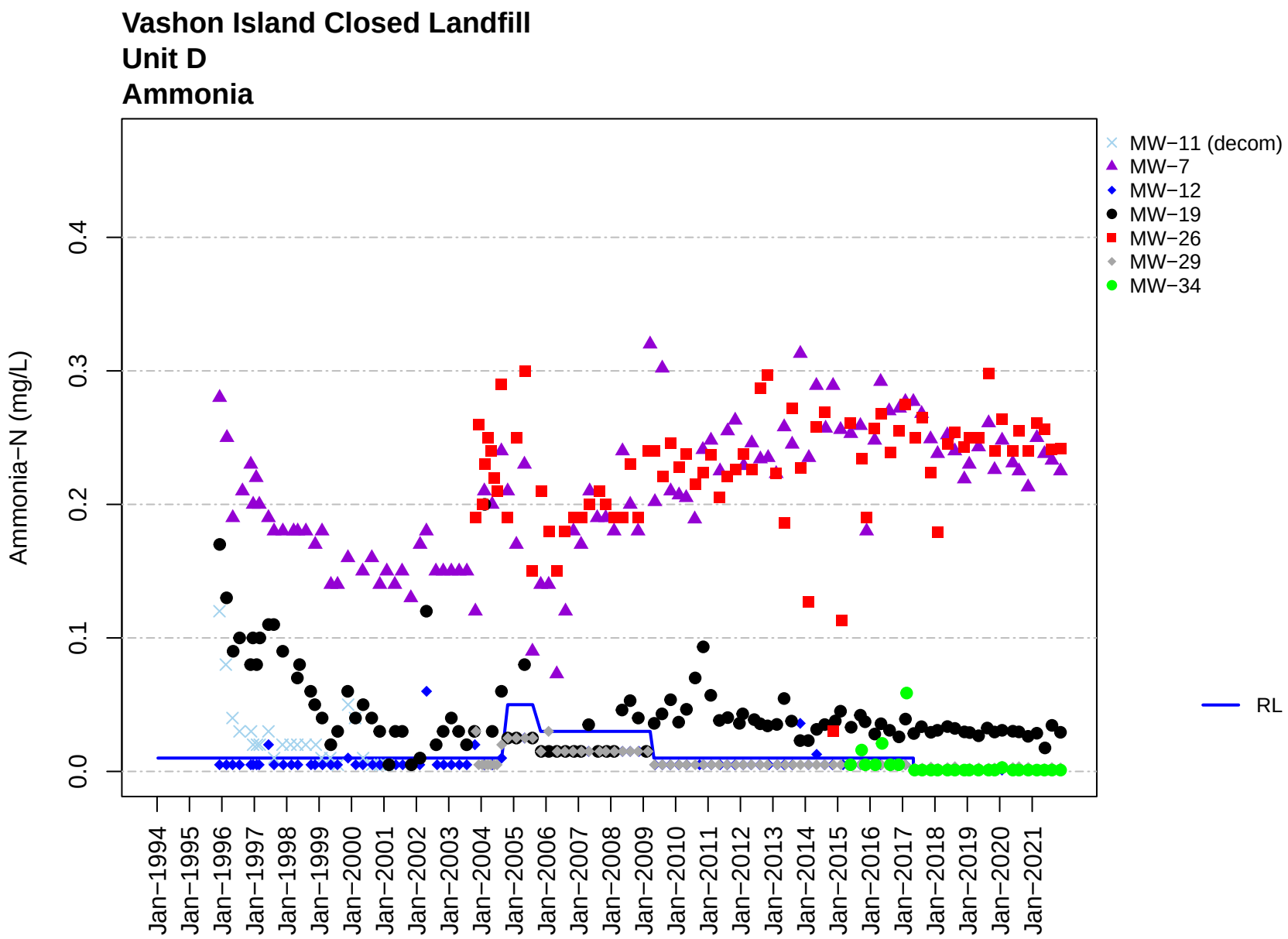

Vashon Island Closed Landfill
Unit D
Field pH
Field pH (standard pH units)
0
2
4
6
8
National Secondary MCL − 6.5 − 8.5 std. pH units
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

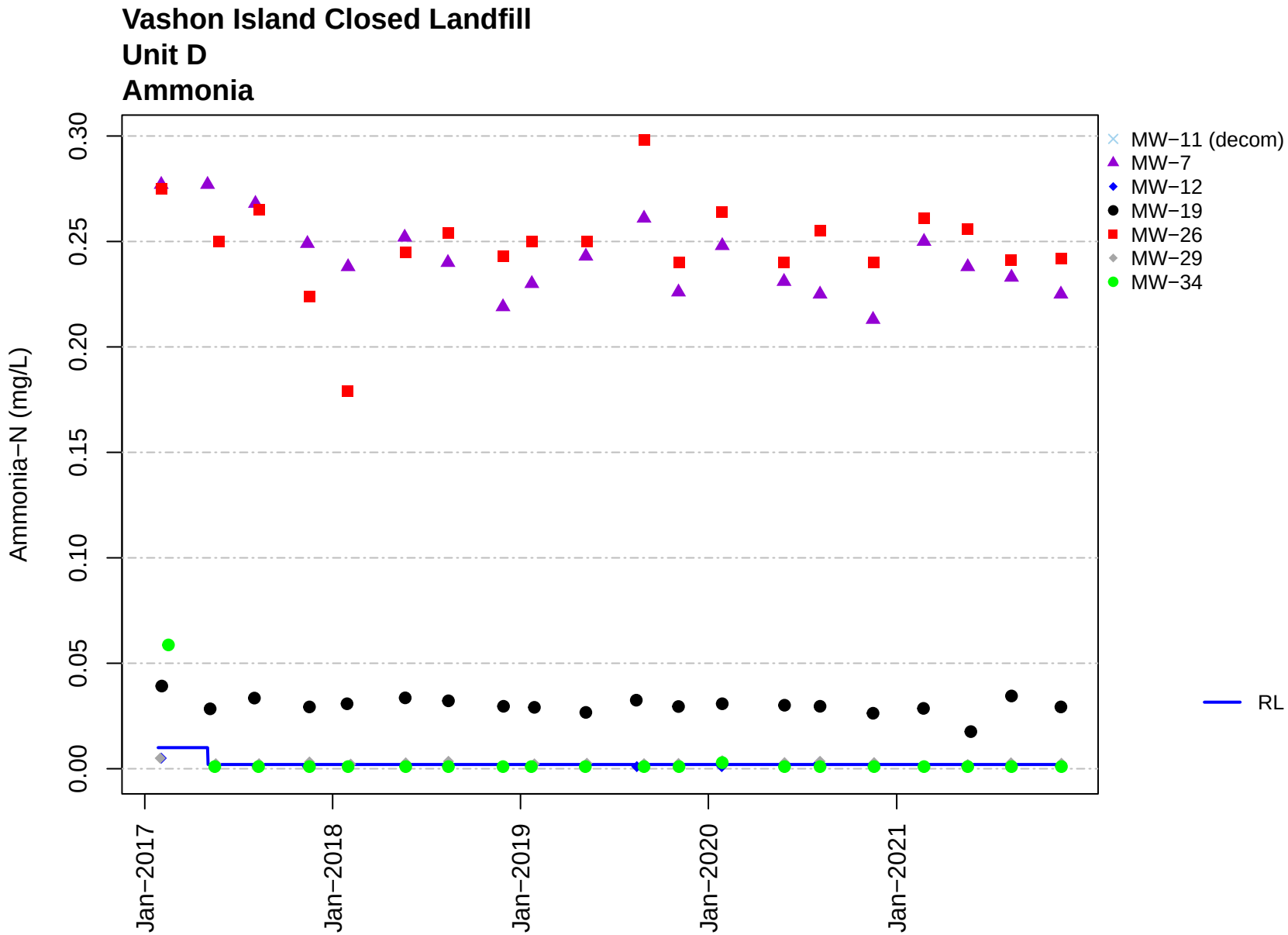

Vashon Island Closed Landfill
Unit D
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
1000
1200
Washington State Groundwater Criteria − 700 umhos/cm
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

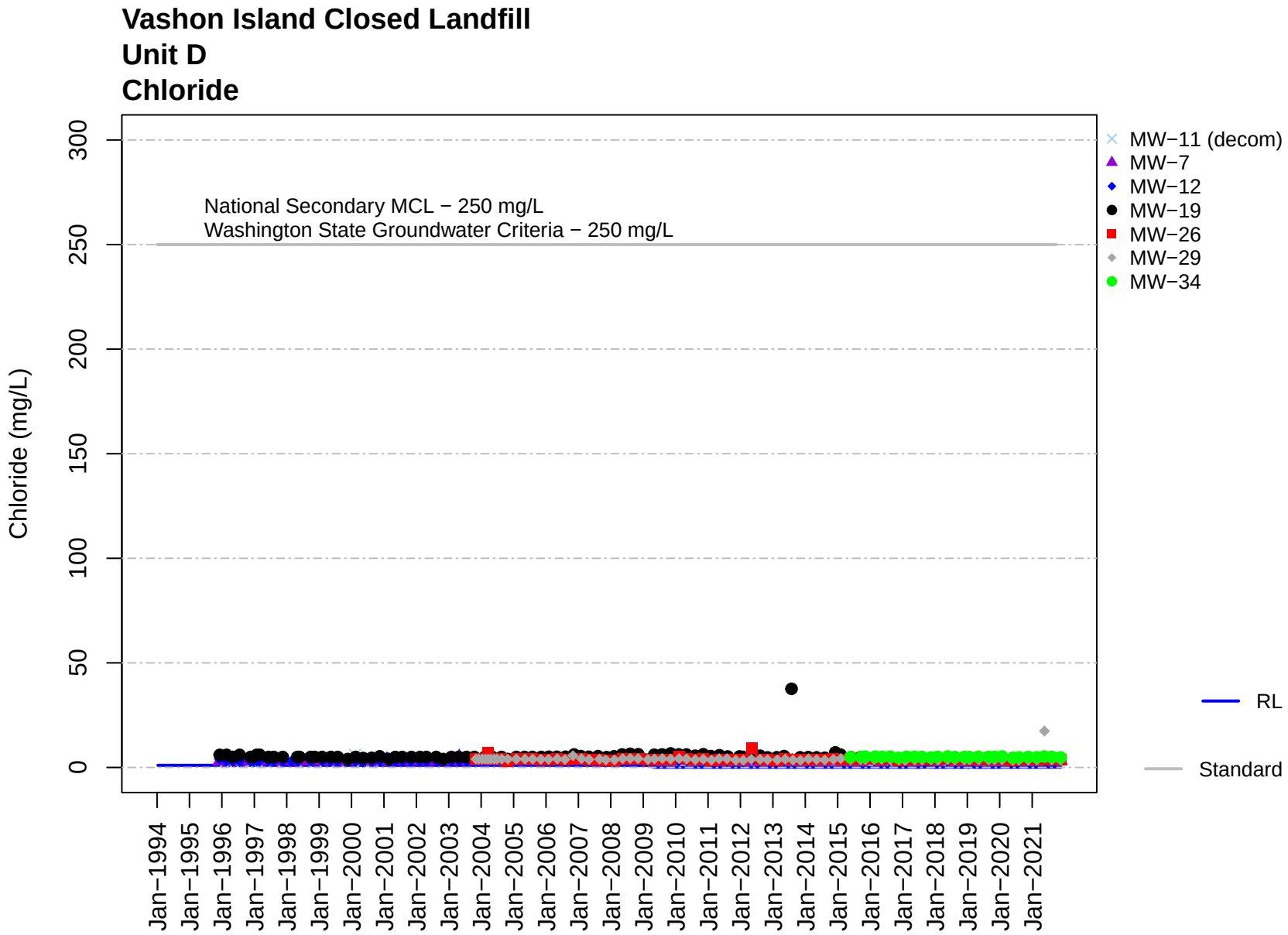

Vashon Island Closed Landfill
Unit D
Field Specific Conductance
Field Specific Conductance (umhos/cm)
0
200
400
600
800
Washington State Groundwater Criteria − 700 umhos/cm
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

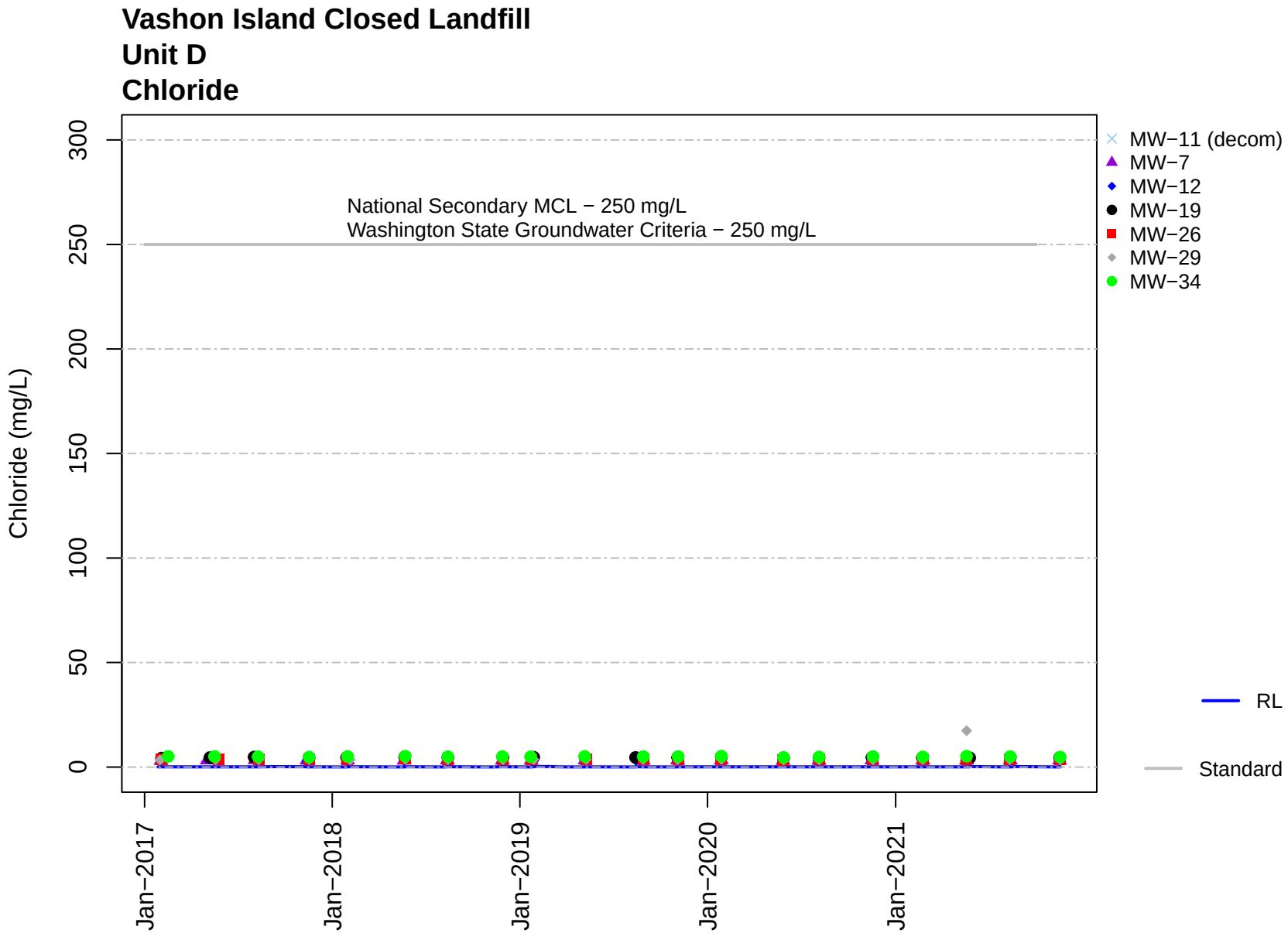

Vashon Island Closed Landfill
Unit D
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
500
600
700
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

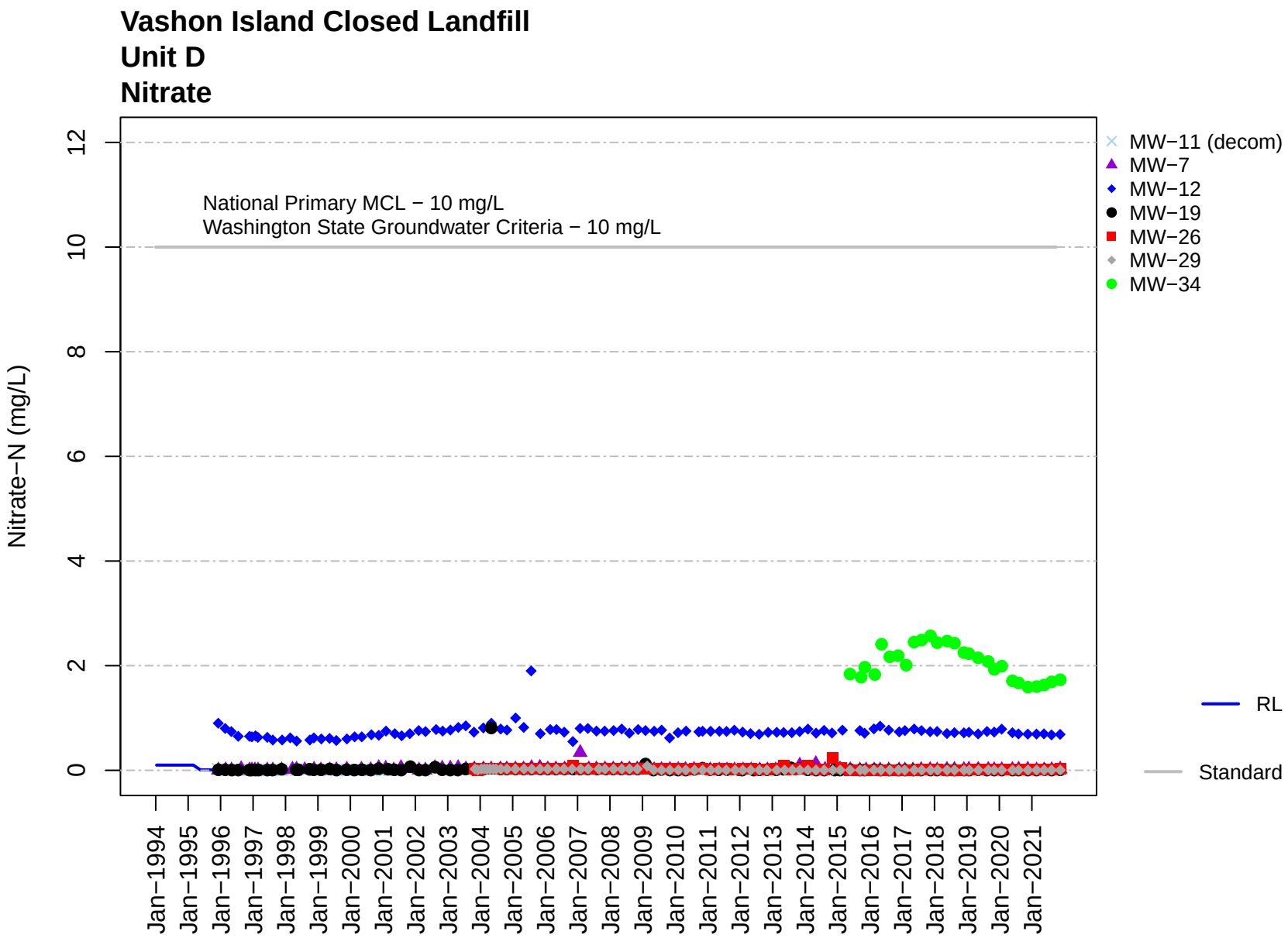

Vashon Island Closed Landfill
Unit D
Alkalinity
Alkalinity (mg/L)
0
100
200
300
400
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

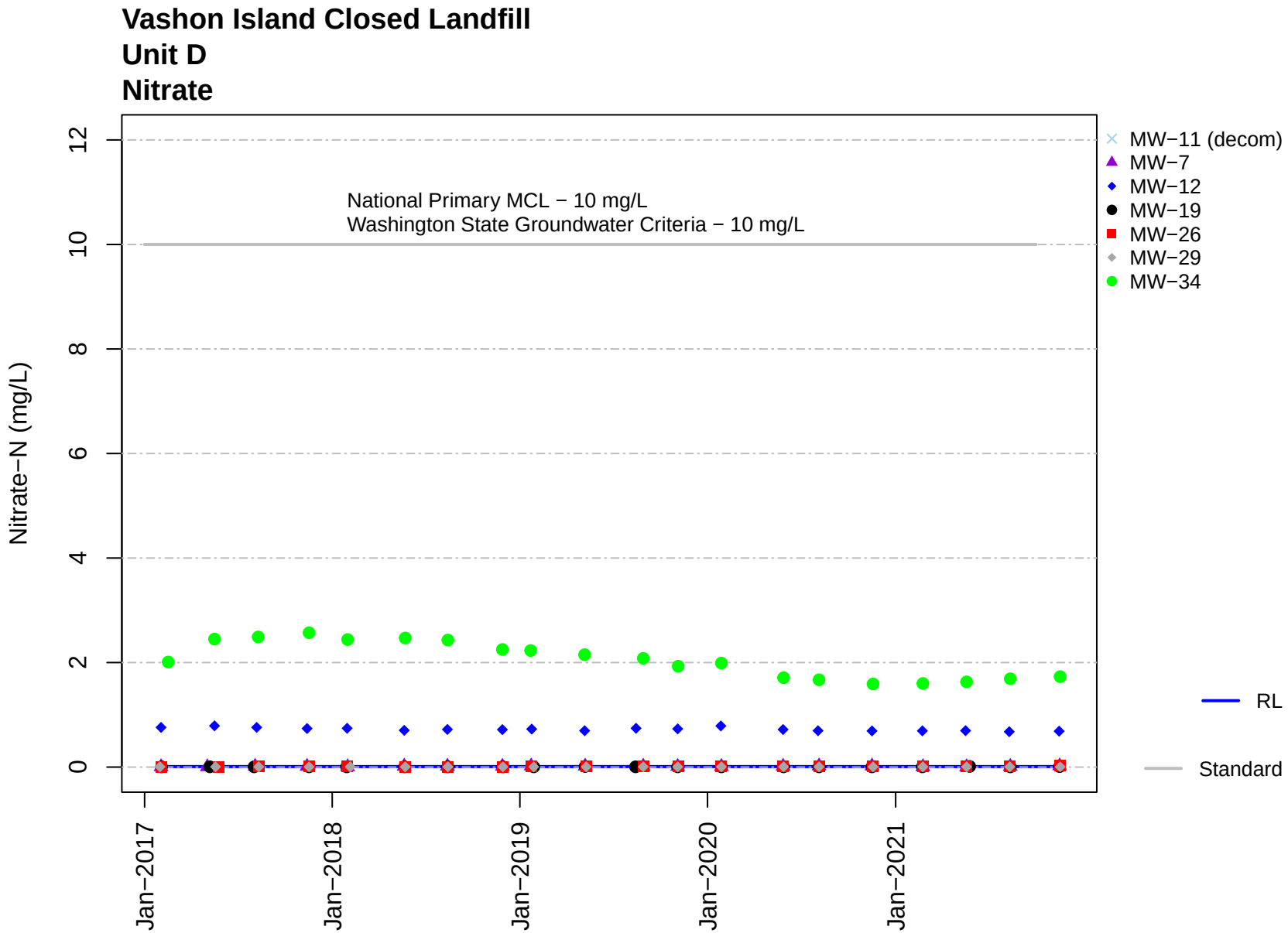

Vashon Island Closed Landfill
Unit D
Ammonia
Ammonia−N (mg/L)
0.0
0.1
0.2
0.3
0.4
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

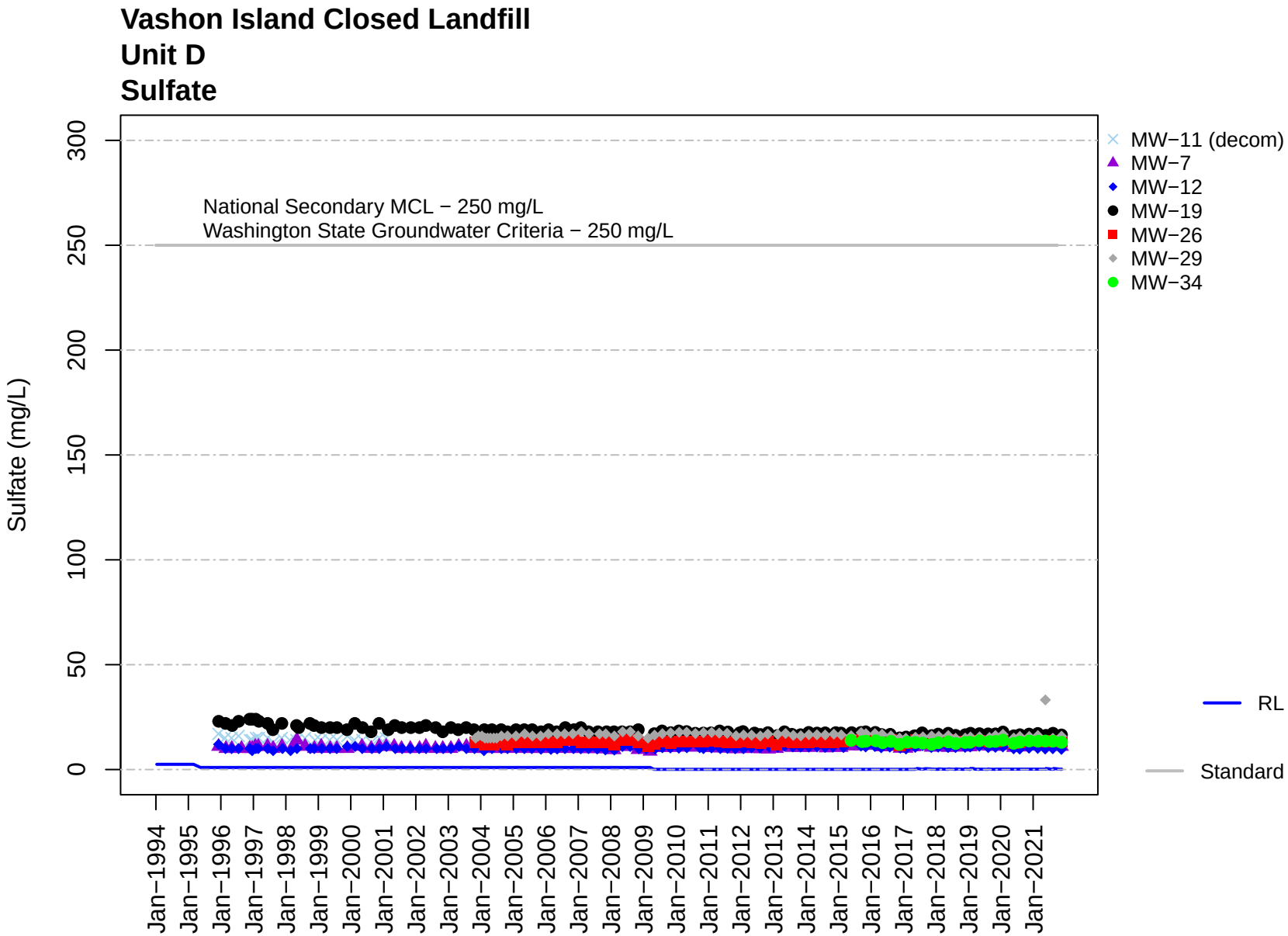

Vashon Island Closed Landfill
Unit D
Ammonia
Ammonia−N (mg/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

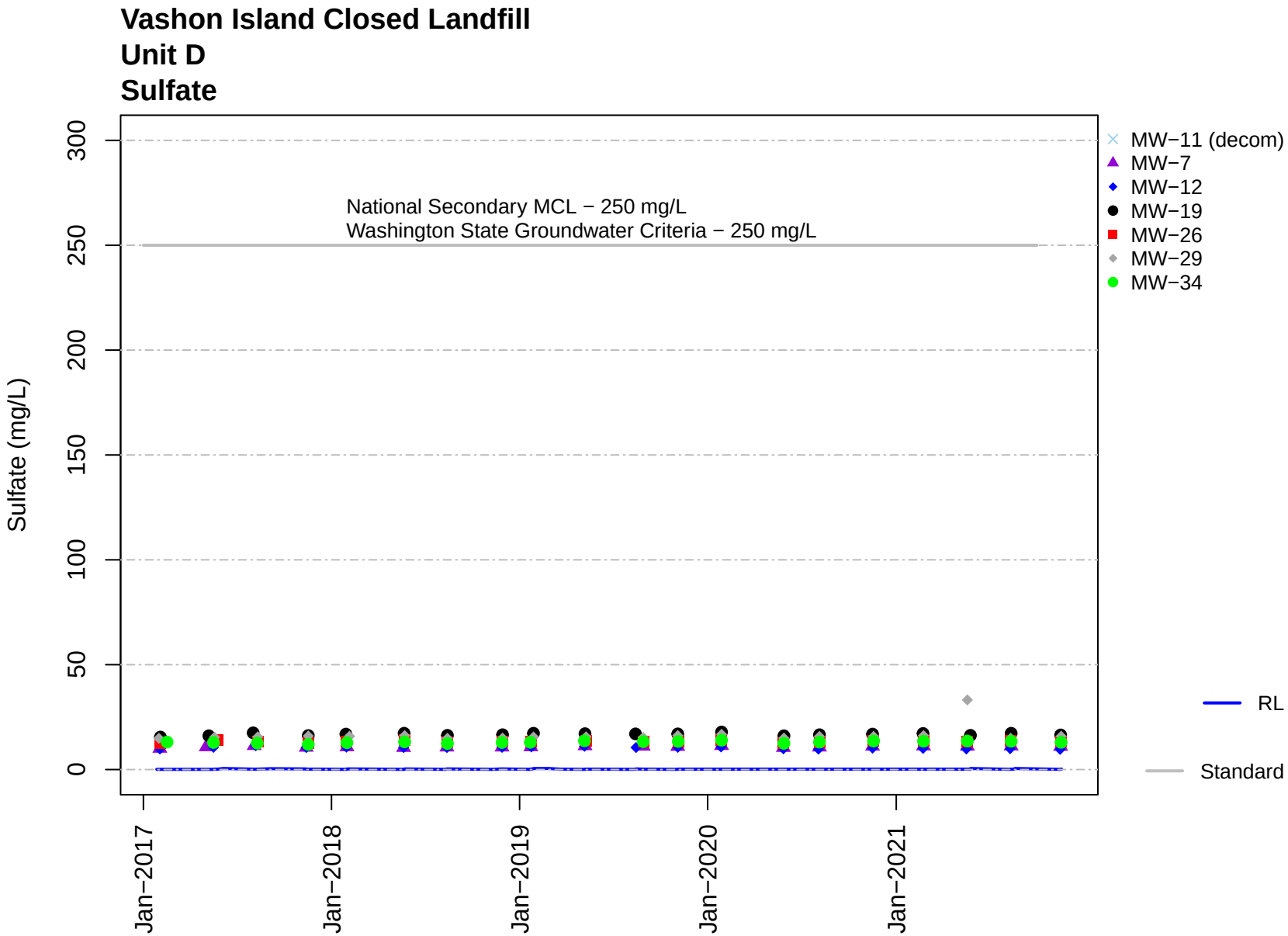

Vashon Island Closed Landfill
Unit D
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

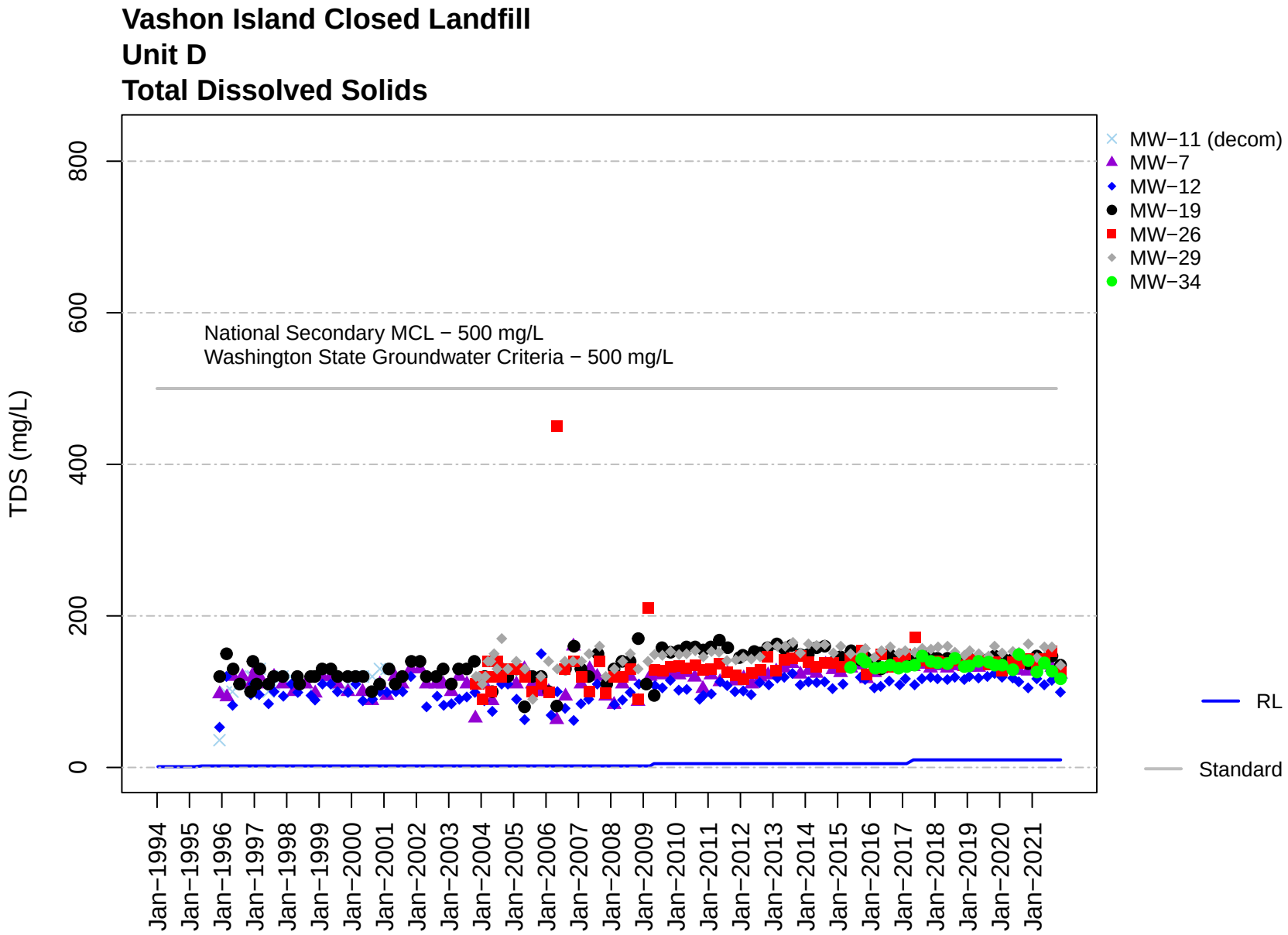

Vashon Island Closed Landfill
Unit D
Chloride
Chloride (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

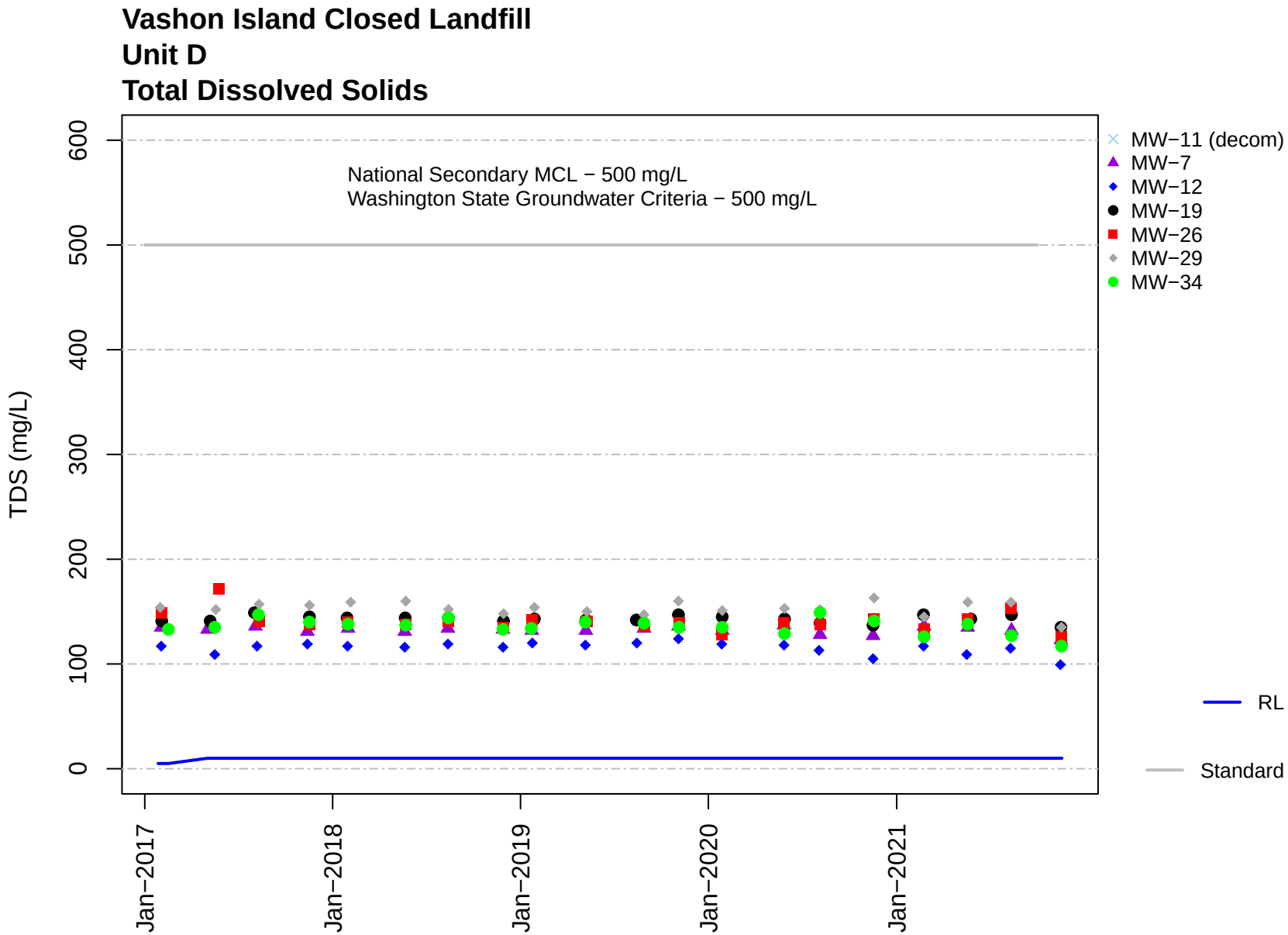

Vashon Island Closed Landfill
Unit D
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

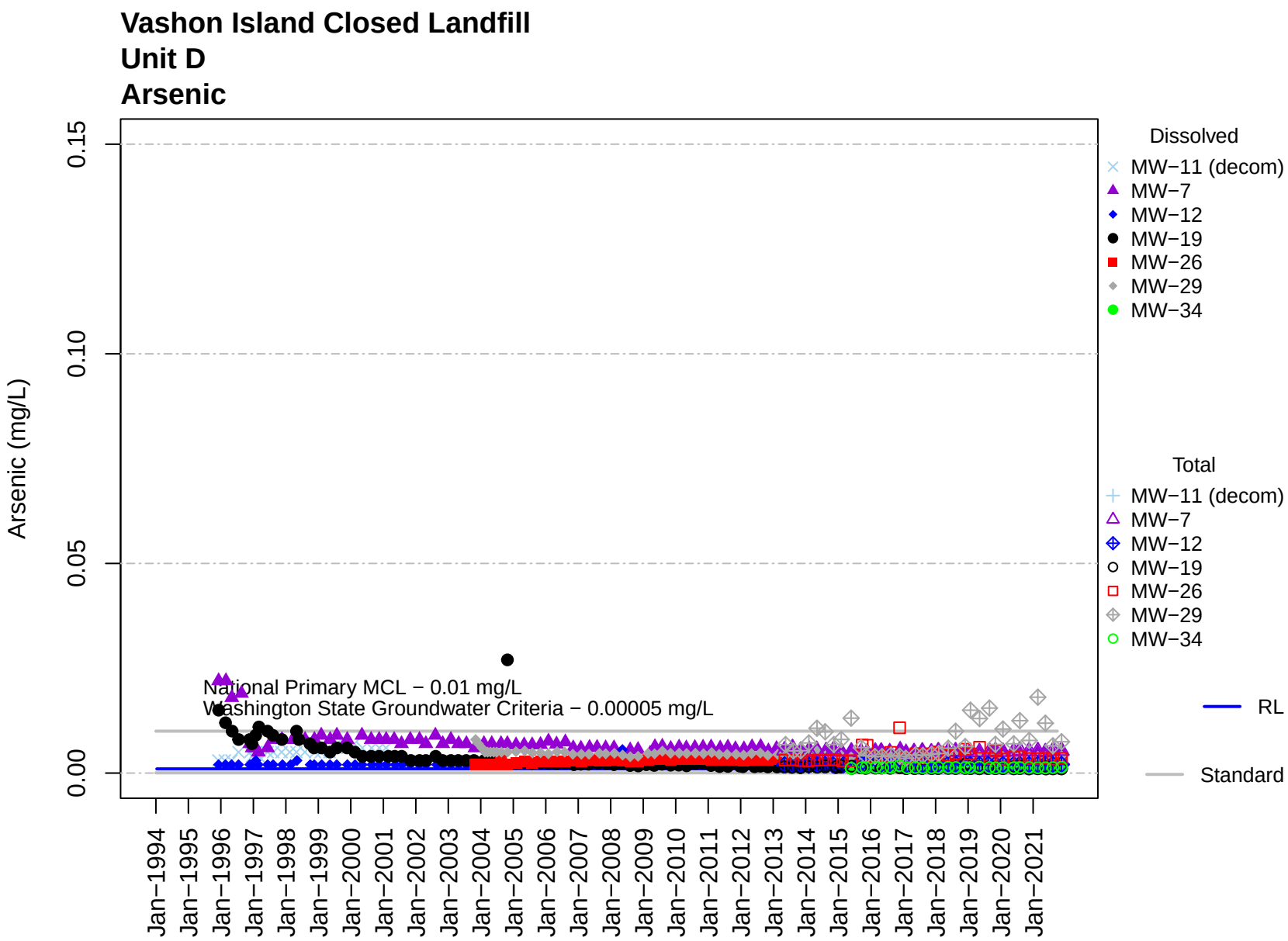

Vashon Island Closed Landfill
Unit D
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
12
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

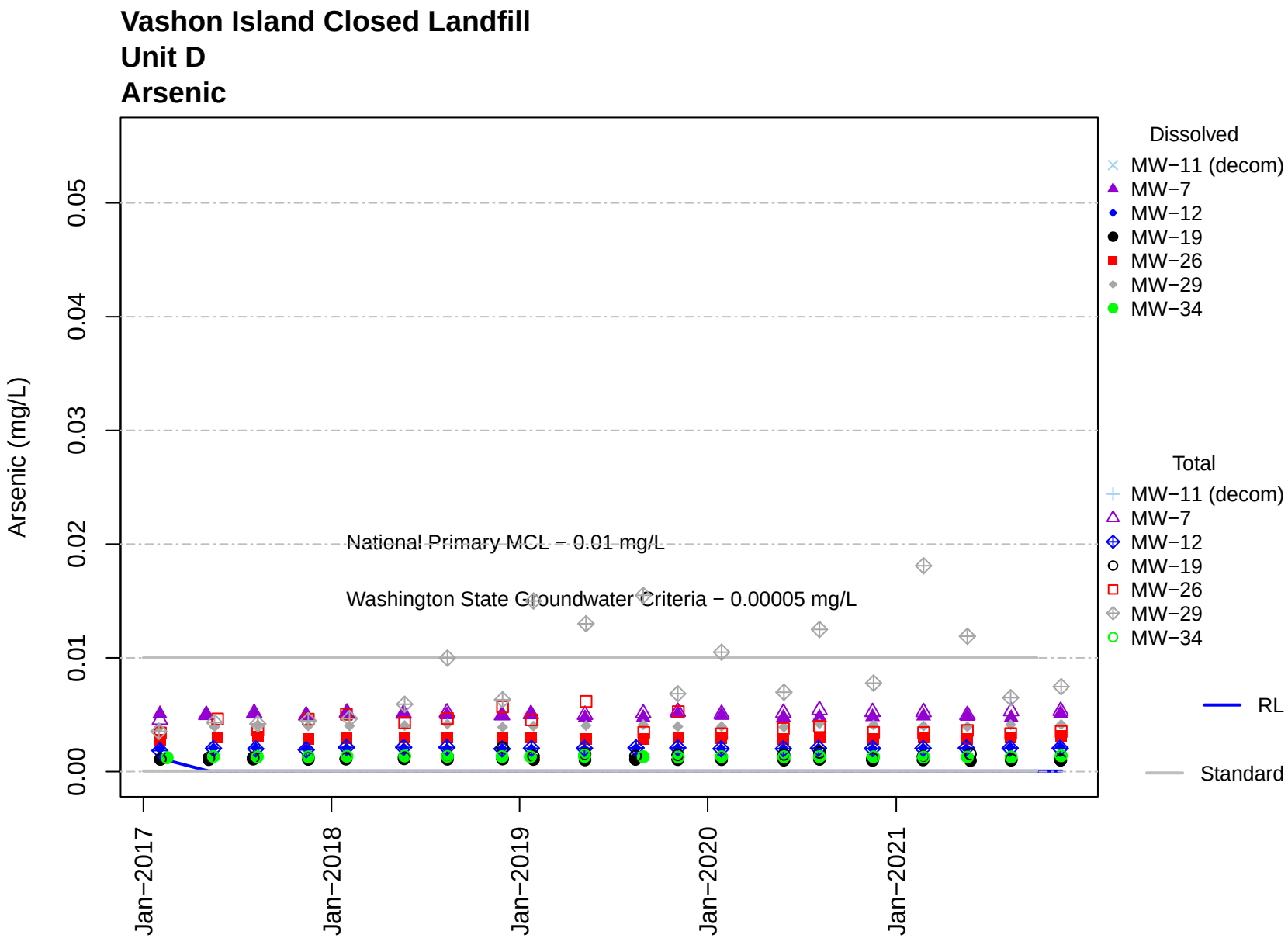

Vashon Island Closed Landfill
Unit D
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

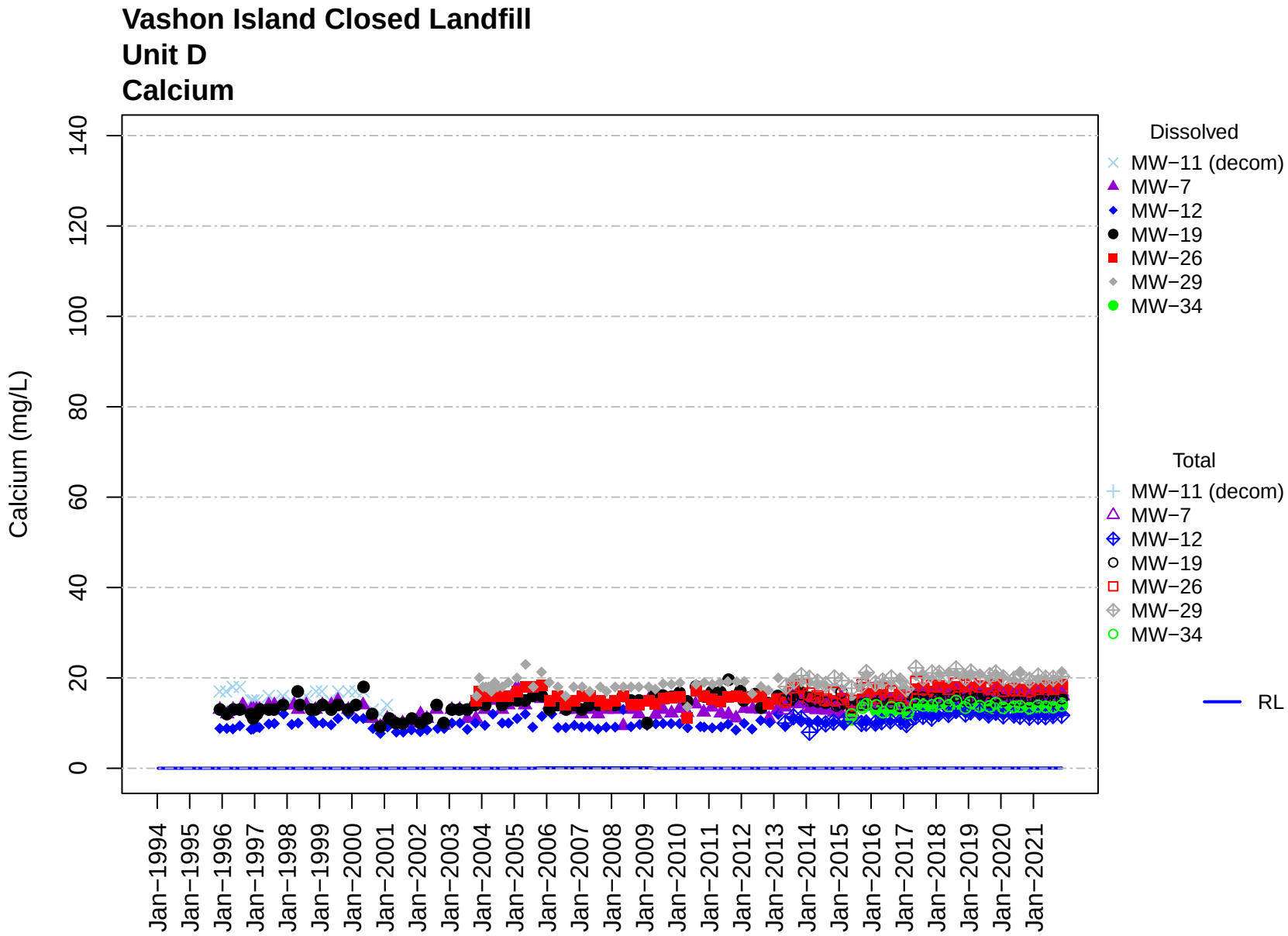

Vashon Island Closed Landfill
Unit D
Sulfate
Sulfate (mg/L)
0
50
100
150
200
250
300
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

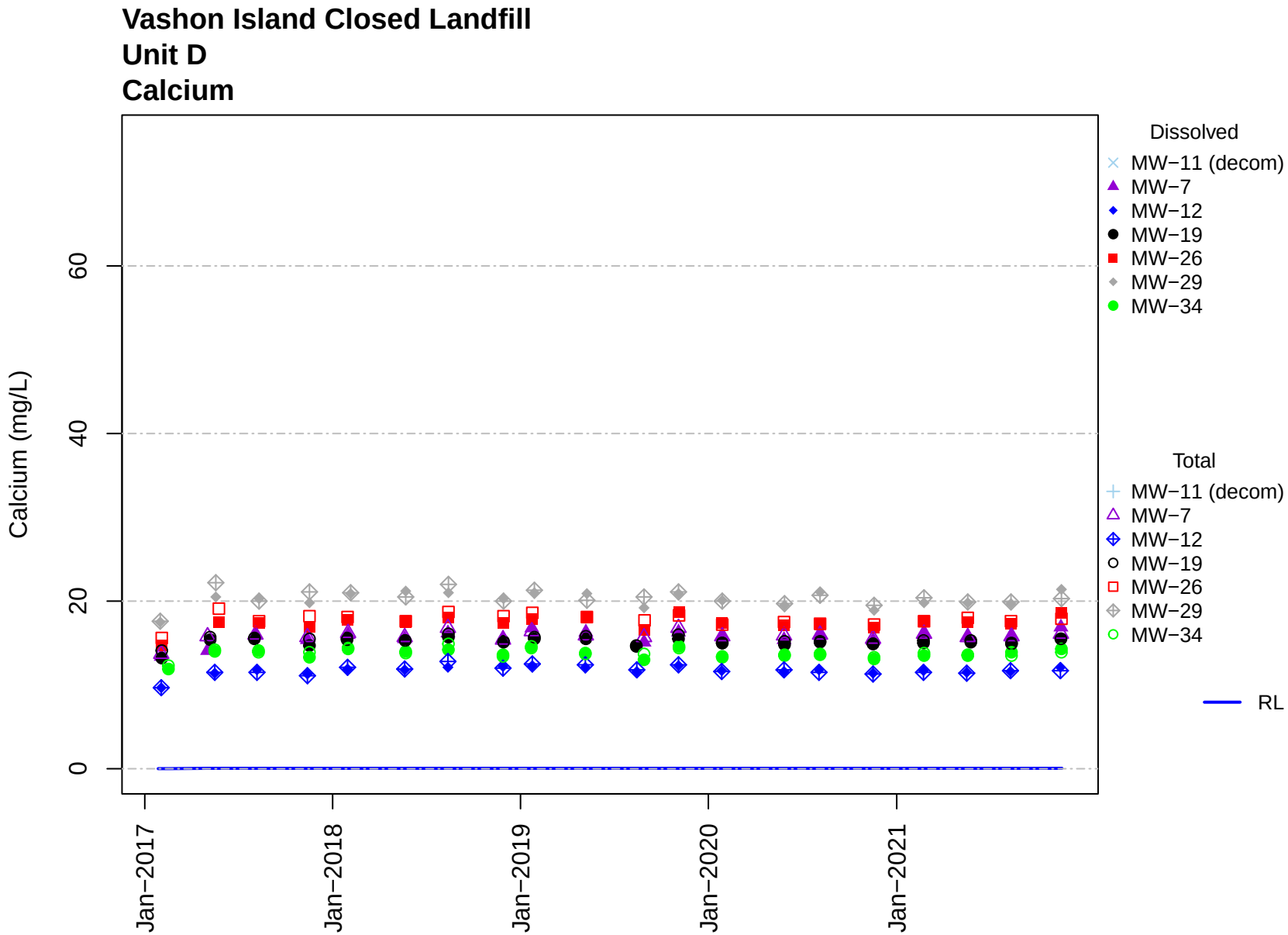

Vashon Island Closed Landfill
Unit D
Total Dissolved Solids
TDS (mg/L)
0
200
400
600
800
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

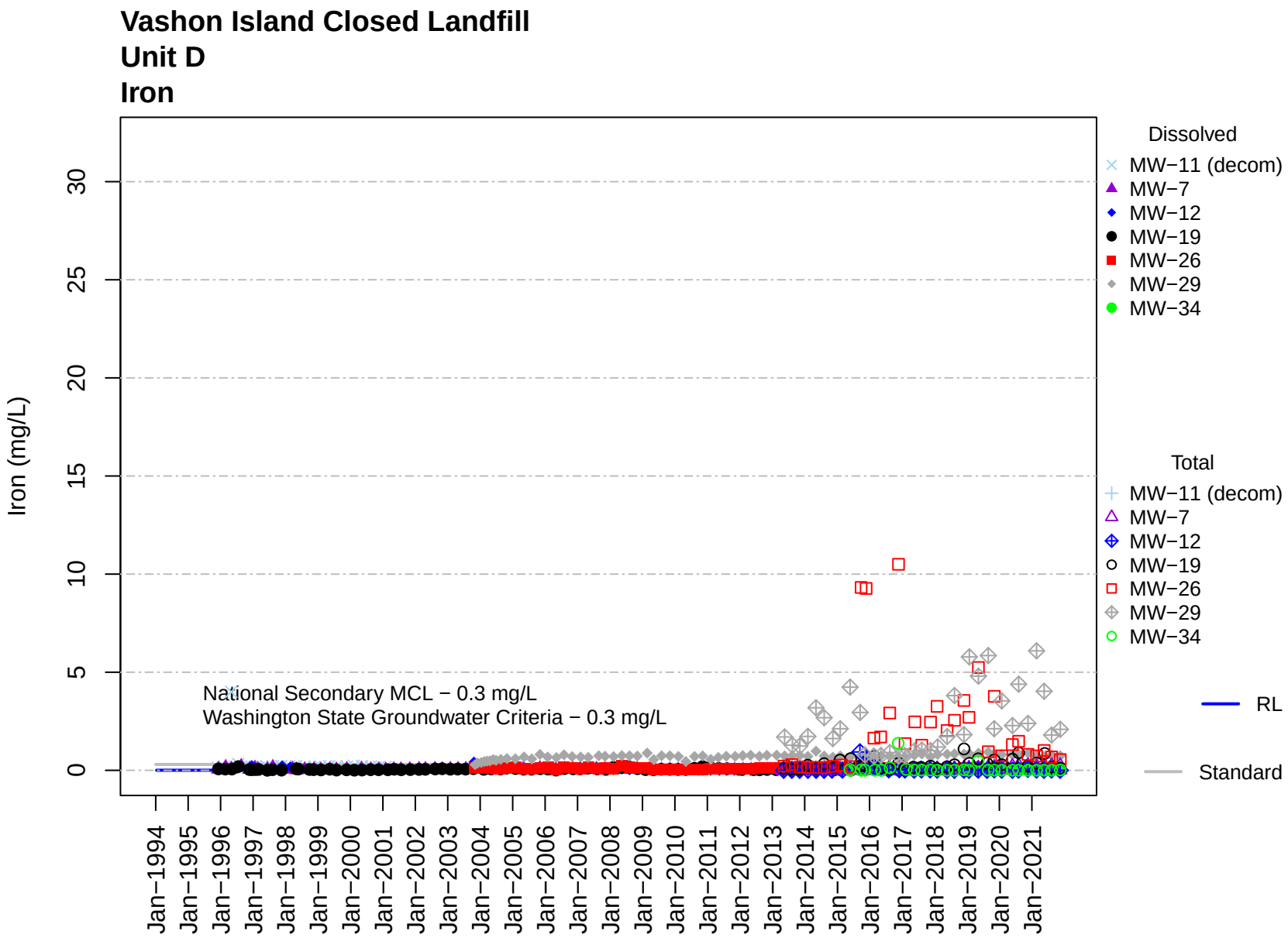

Vashon Island Closed Landfill
Unit D
Total Dissolved Solids
National Secondary MCL − 500 mg/L
Washington State Groundwater Criteria − 500 mg/L
TDS (mg/L)
0
100
200
300
400
500
600
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

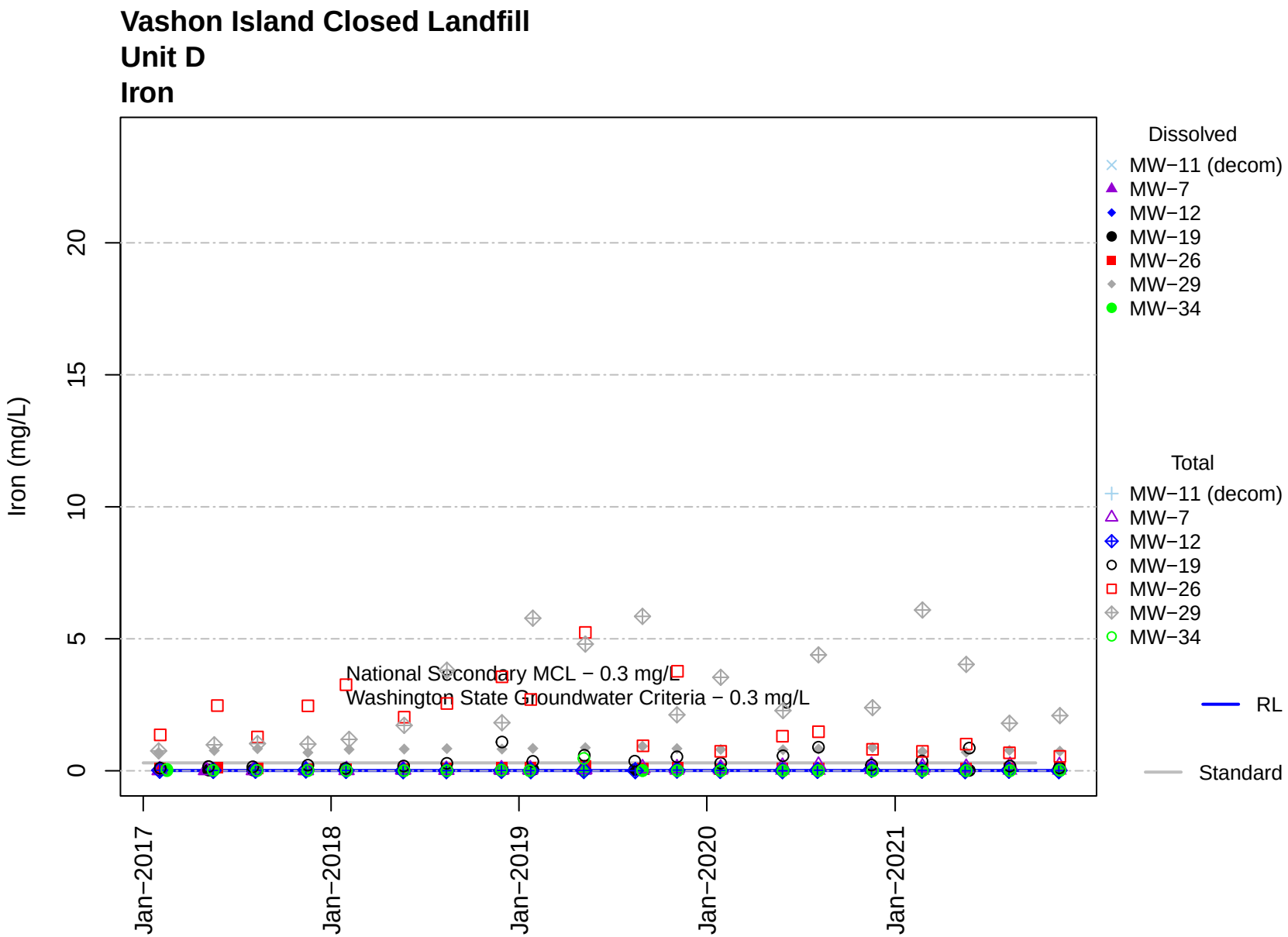

Vashon Island Closed Landfill
Unit D
Arsenic
Arsenic (mg/L)
0.00
0.05
0.10
0.15
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

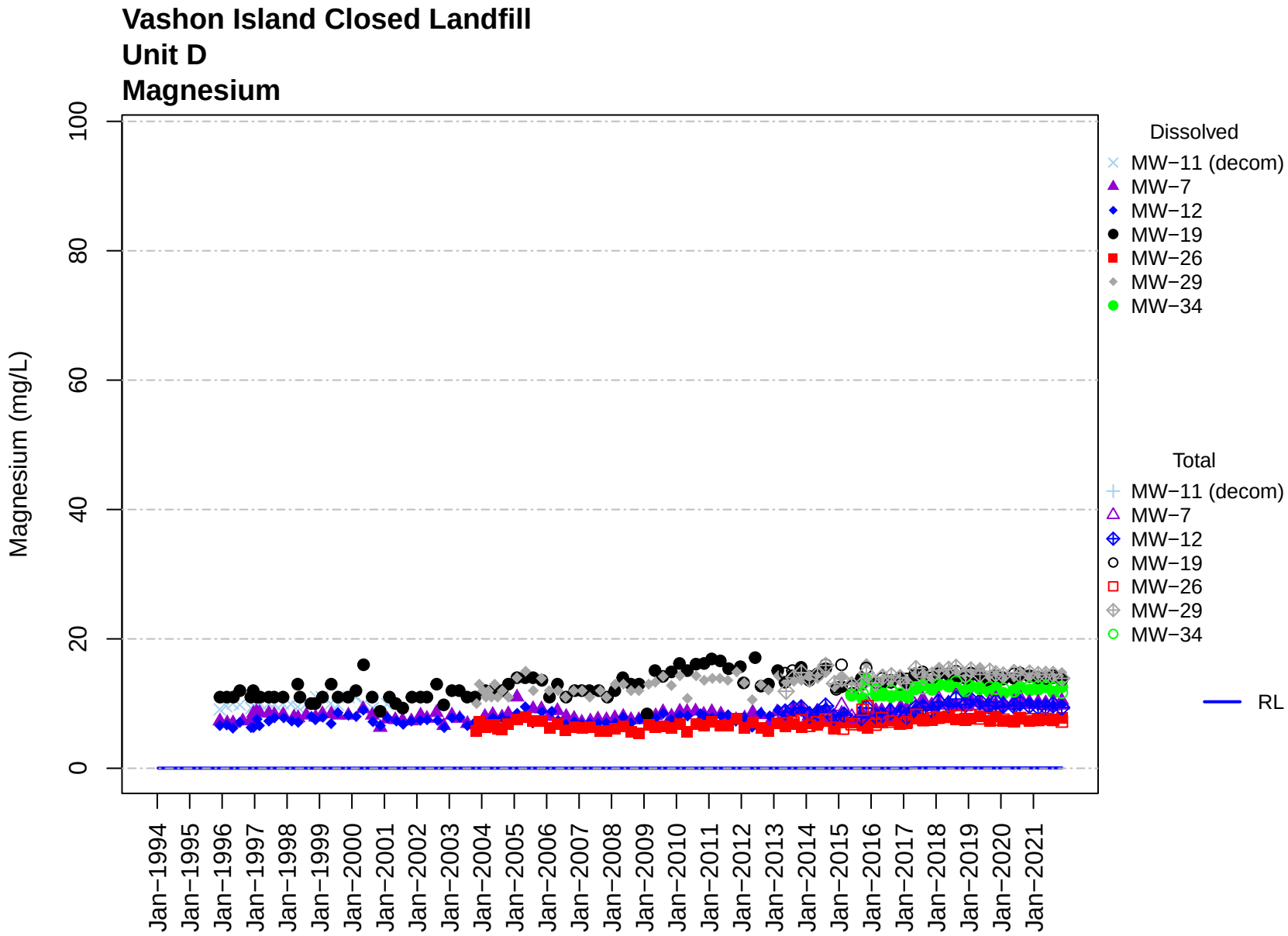

Vashon Island Closed Landfill
Unit D
Arsenic
Arsenic (mg/L)
0.00
0.01
0.02
0.03
0.04
0.05
National Primary MCL − 0.01 mg/L
Washington State Groundwater Criteria − 0.00005 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

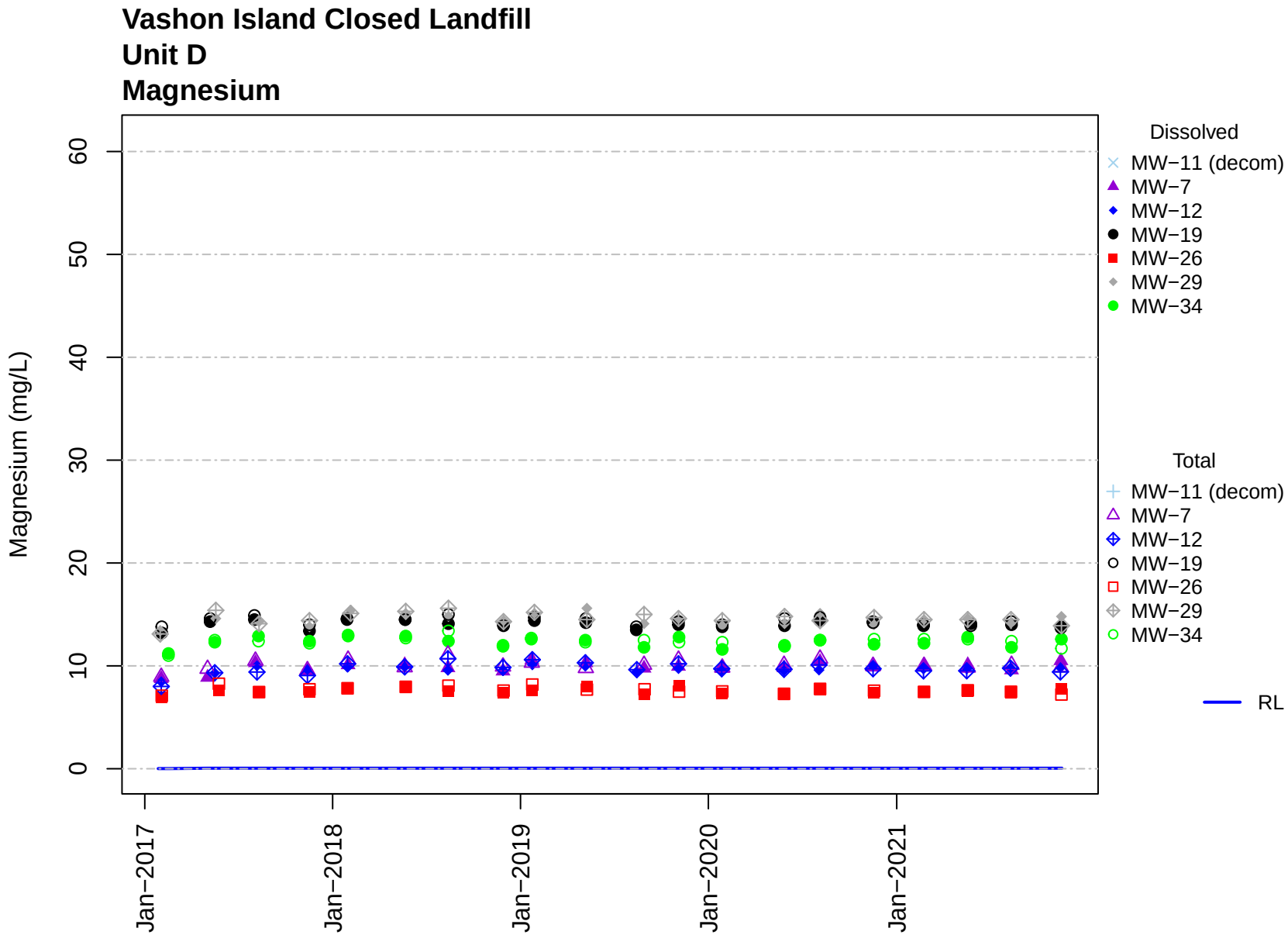

Vashon Island Closed Landfill
Unit D
Calcium
Calcium (mg/L)
0
20
40
60
80
100
120
140
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

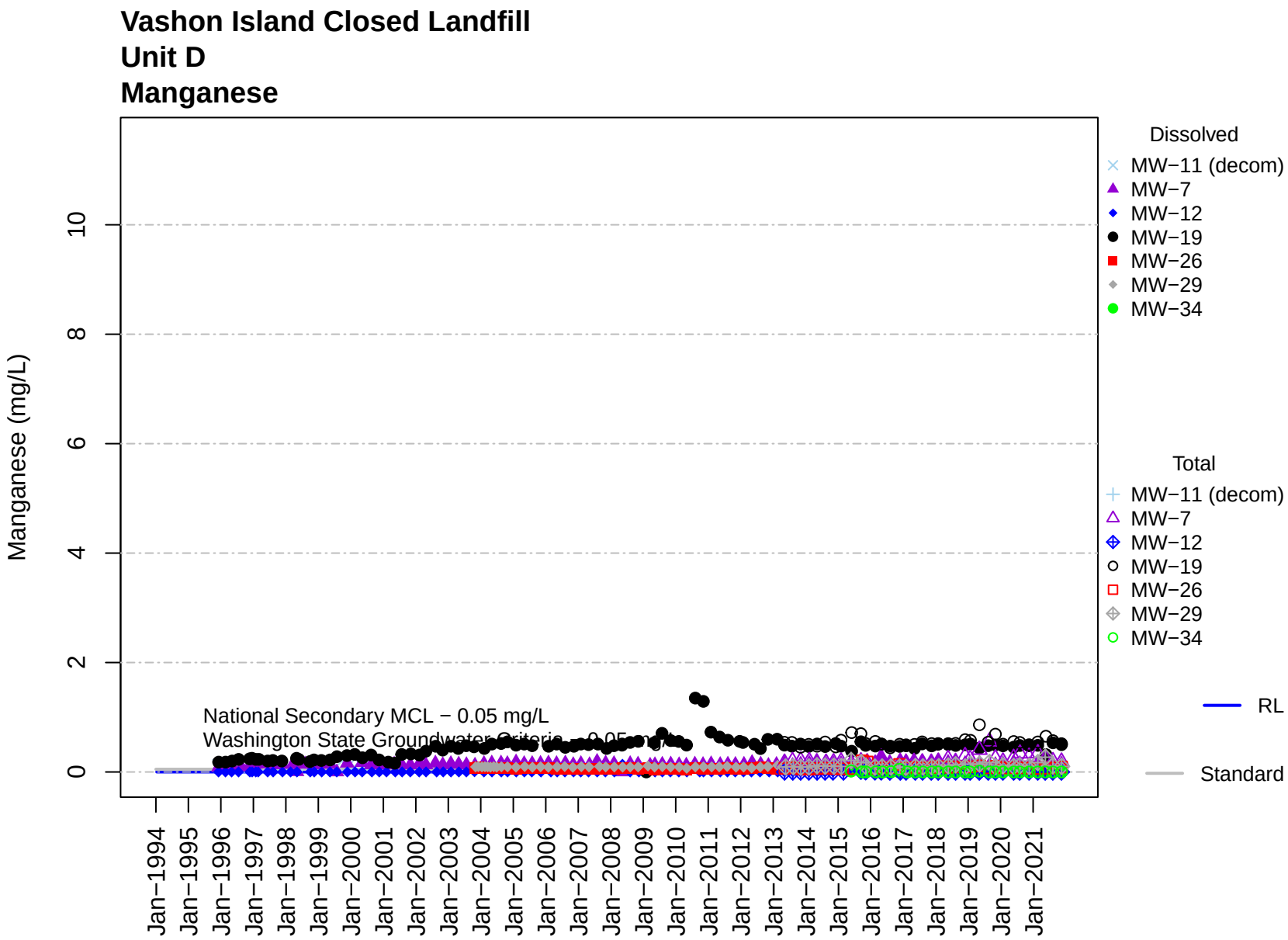

Vashon Island Closed Landfill
Unit D
Calcium
Calcium (mg/L)
0
20
40
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

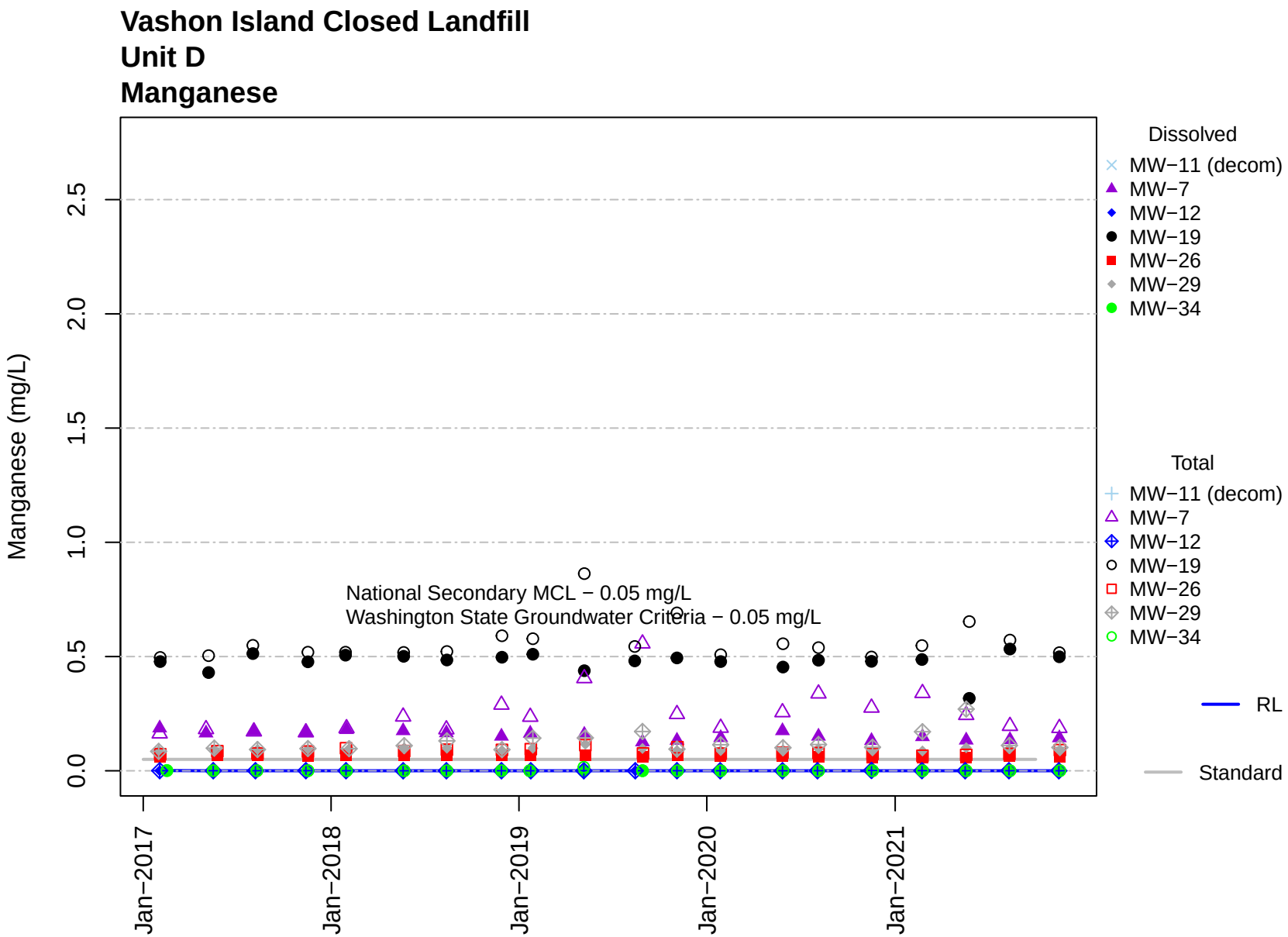

Vashon Island Closed Landfill
Unit D
Iron
Iron (mg/L)
0
5
10
15
20
25
30
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

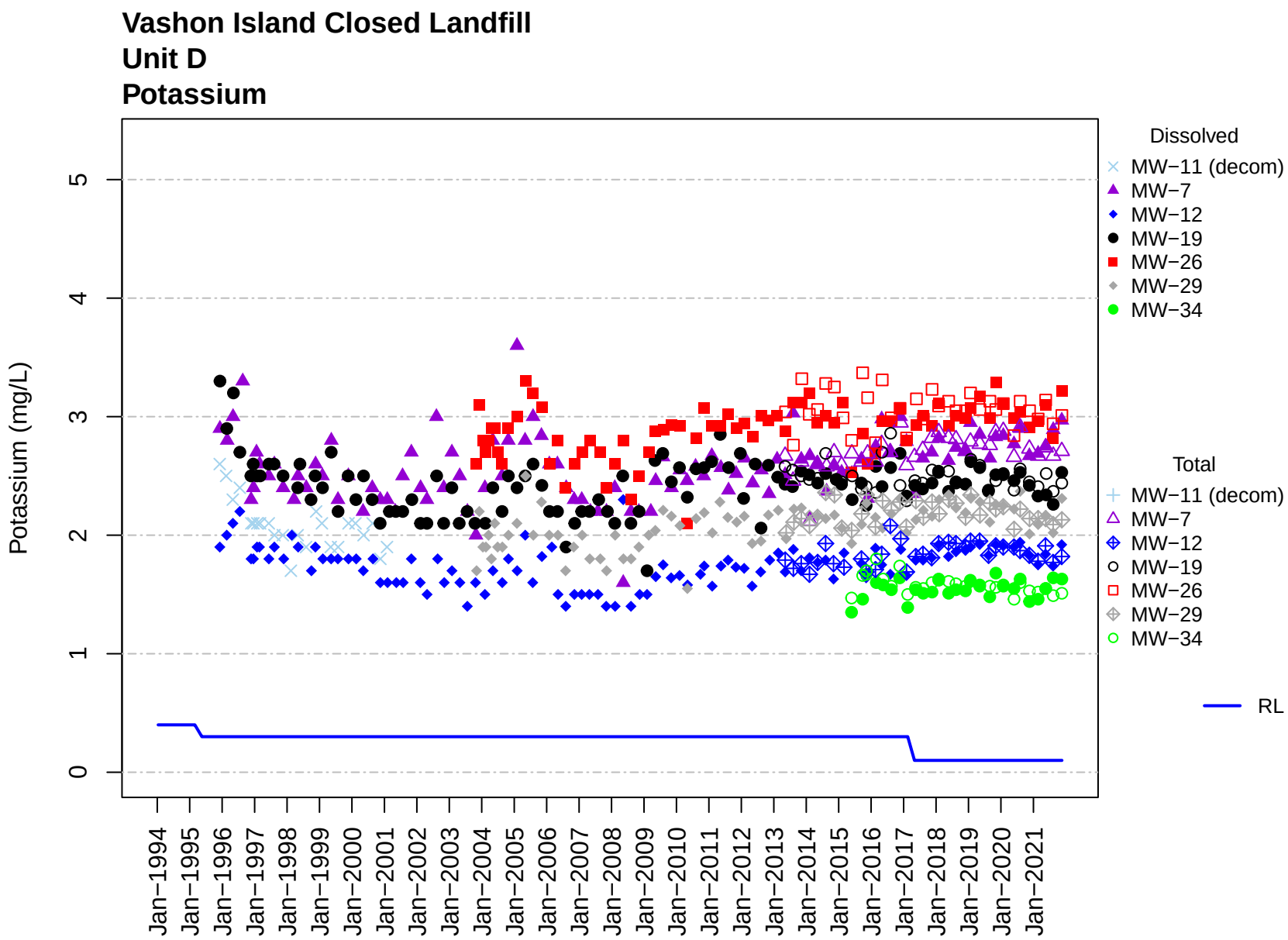

Vashon Island Closed Landfill
Unit D
Iron
Iron (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

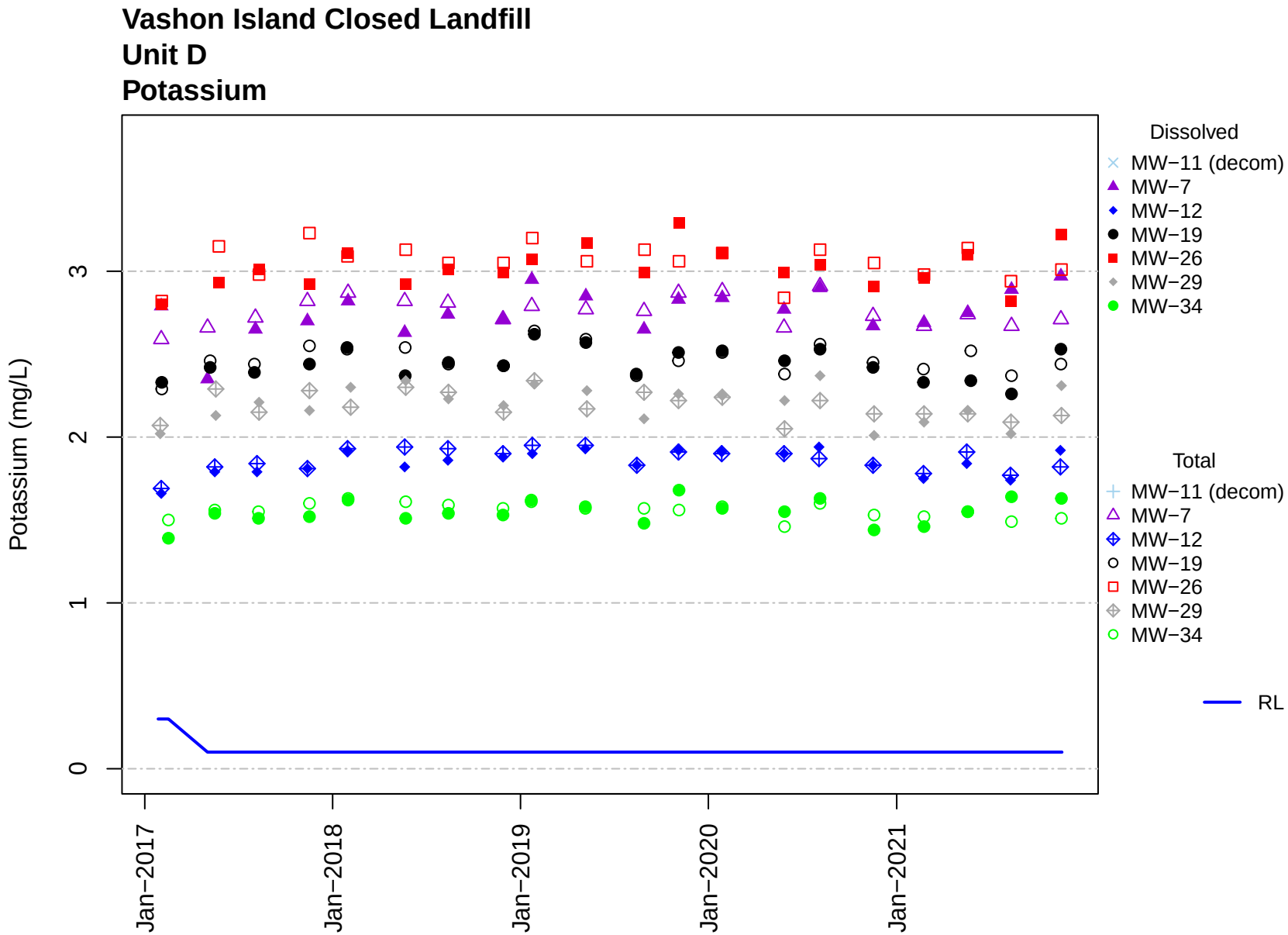

Vashon Island Closed Landfill
Unit D
Magnesium
Magnesium (mg/L)
0
20
40
60
80
100
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

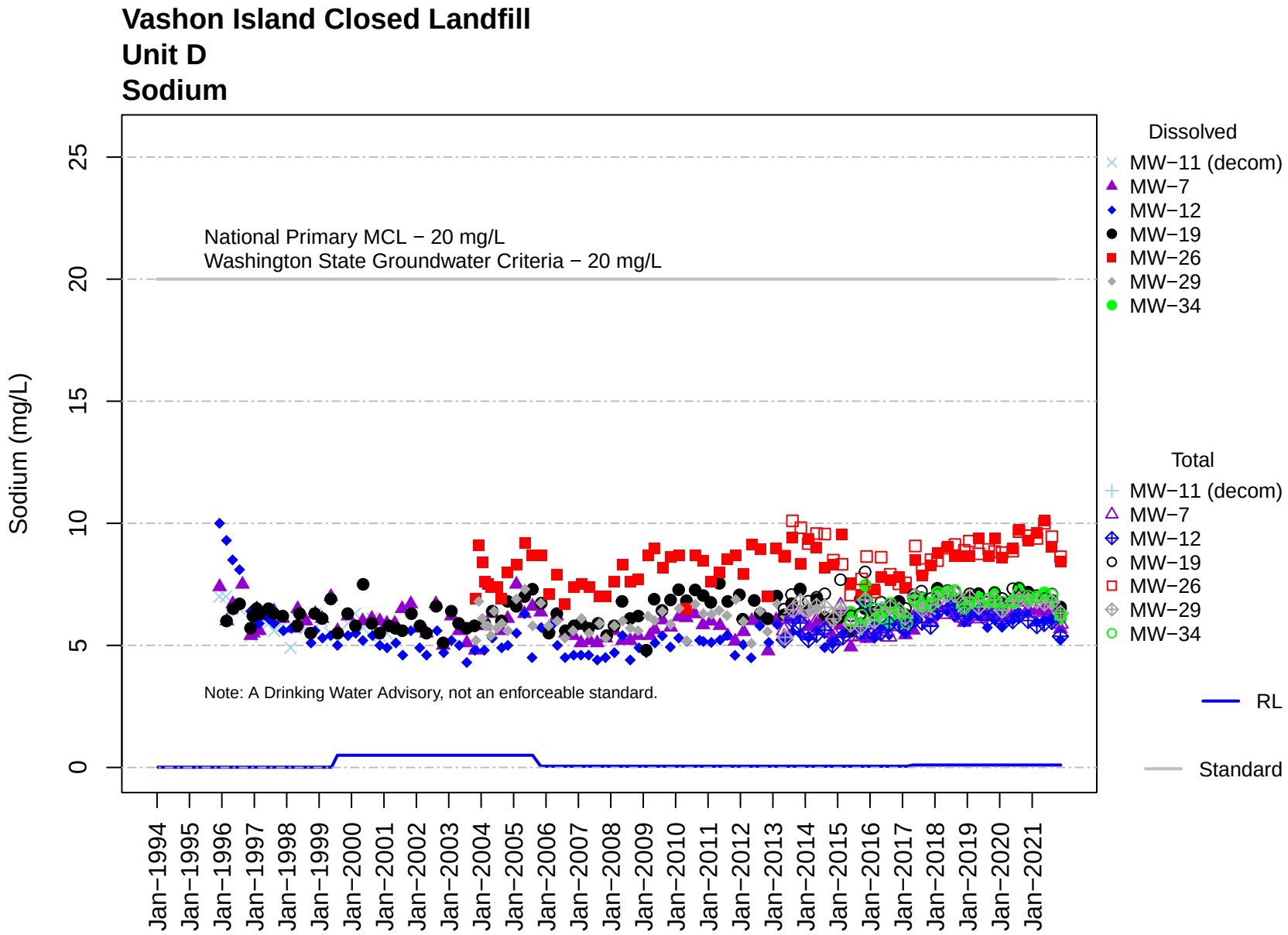

Vashon Island Closed Landfill
Unit D
Magnesium
Magnesium (mg/L)
0
10
20
30
40
50
60
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

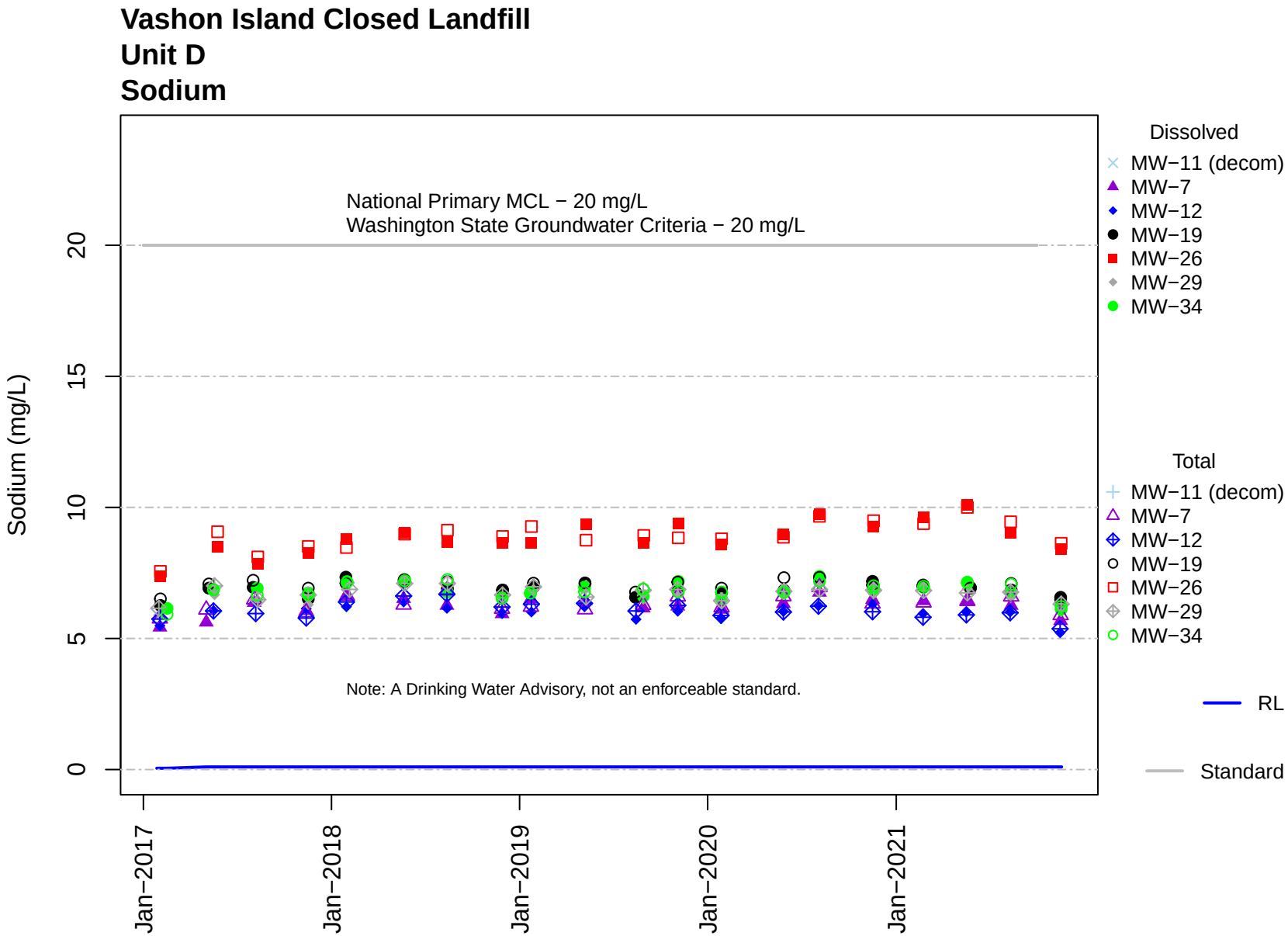

Vashon Island Closed Landfill
Unit D
Manganese
Manganese (mg/L)
0
2
4
6
8
10
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

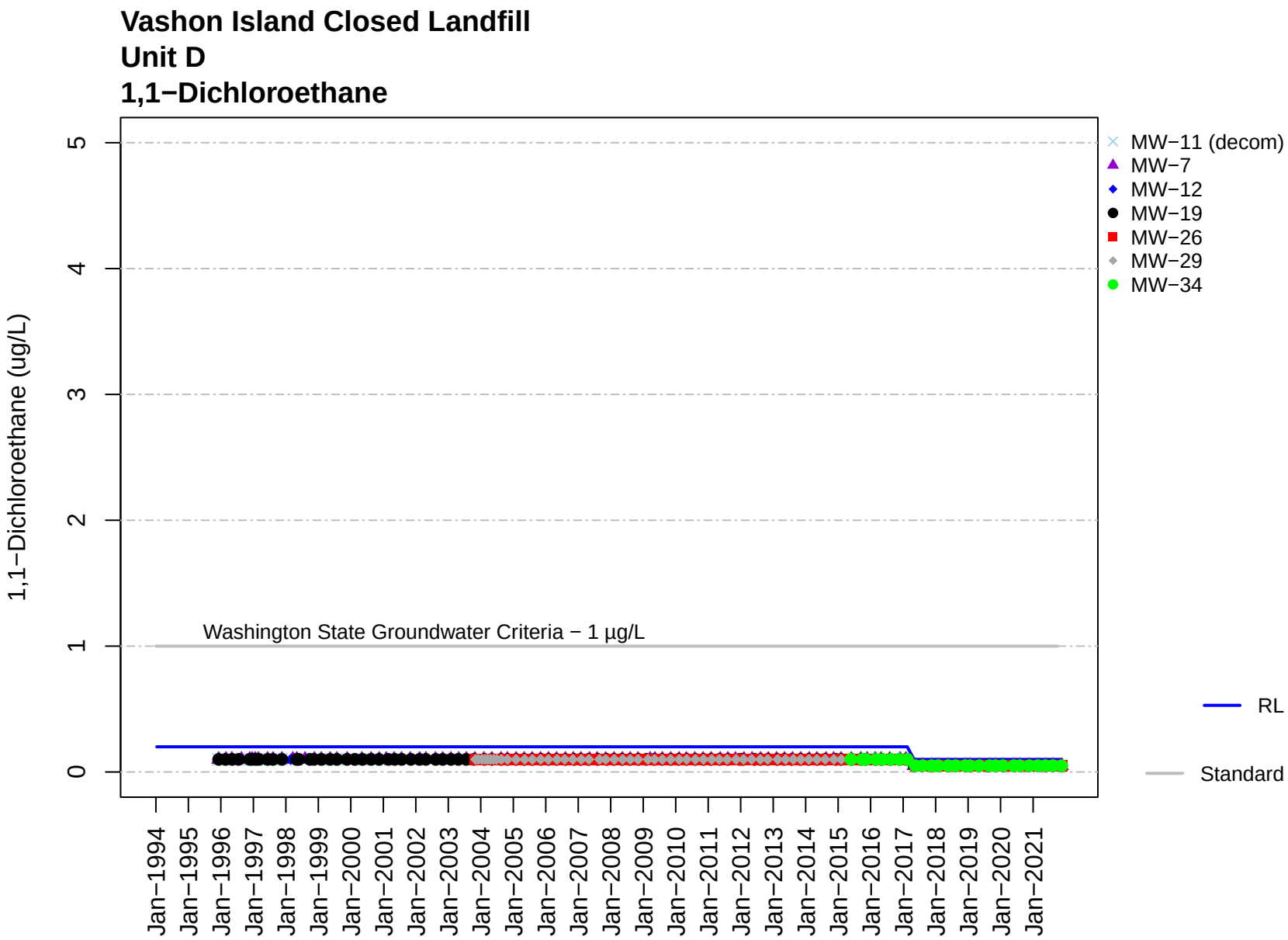

Vashon Island Closed Landfill
Unit D
Manganese
Manganese (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 0.05 mg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

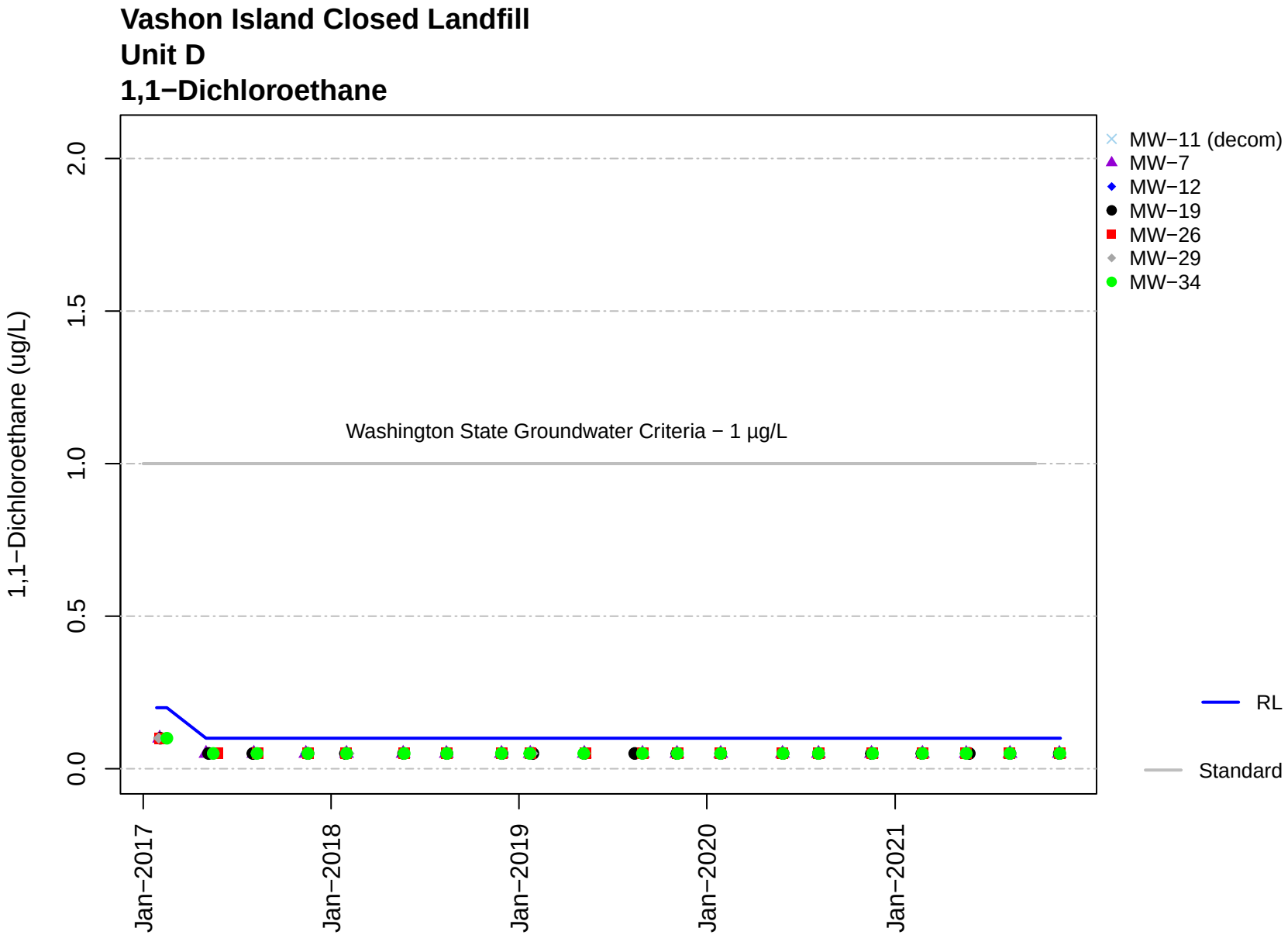

Vashon Island Closed Landfill
Unit D
Potassium
Potassium (mg/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

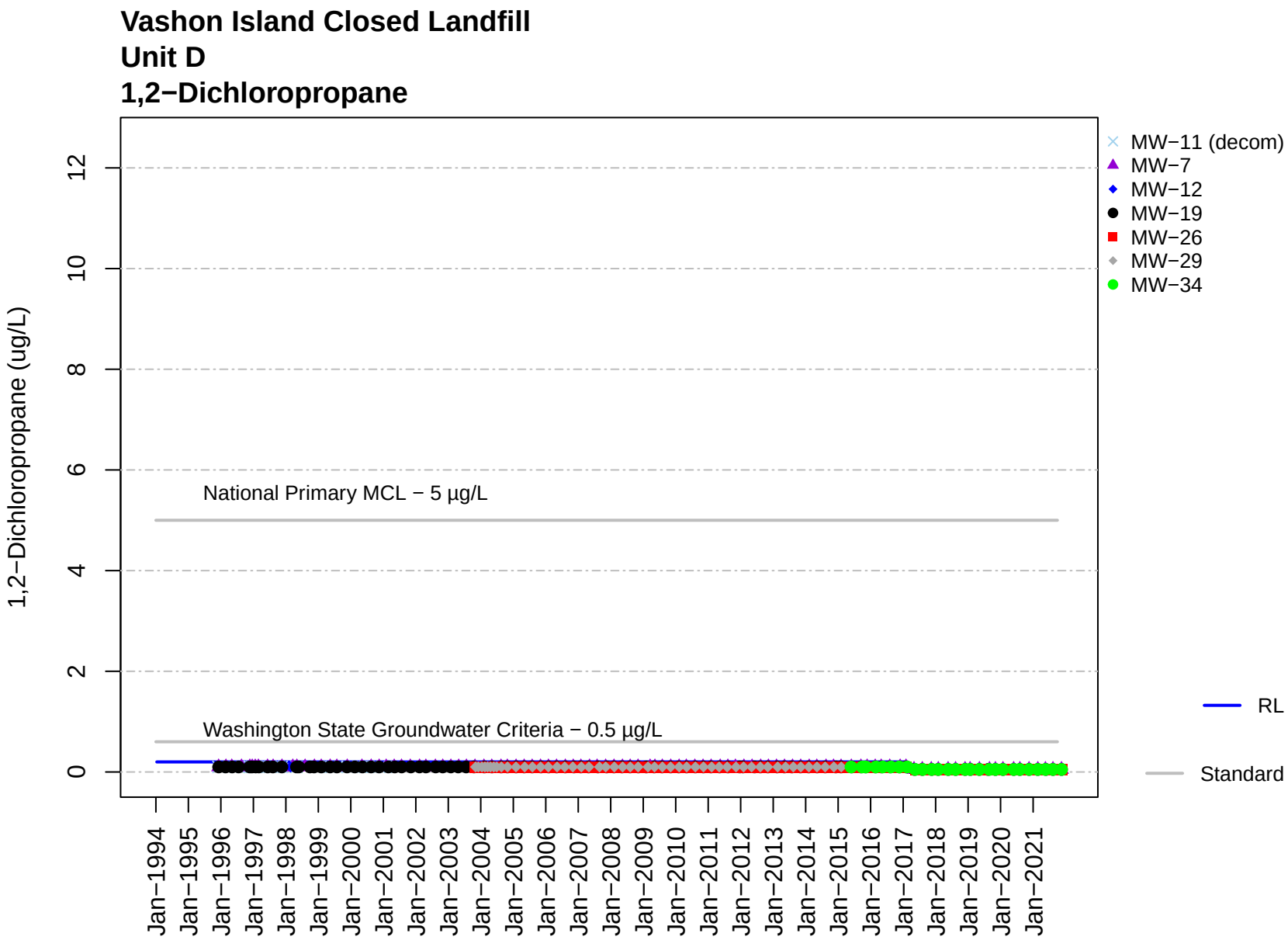

Vashon Island Closed Landfill
Unit D
Potassium
Potassium (mg/L)
0
1
2
3
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

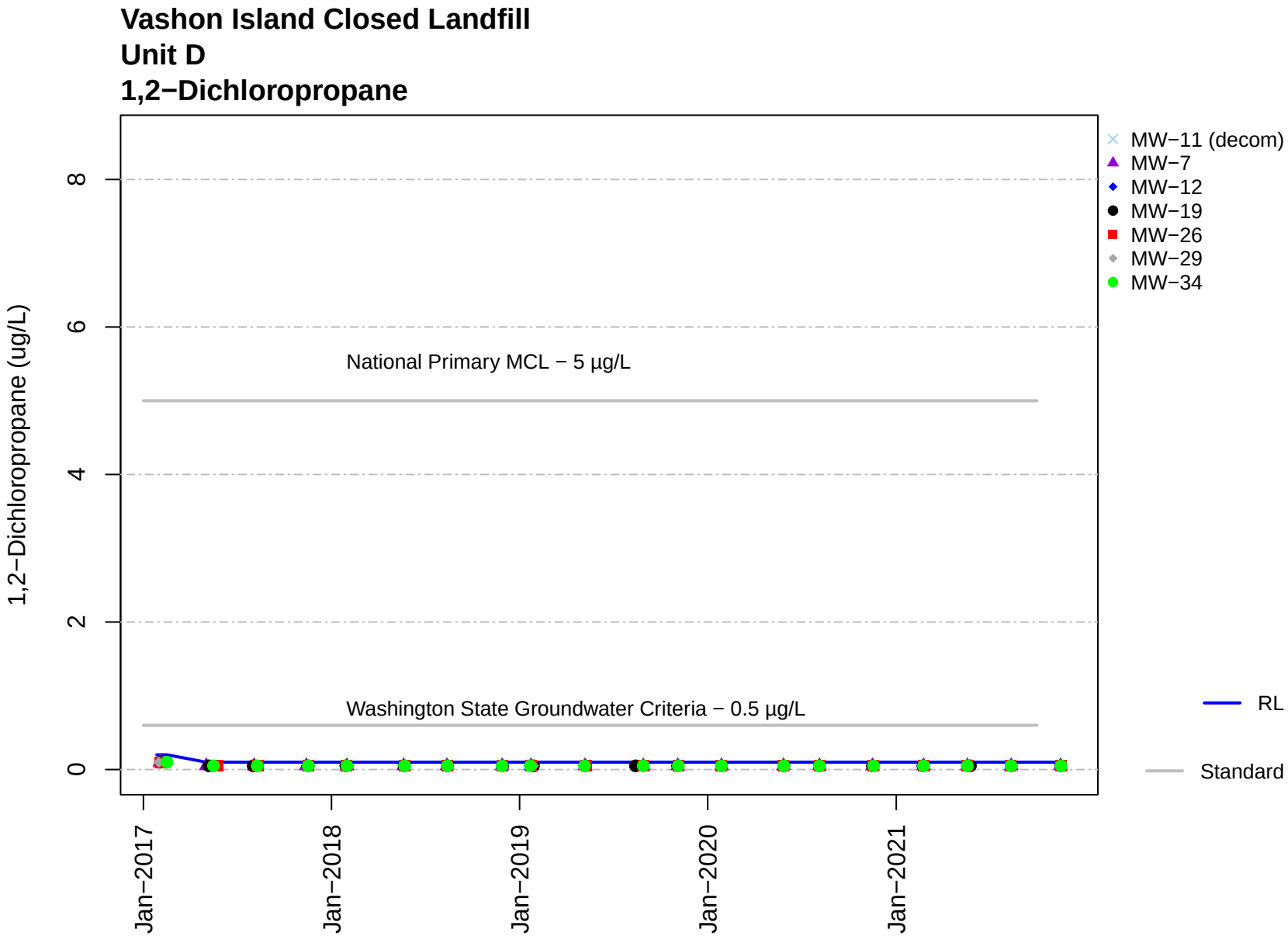

Vashon Island Closed Landfill
Unit D
Sodium
Sodium (mg/L)
0
5
10
15
20
25
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

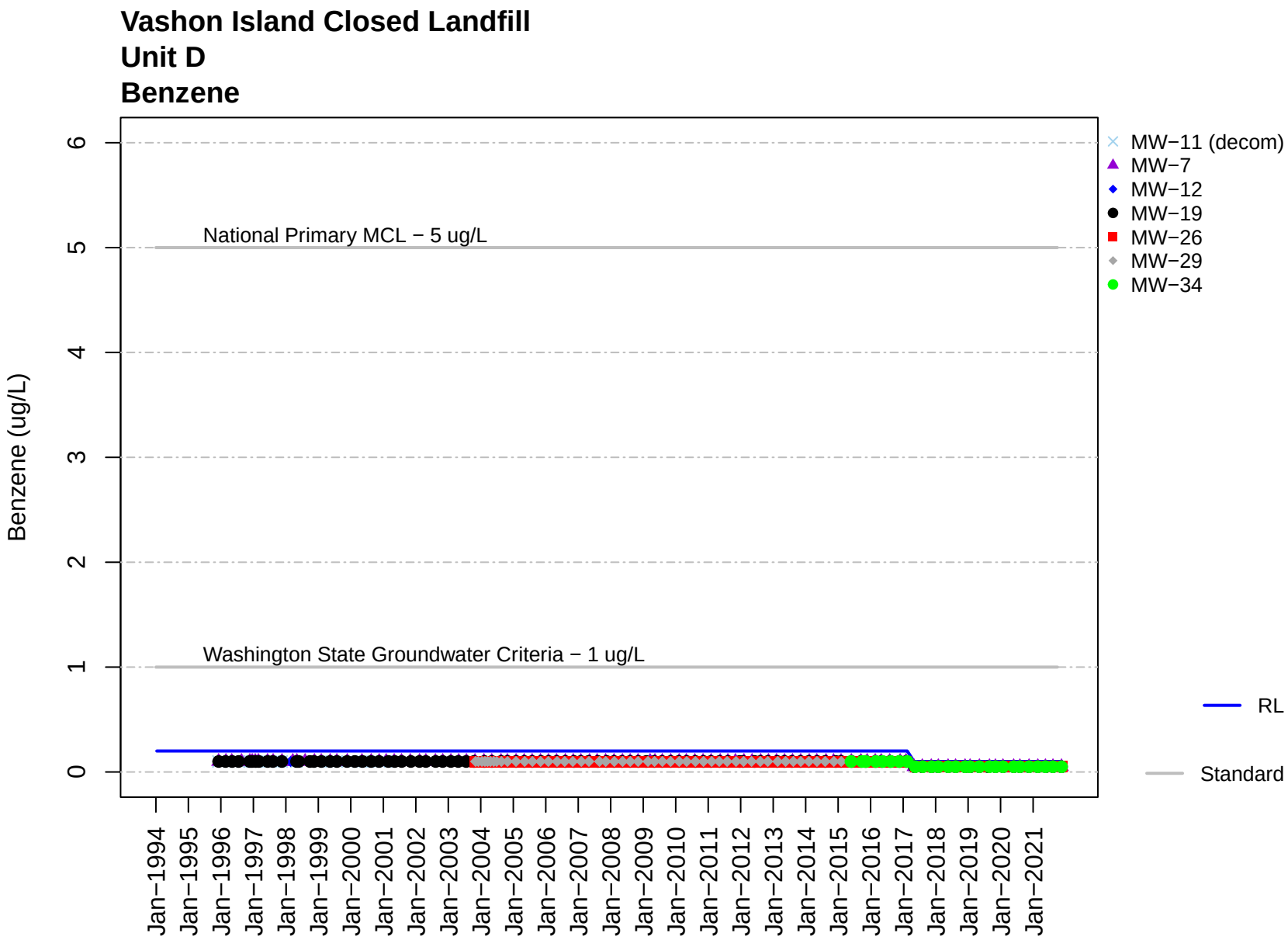

Vashon Island Closed Landfill
Unit D
Sodium
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Sodium (mg/L)
0
5
10
15
20
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

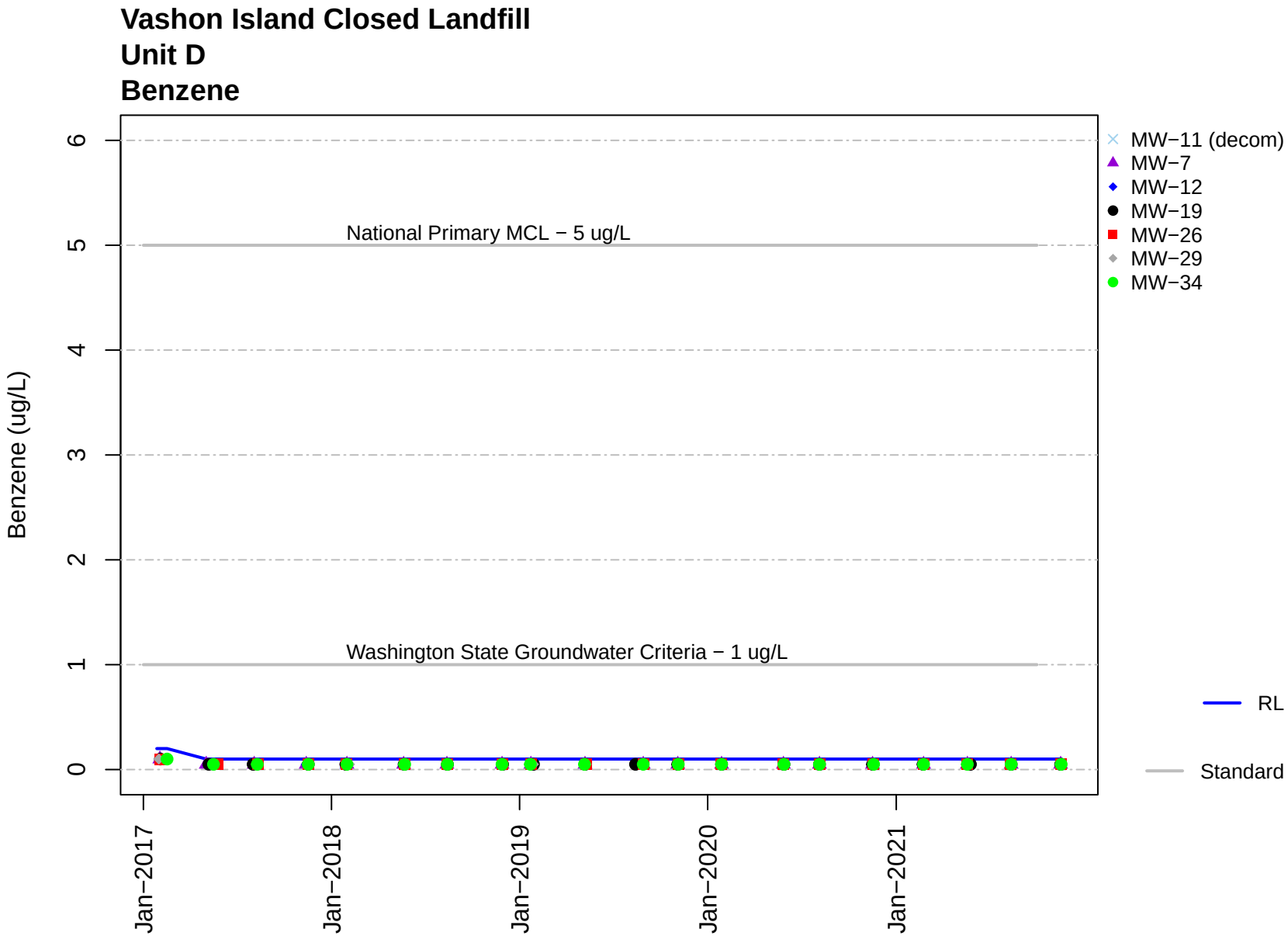

Vashon Island Closed Landfill
Unit D
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0
1
2
3
4
5
Washington State Groundwater Criteria − 1 µg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021

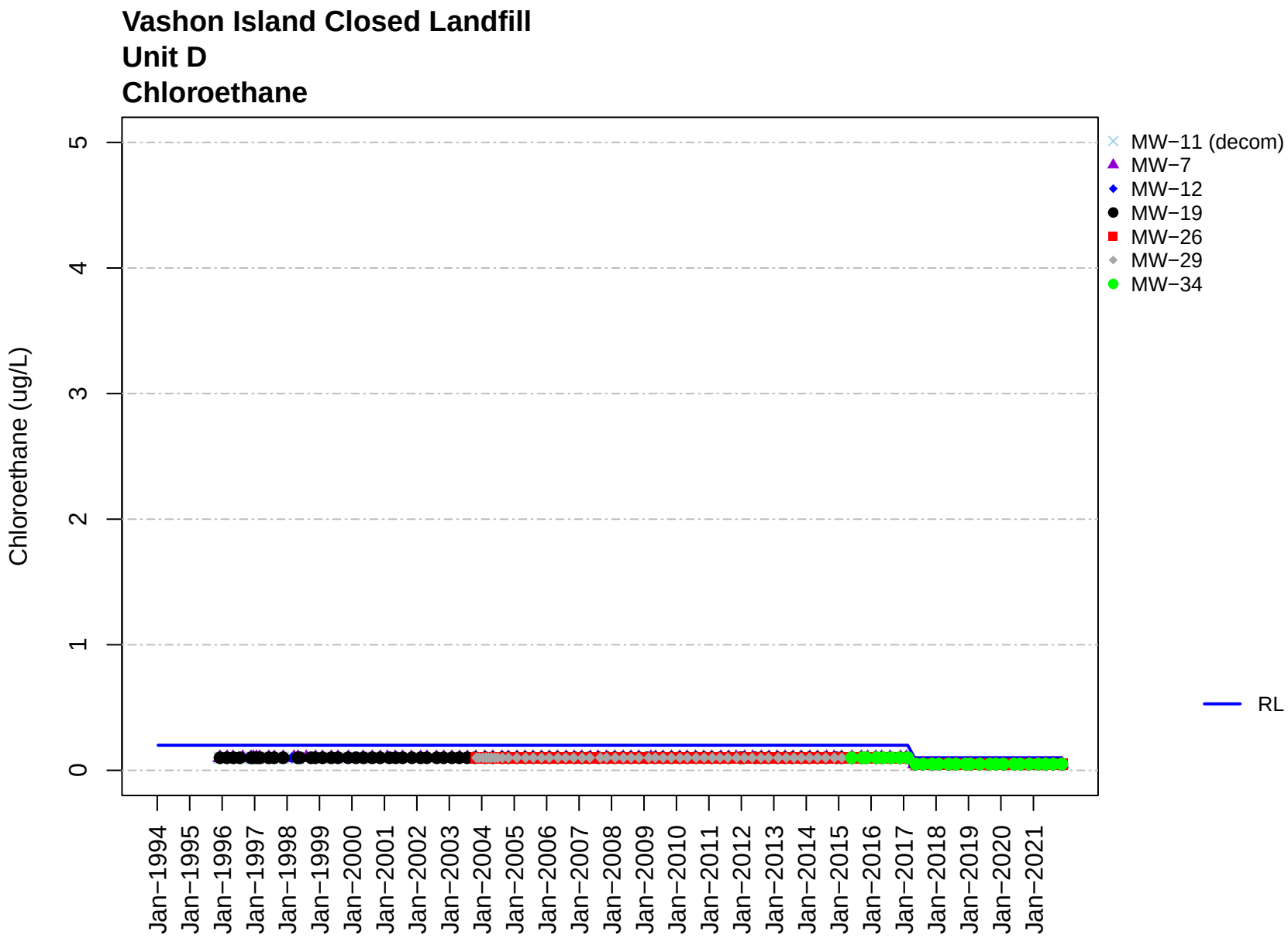

Vashon Island Closed Landfill
Unit D
1,1−Dichloroethane
1,1−Dichloroethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Washington State Groundwater Criteria − 1 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

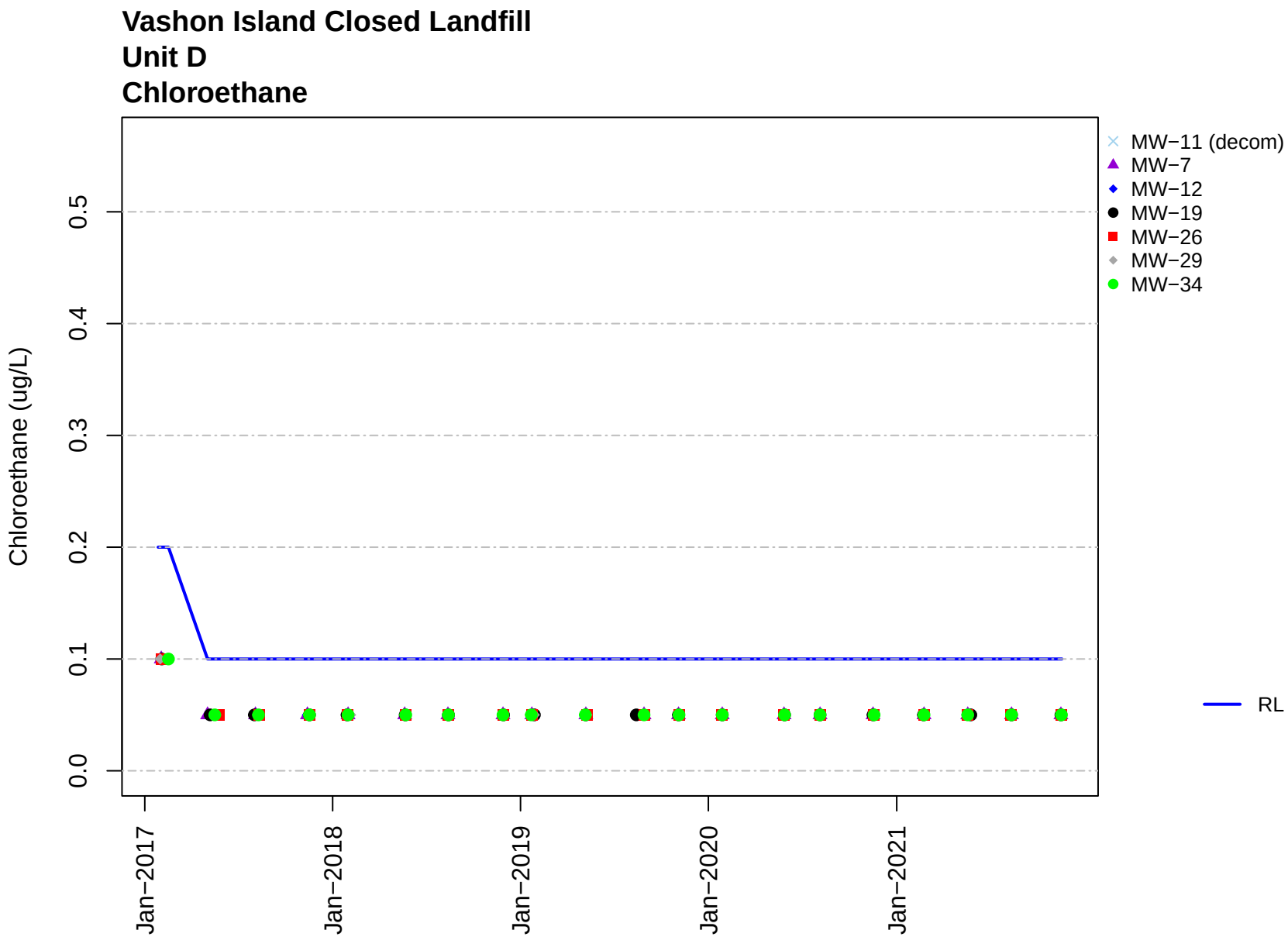

Vashon Island Closed Landfill
Unit D
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
10
12
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

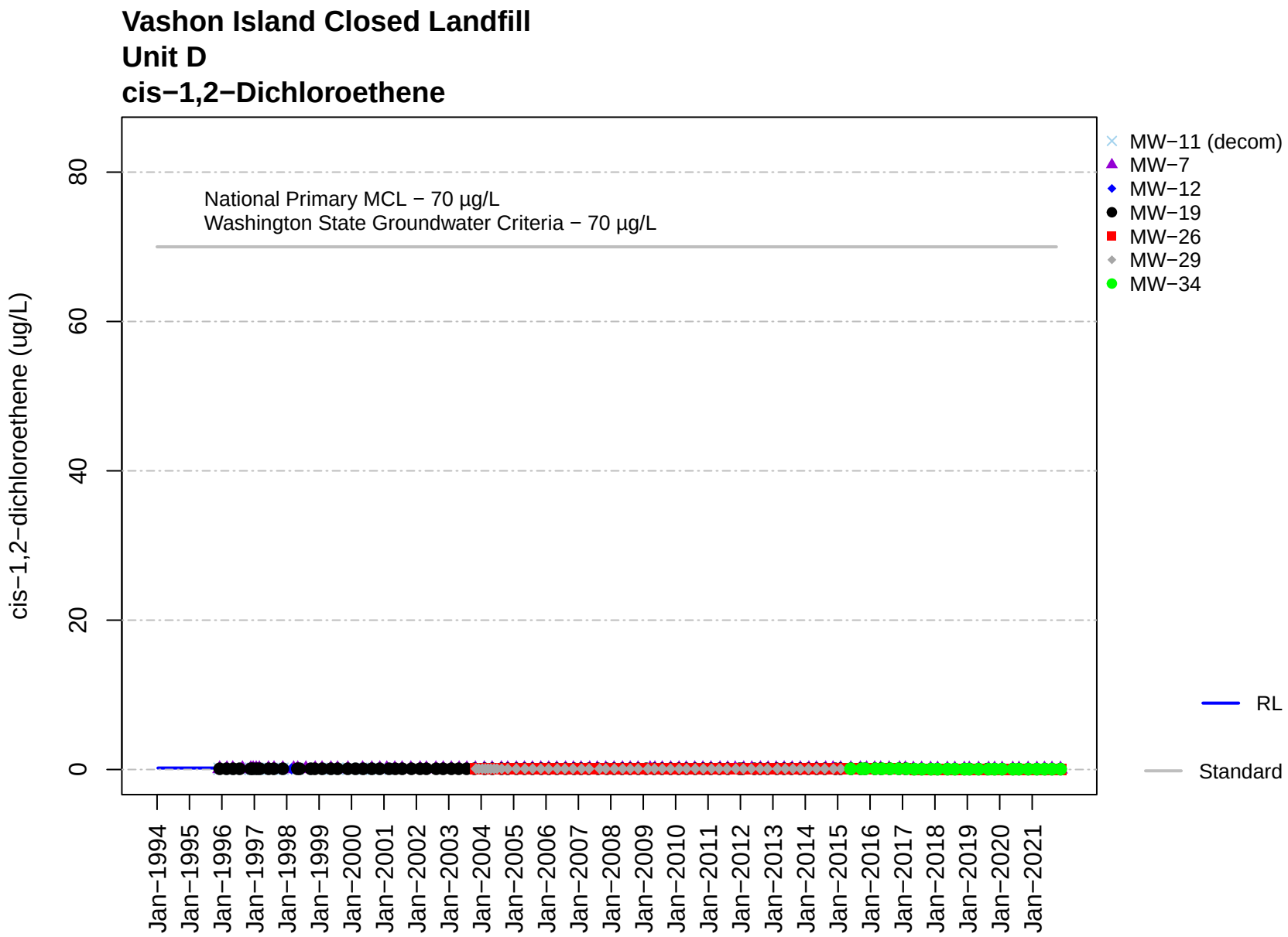

Vashon Island Closed Landfill
Unit D
1,2−Dichloropropane
1,2−Dichloropropane (ug/L)
0
2
4
6
8
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

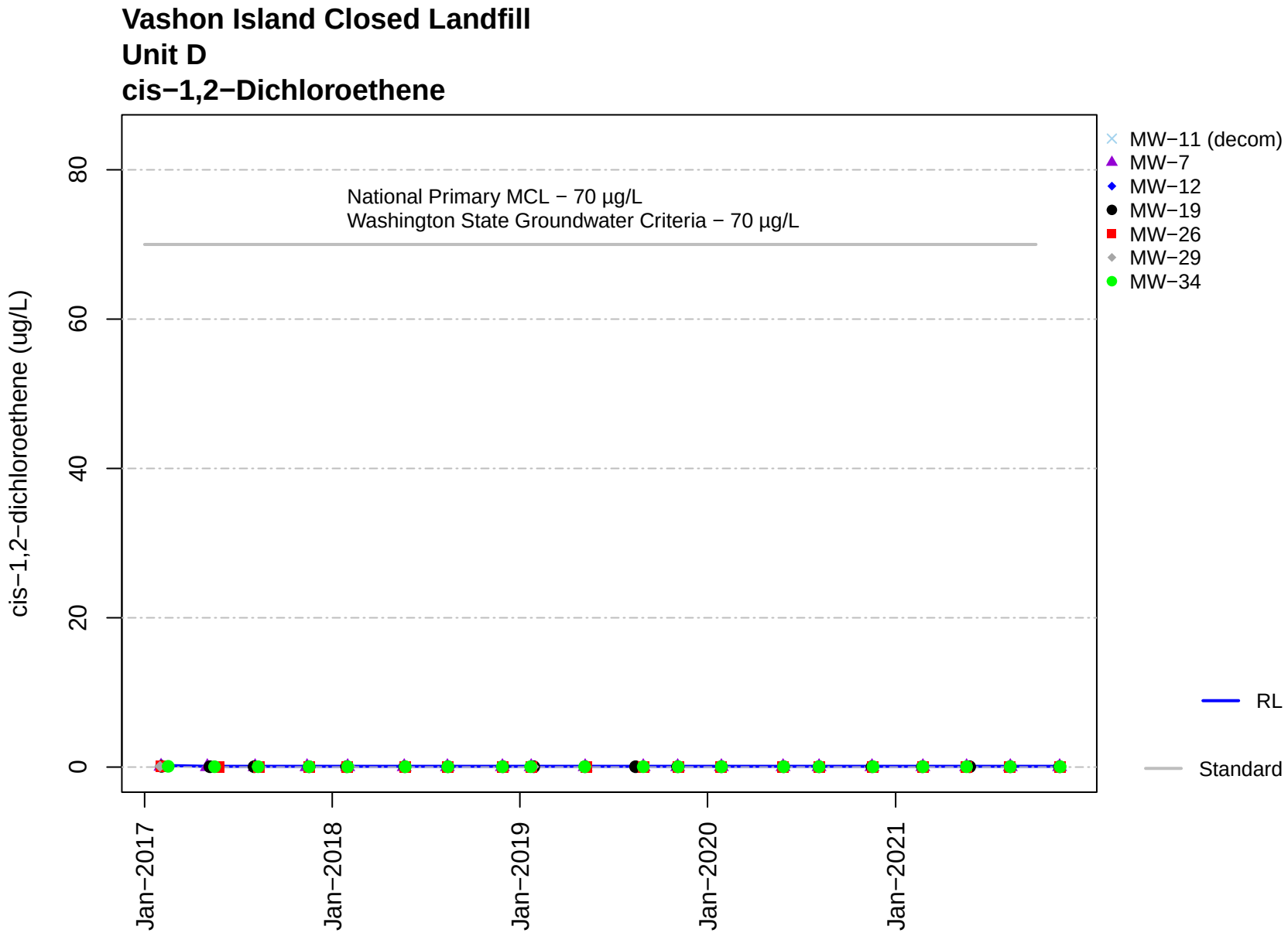

Vashon Island Closed Landfill
Unit D
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

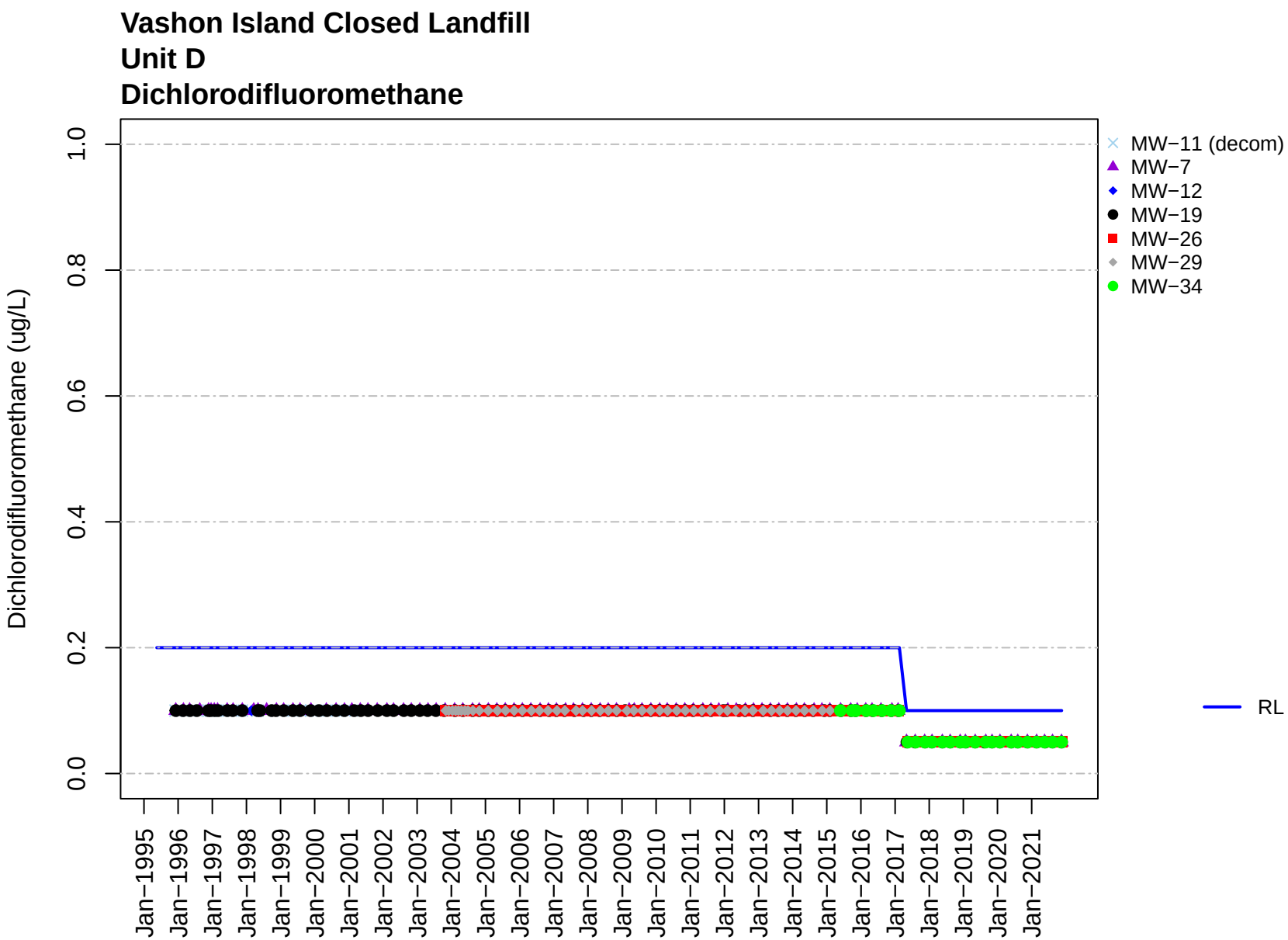

Vashon Island Closed Landfill
Unit D
Benzene
Benzene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

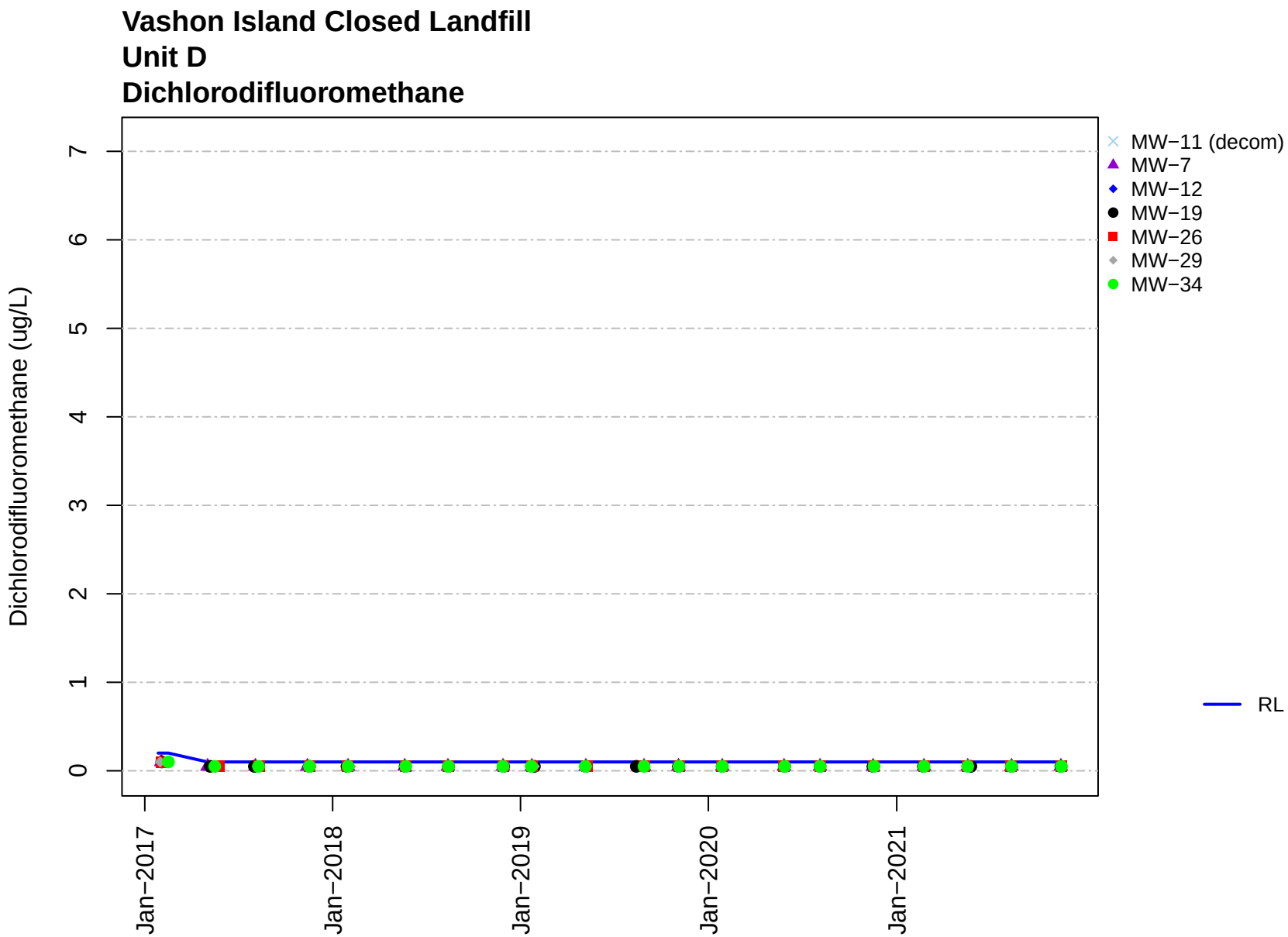

Vashon Island Closed Landfill
Unit D
Chloroethane
Chloroethane (ug/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

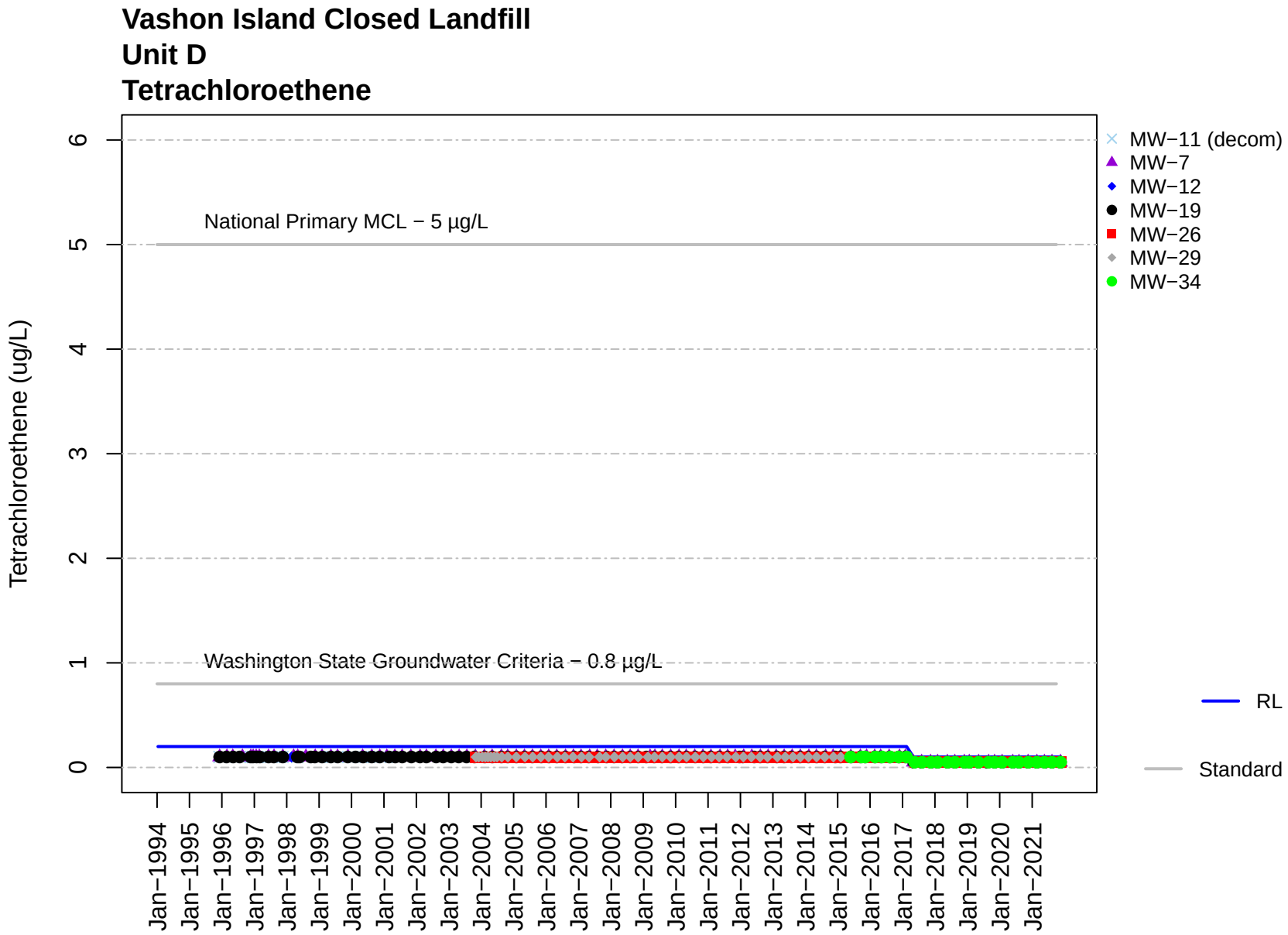

Vashon Island Closed Landfill
Unit D
Chloroethane
Chloroethane (ug/L)
0.0
0.1
0.2
0.3
0.4
0.5
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

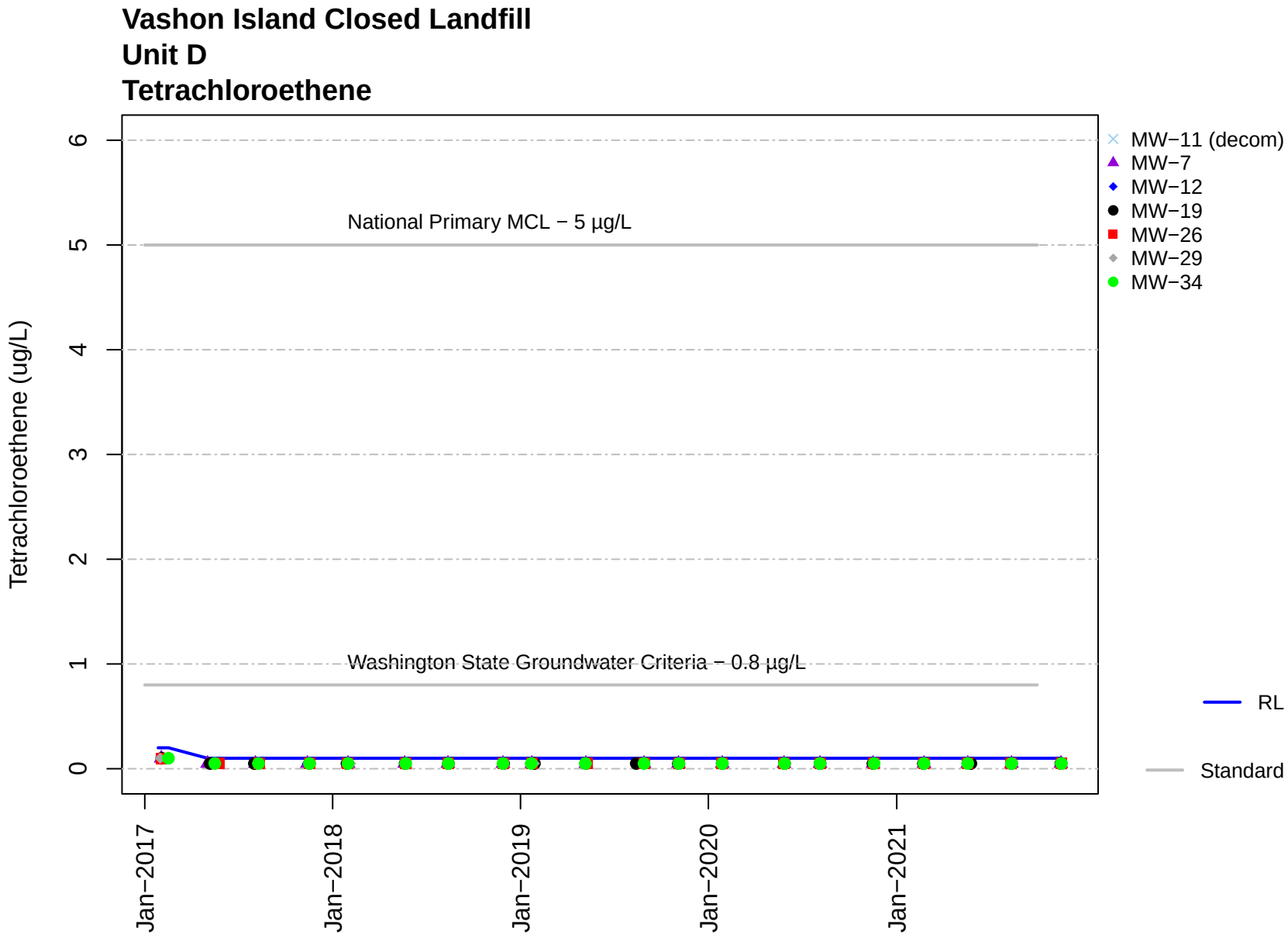

Vashon Island Closed Landfill
Unit D
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

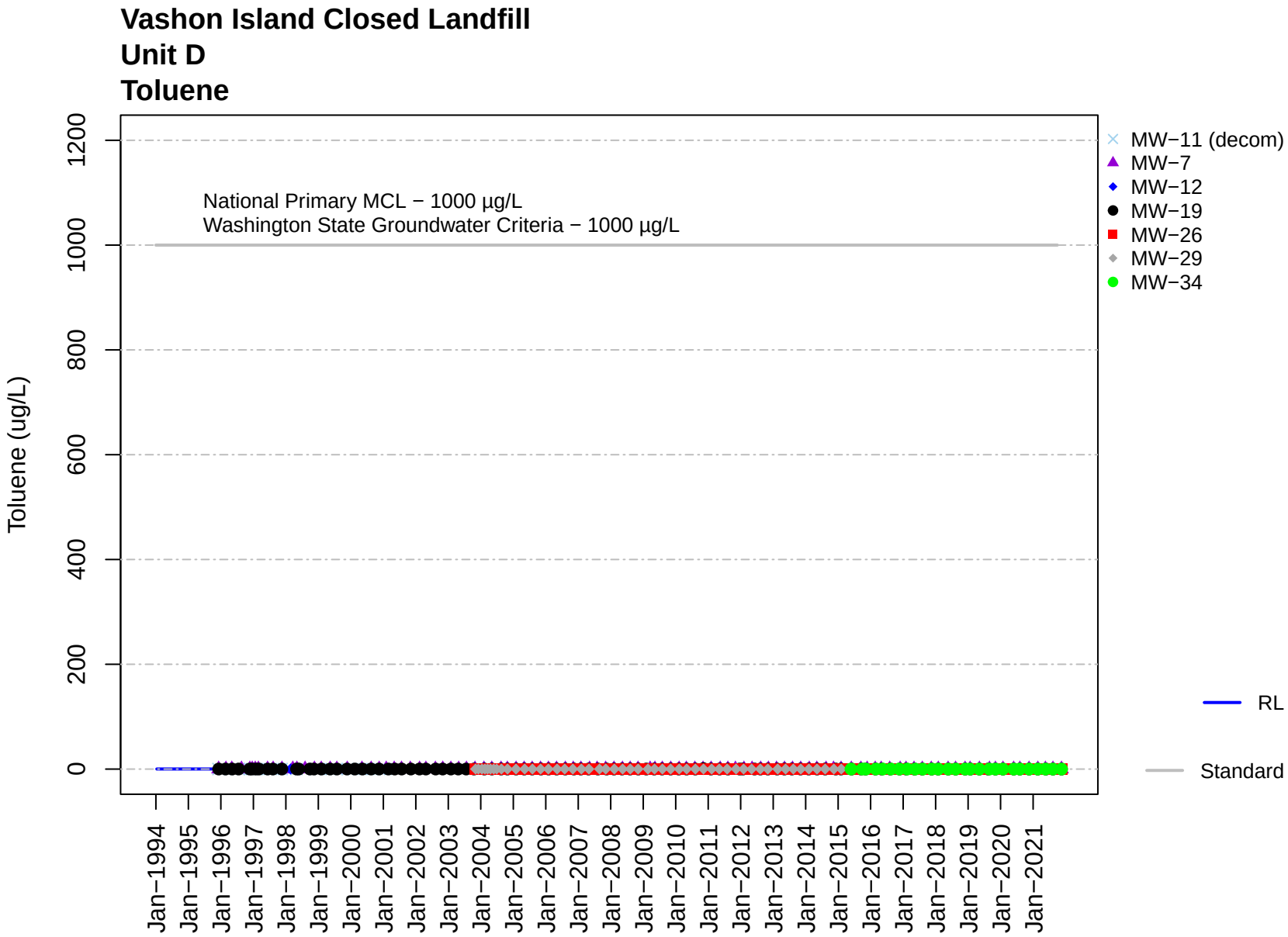

Vashon Island Closed Landfill
Unit D
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0
20
40
60
80
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

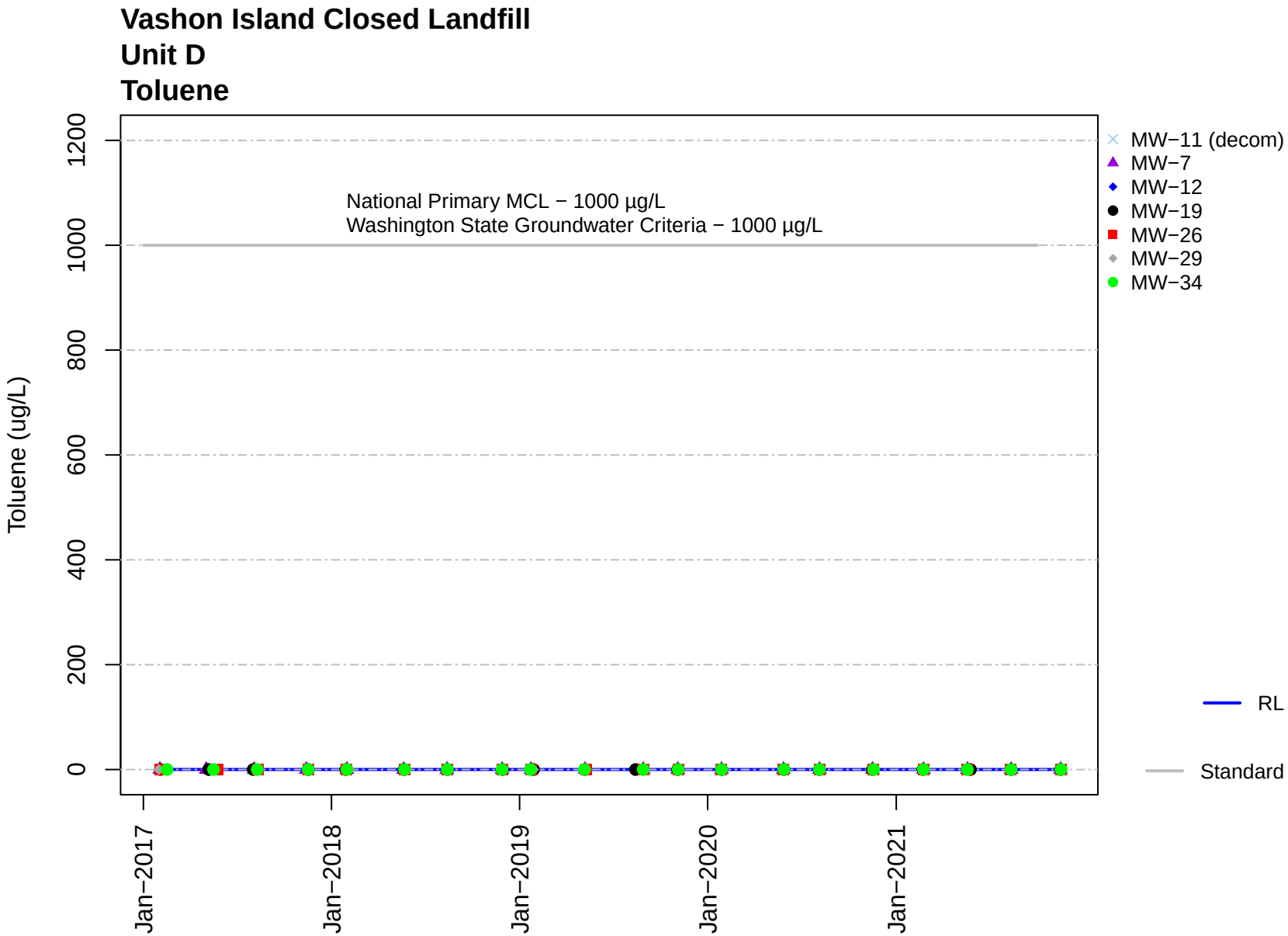

Vashon Island Closed Landfill
Unit D
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0.0
0.2
0.4
0.6
0.8
1.0
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

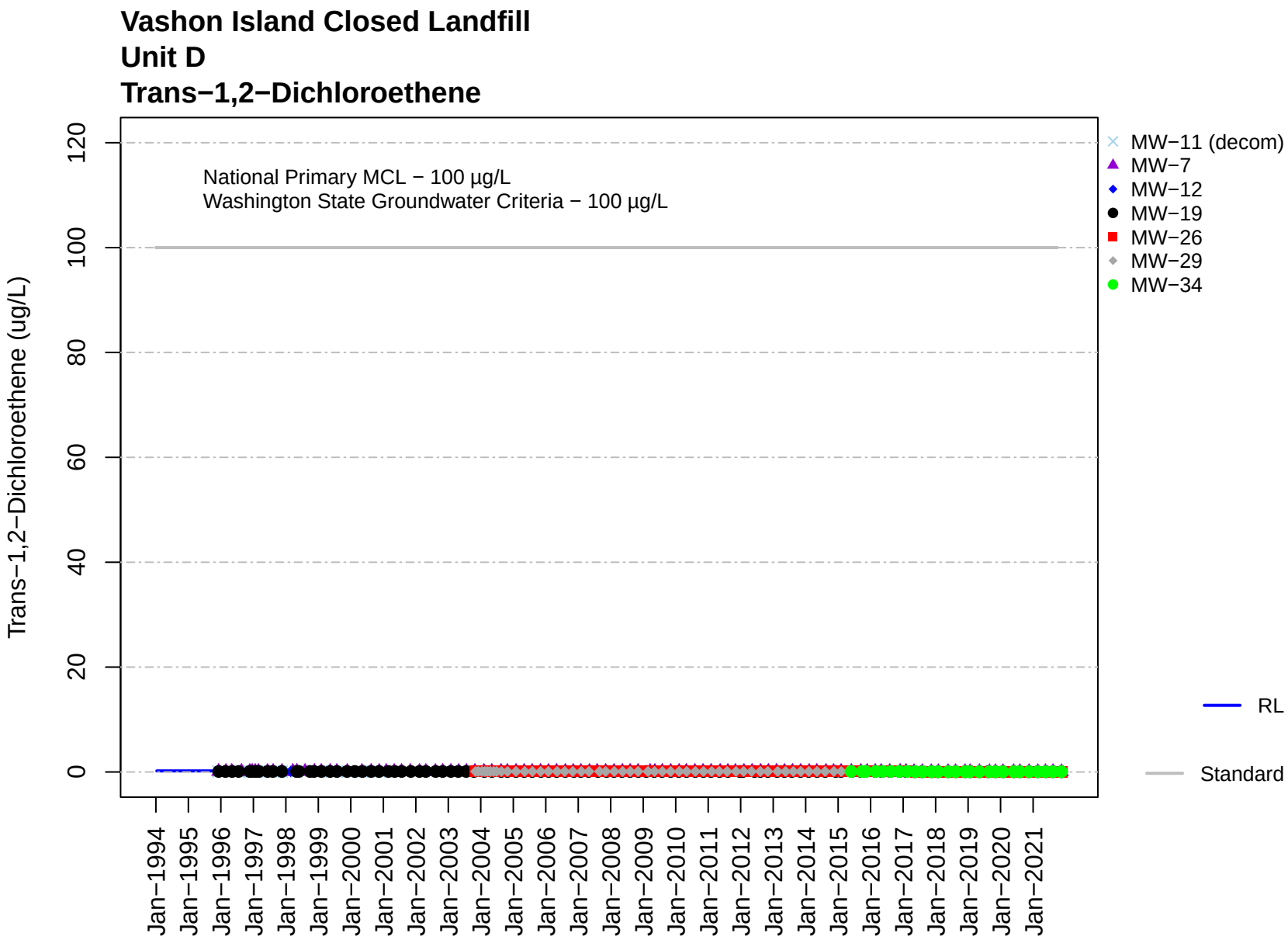

Vashon Island Closed Landfill
Unit D
Dichlorodifluoromethane
Dichlorodifluoromethane (ug/L)
0
1
2
3
4
5
6
7
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

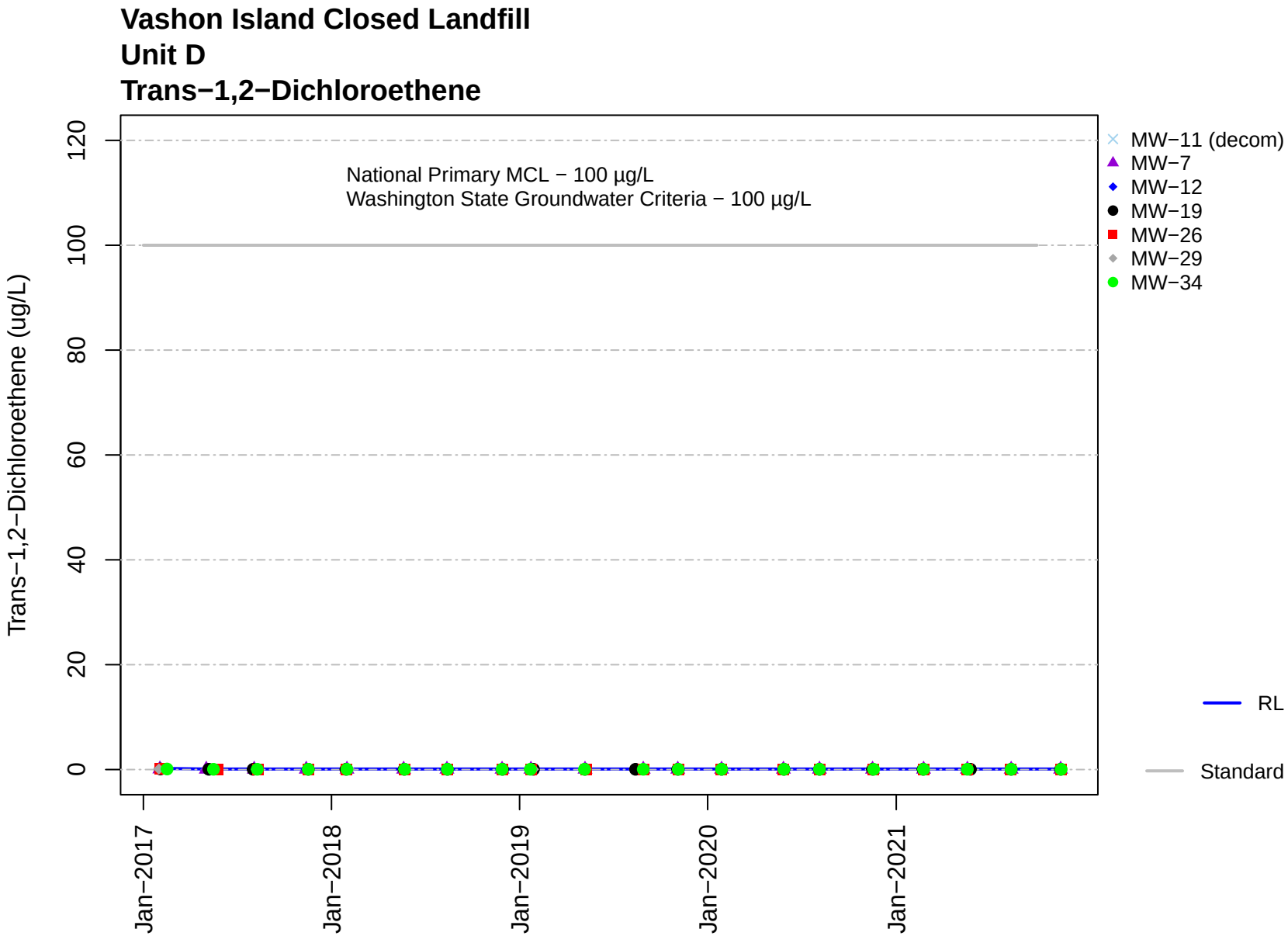

Vashon Island Closed Landfill
Unit D
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

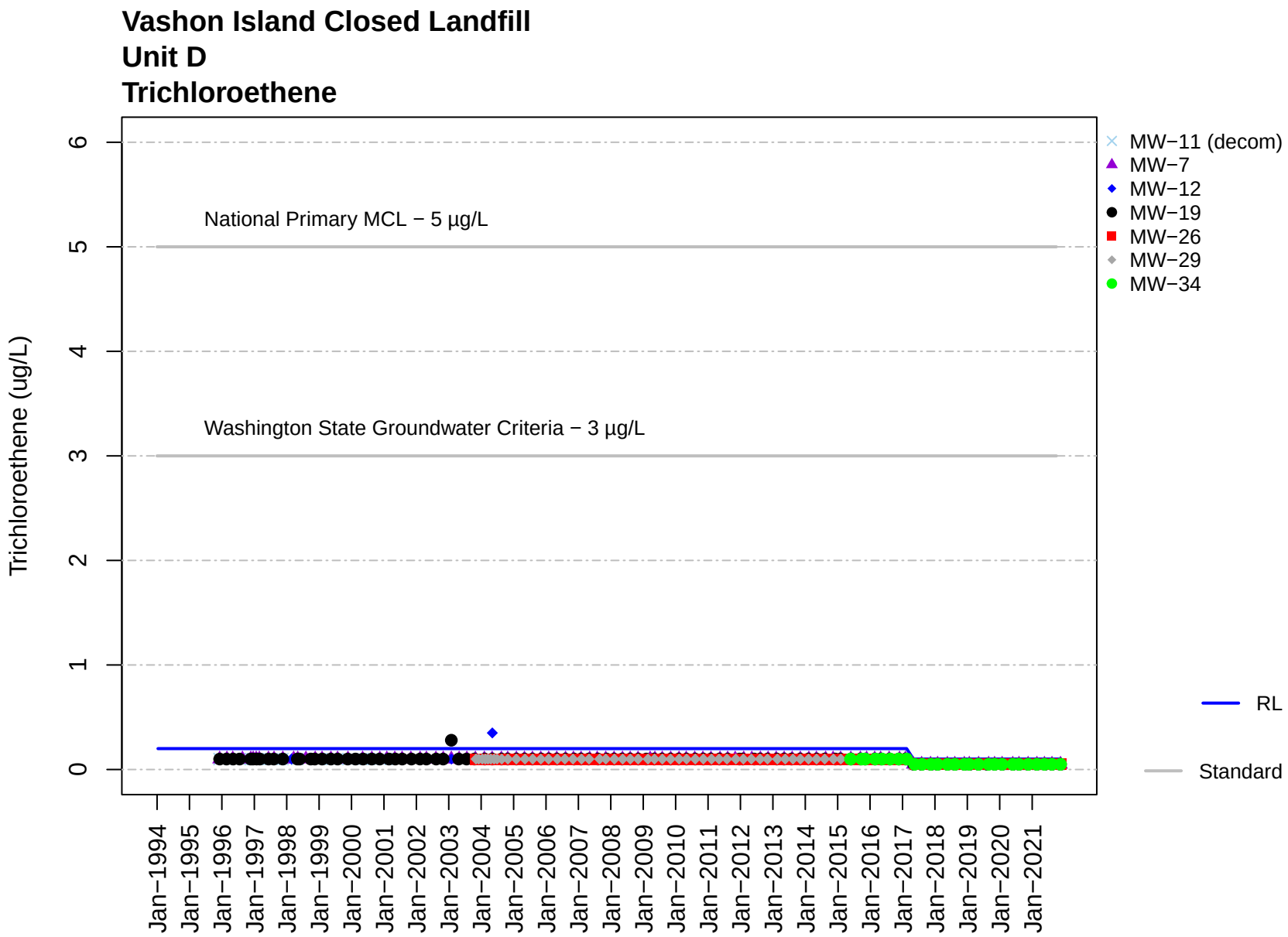

Vashon Island Closed Landfill
Unit D
Tetrachloroethene
Tetrachloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

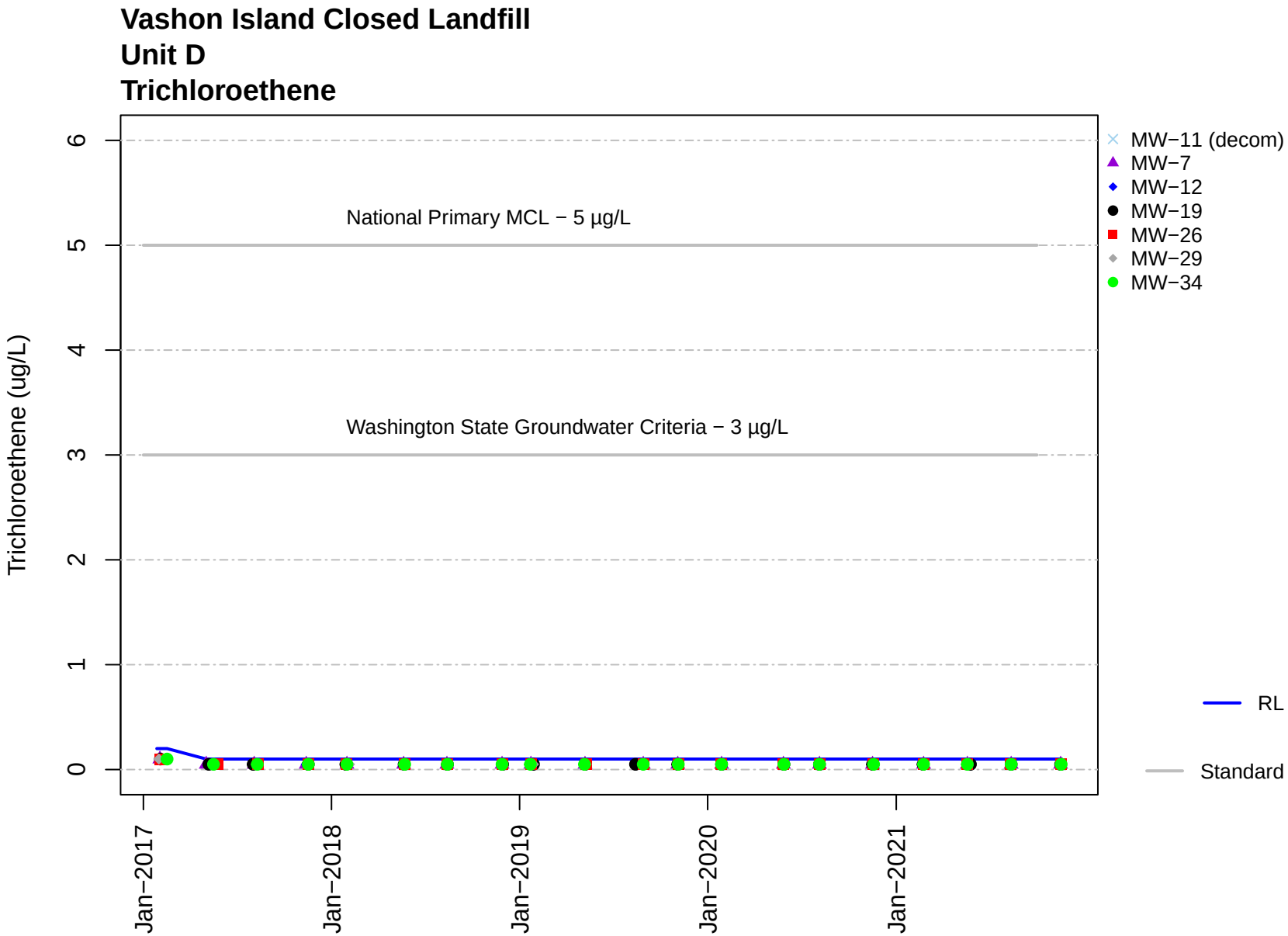

Vashon Island Closed Landfill
Unit D
Toluene
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Toluene (ug/L)
0
200
400
600
800
1000
1200
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

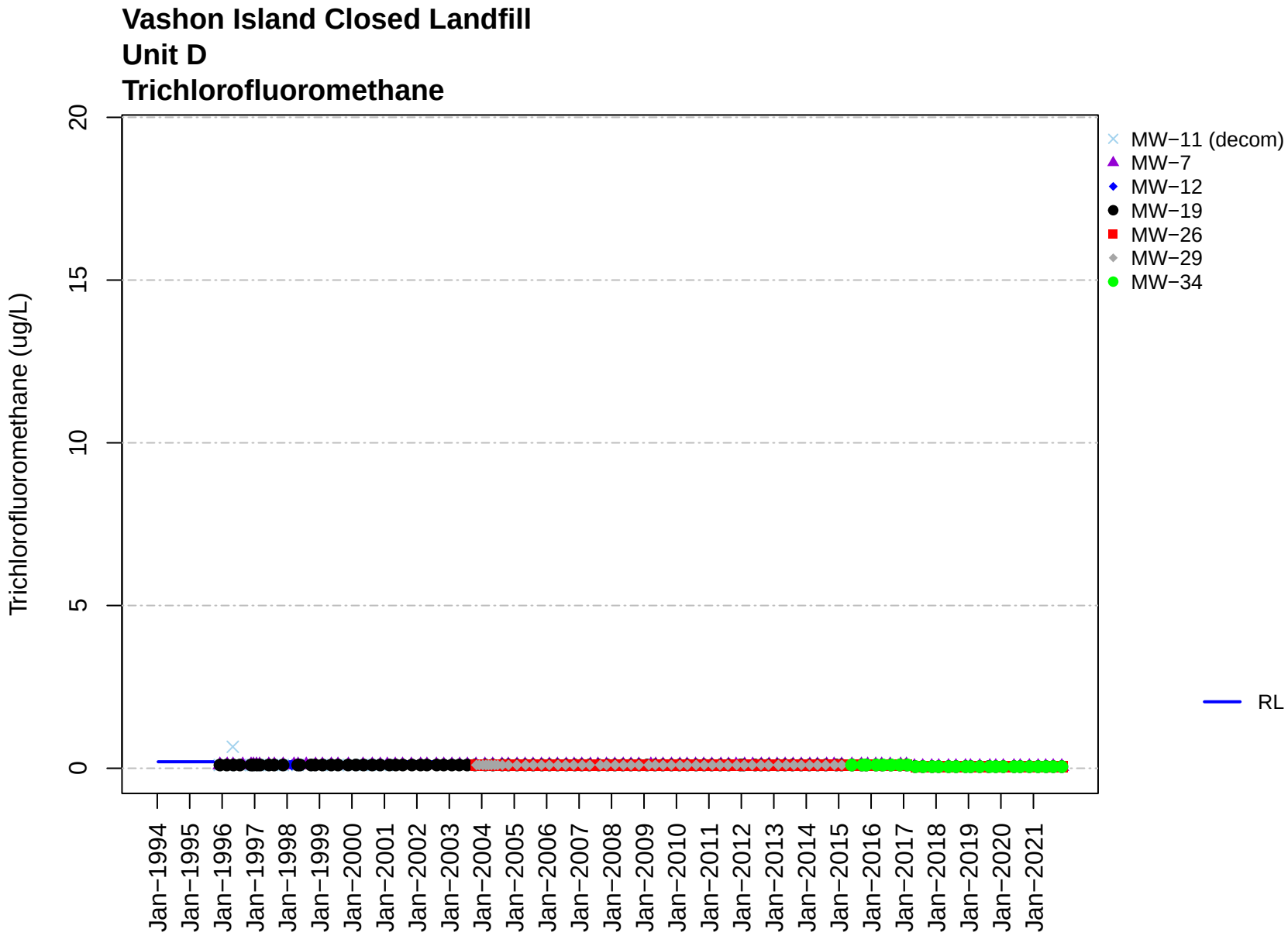

Vashon Island Closed Landfill
Unit D
Toluene
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Toluene (ug/L)
0
200
400
600
800
1000
1200
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

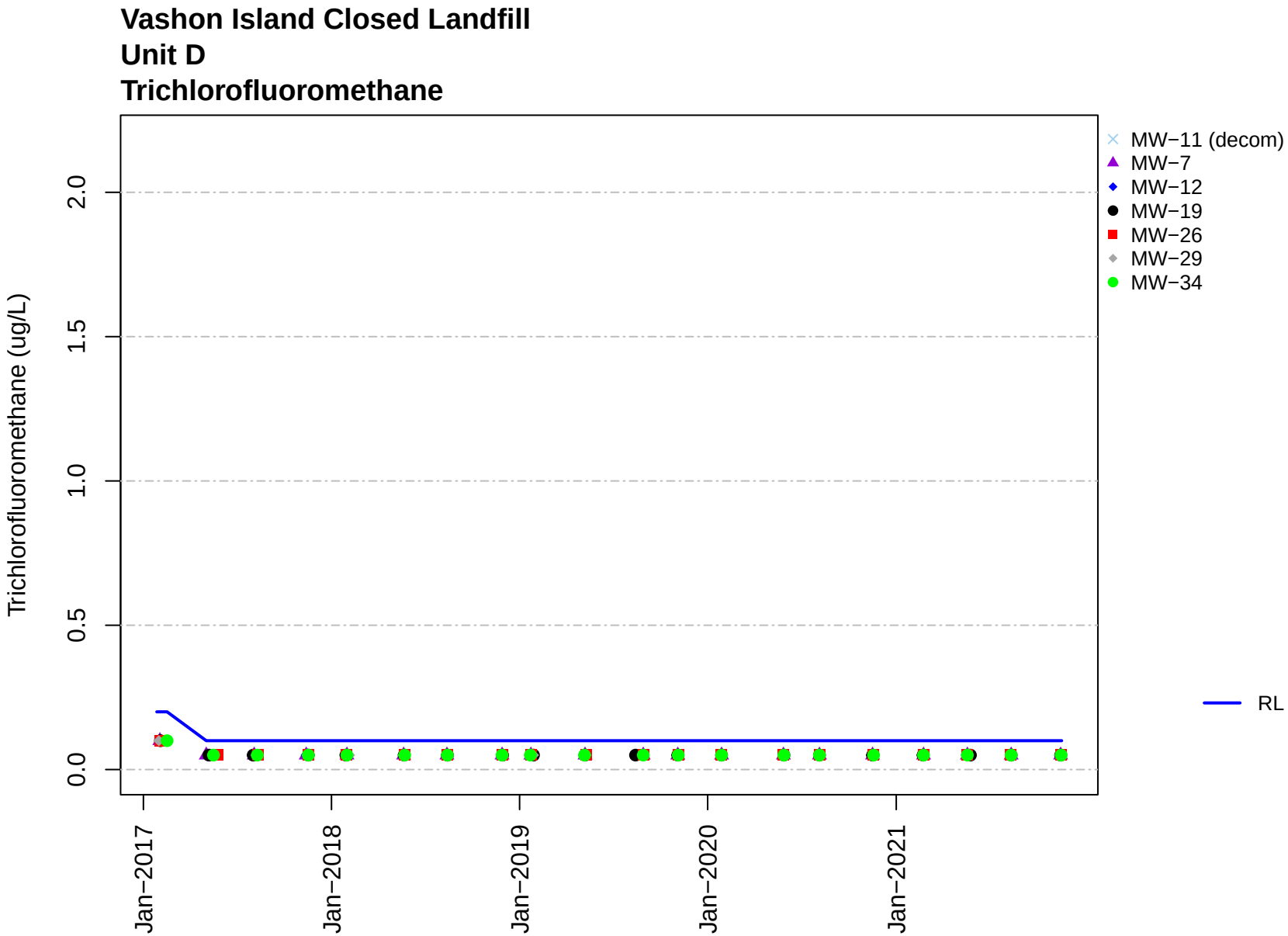

Vashon Island Closed Landfill
Unit D
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

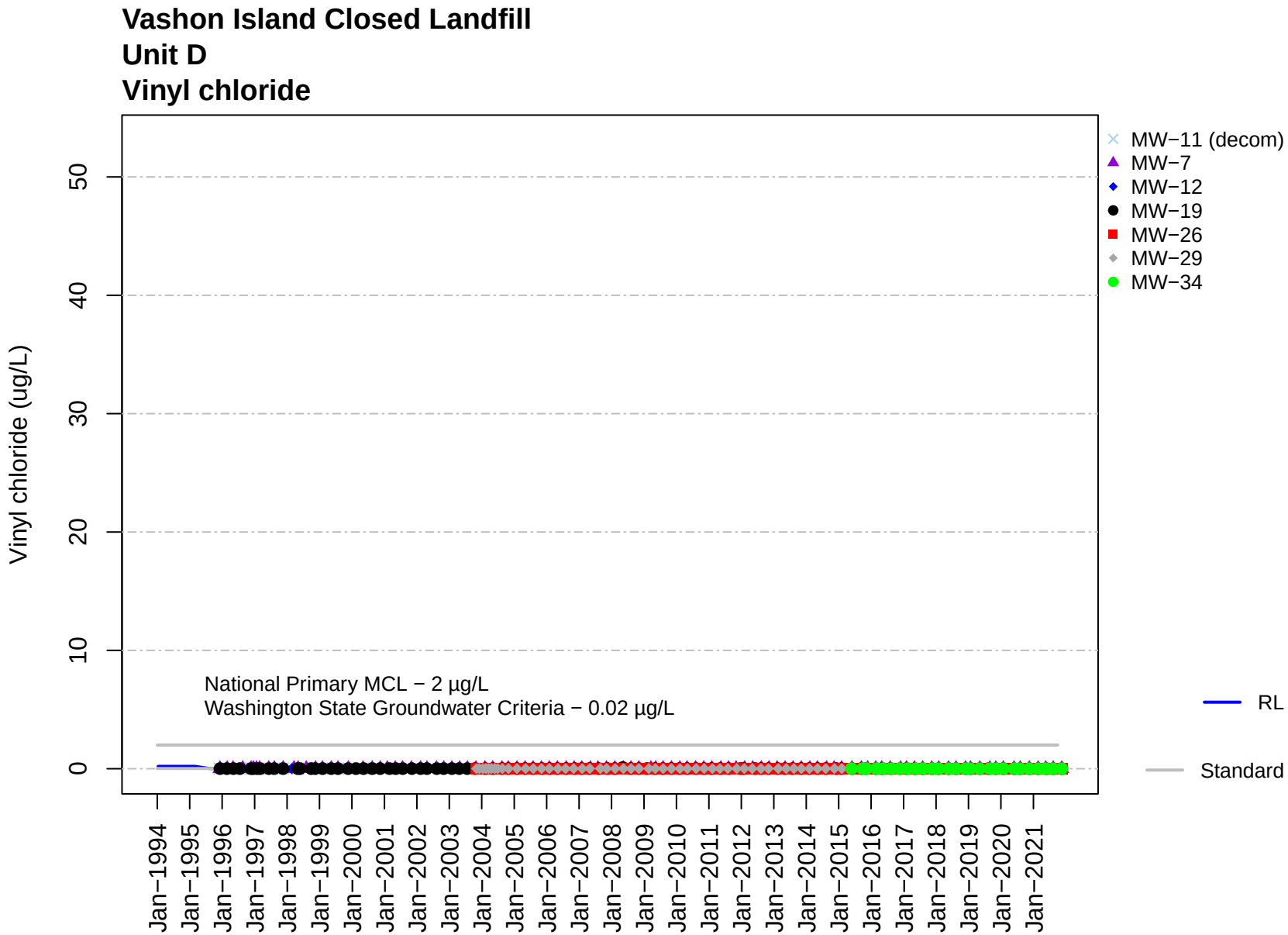

Vashon Island Closed Landfill
Unit D
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0
20
40
60
80
100
120
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

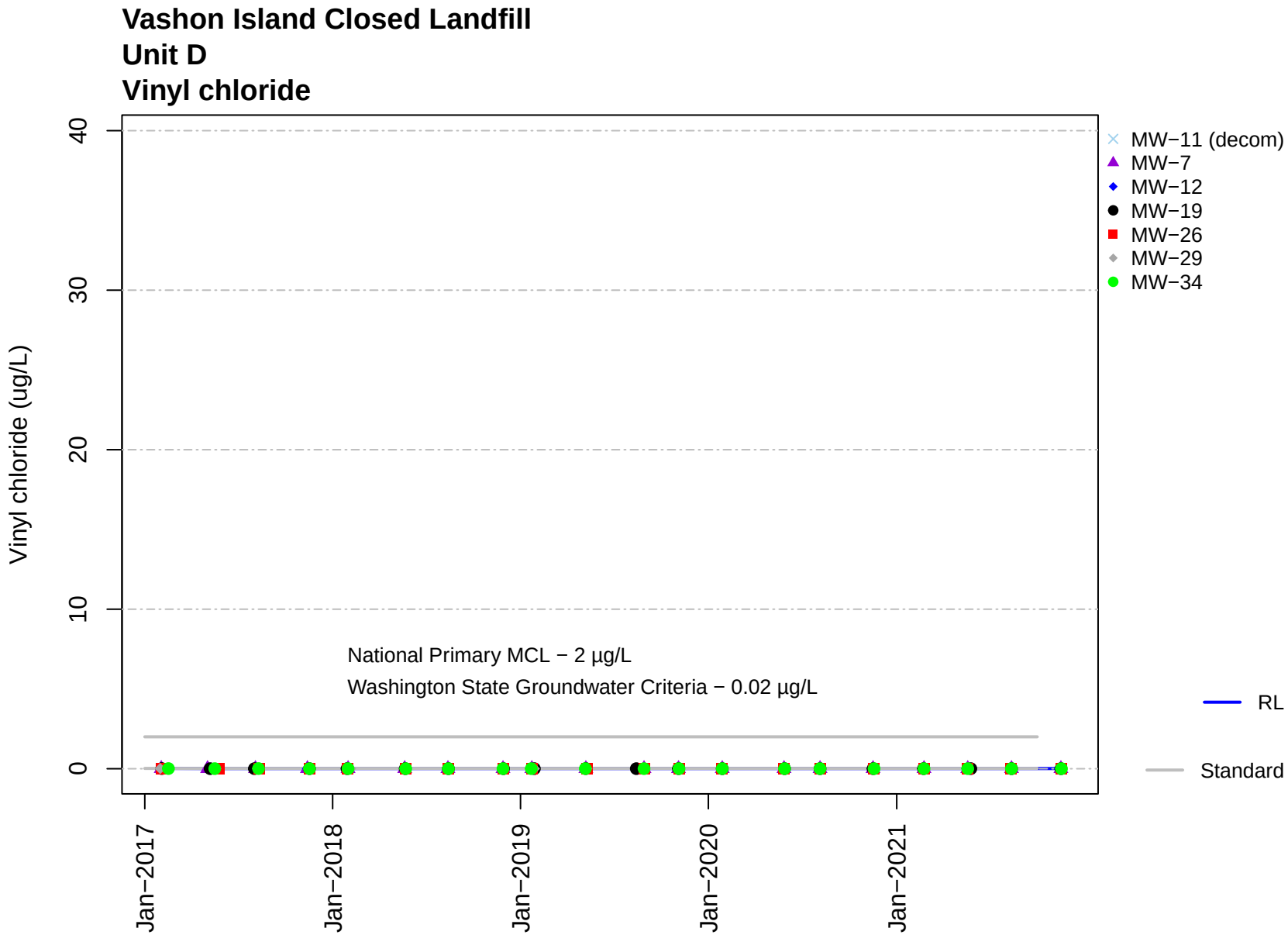

Vashon Island Closed Landfill
Unit D
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard


Vashon Island Closed Landfill
Unit D
Trichloroethene
Trichloroethene (ug/L)
0
1
2
3
4
5
6
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard


Vashon Island Closed Landfill
Unit D
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0
5
10
15
20
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL


Vashon Island Closed Landfill
Unit D
Trichlorofluoromethane
Trichlorofluoromethane (ug/L)
0.0
0.5
1.0
1.5
2.0
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL


Vashon Island Closed Landfill
Unit D
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
50
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard


Vashon Island Closed Landfill
Unit D
Vinyl chloride
Vinyl chloride (ug/L)
0
10
20
30
40
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

Appendix G

Groundwater Velocity Calculations and
Potentiometric Maps

King County

Water and Land Resources Division
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 5600
Seattle, WA 98104-3855
206-477-4800 Fax 206-296-0192
TTY Relay: 711

TECHNICAL MEMORANDUM

May 12, 2021

TO: Marisa Baptiste, Engineer III, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks (DNRP)

FM: Sevin Bilir, Environmental Scientist IV, Science and Technical Support Section, Water and Land Resources Division, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
First Quarter 2021 Results
Vashon Island Closed Landfill, King County, Washington
Project No. 1033601 – Task 29.14.137.45

The King County Water and Land Resources Division (WLRD) submits this memorandum report on groundwater conditions during the first quarter of 2021 for the middle channel deposit in the Cc2 perched zone and the Unit D aquifer beneath the Vashon Island Closed Landfill (Landfill), in accordance with the *Proposal for Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations* (WLRD, 2021). King County Solid Waste Division (SWD) personnel measured groundwater levels at the Landfill on February 18, 2021. These measurements were received by WLRD on April 6 through April 13, 2021 and were used to:

1. Evaluate the potentiometric groundwater surface elevation for the Cc2 perched zone and the Unit D aquifer;
2. Determine the groundwater flow direction and horizontal gradient for the Cc2 perched zone and the Unit D aquifer; and
3. Calculate the groundwater velocity of the Cc2 perched zone and the Unit D aquifer.

There have been no significant changes in the interpreted groundwater conditions for the Cc2 perched zone and the Unit D aquifer since the report submitted for the fourth quarter of 2021.

Groundwater Elevation Data

The SWD attempted groundwater level measurements at 15 monitoring wells during the first quarter of 2021. These wells are completed in the Cc2 perched zone and the Unit D aquifer, as referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect 2020).

Table A-1 lists the groundwater monitoring well identifications, locations, construction details, measured depth to groundwater levels and calculated groundwater elevations for monitoring wells screened in the Cc2 perched zone and Unit D aquifer.

Cc2 Perched Zone

Three separate coarse-grained perched zones are identified within variable fine-grained sediment in the Cc2 perched zone (Aspect 2020). The Cc2 channel deposit perched zone is not laterally extensive across the Landfill as it was not identified in borings southeast and northwest of the landfill closure area (Aspect 2020). Groundwater in this perched zone is monitored by wells MW-2, MW-9, MW-20, MW-21, MW-30, MW-33, and MW-35 (Aspect 2020).

According to Aspect (2020), water levels in the Unit Cc2 perched zone generally indicate unconfined groundwater conditions, with the exception of monitoring wells MW-20 and MW-33. Groundwater elevations in these two wells are above coarse-grained layers indicating confined conditions (Aspect 2020). During this quarter, the water level in monitoring well MW-33 was measured at almost 17 feet above the top of the screen and may be influenced by confining conditions.

Figure A-1 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Cc2 perched zone based on measurements taken on February 18, 2021.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, MW-28, MW-29, and MW-34 (Aspect 2020). Measured water levels in monitoring wells MW-7, MW-12, MW-19, MW-25, and MW-34 were at least 16.2 feet above the top of the screen and may be influenced by vertical gradients, permeability differences (Aspect 2020), or confining conditions in the Unit D aquifer.

Monitoring well MW-28 was again reported as dry as moisture was noted at less than two feet above the screen bottom elevation. This well has historically been reported as

"dry" for this reason. The screen for MW-28 was installed at the contact between Unit D and unit below (Unit E) and requires a two foot rise in surrounding groundwater levels to reach the screen bottom.

Figure A-2 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Unit D aquifer based on measurements taken on February 18, 2021.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on February 18, 2021, are shown in Figures A-1 and A-2. Table A-2 lists the flow direction for the Cc2 perched zone and Unit D aquifer beneath the Landfill based on measurements and mapping of groundwater elevation contours taken during the first quarter of 2021.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the west-northwest property-wide with a west to west-southwest component in the south slope area (Figure A-1).

Unit D Aquifer

As per Aspect (2020), groundwater flow direction in Unit D is strongly influenced by the typically higher water levels in MW-7 and MW-34 and this is seen in quarterly mapping of the potentiometric surface forming a groundwater divide running generally west-east beneath the southern area of the landfill footprint. Calculated groundwater elevations and interpreted groundwater potentiometric surface contours during the first quarter of 2021 indicate that groundwater in the Unit D aquifer flows generally southwesterly in the area south of the divide and northerly in the area north of the divide with components of flow to the northeast and northwest (Figure A-2). The groundwater gradient south of the divide is less steep than that north of the divide.

Groundwater Parameters

Table A-2 presents a summary of the groundwater parameters. Hydraulic conductivity and effective porosity values are based on the ranges referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect 2020).

The average horizontal hydraulic conductivity for the Cc2 perched zone beneath the Landfill is reported to be 8.21 feet per day (ft/d) property wide and 5.81 ft/d in the south slope area (Aspect 2020). The average horizontal hydraulic conductivity in the Unit D aquifer beneath the landfill is reported to be 10.2 ft/d (Aspect 2020). The effective

porosity is reported as 20 percent for both the Cc2 perched zone and the Unit D aquifer (Aspect 2020).

Average hydraulic gradients for the Cc2 perched zone are approximately 0.019 ft/ft property wide and 0.013 ft/ft for the south slope area based on measurements made during the first quarter of 2021. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the first quarter of 2021, are approximately 0.031 and 0.014 ft/ft in the northerly and southerly flow directions, respectively.

Average horizontal groundwater velocities calculated for the Cc2 perched zone and Unit D aquifer beneath the Landfill, are based on spatial differences in aquifer parameters, hydraulic gradients, and calculations using the following formula:

where: $$v = \frac{1}{n_{eff}} K \frac{\Delta H}{\Delta L}$$

v = Groundwater velocity [L/t]

n_{eff} = Effective porosity [dimensionless]

K = Hydraulic conductivity [L/t]

$\frac{\Delta H}{\Delta L}$ = Hydraulic gradient [L/L]

The average horizontal groundwater velocities in the Cc2 perched zone are approximately 0.79 ft/d property wide and 0.37 ft/d in the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.58 and 0.73 ft/d in the northerly and southerly direction, respectively.

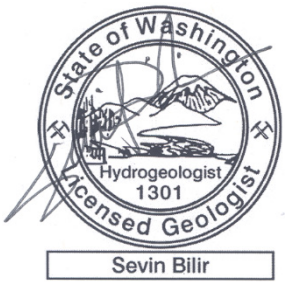
References

Aspect Consulting, LLC. (Aspect). 2020. Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1 (Contract Number E00102E08; Task No. 310.3 – D310.3.1.3). AGENCY DRAFT. November 6. FINAL.

King County Water and Land Resources Division (WLRD). 2021. Proposal for 2021 Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations; King County Closed Landfills (Cedar Falls, Enumclaw, Hobart and Vashon Island) and Cedar Hills Regional Landfill. April.

Thank you for the opportunity to provide hydrogeologic services to SWD. If you have any questions, please feel free to contact me at 206-477-4646 or sevin.bilir@kingcounty.gov.

Sincerely,



Sevin Bilir, WA LHG
Environmental Scientist IV
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – First Quarter 2021
Table A-2:	Groundwater Parameters – First Quarter 2021
Figure A-1:	Groundwater Potentiometric Surface Map – First Quarter 2021 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – First Quarter 2021 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – First Quarter 2021
Vashon Island Closed Landfill
King County, Washington

							February 18, 2021	
	Well Identification	Easting[2] (ft)	Northing[2] (ft)	Top of Casing Elevation[5] (ft MSL)	Top of Screen Elevation[5] (ft MSL)	Bottom of Screen Elevation[5] (ft MSL)	Measured Depth to Water[1] (ft)	Groundwater Elevations[5] (ft MSL)
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	74.21	243.76
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	165.55	239.62
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	122.35	247.97
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.92	242.13
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	5.33	230.34
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	112.72	246.45
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.68	242.66
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	192.15	184.60
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	142.82	172.71
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	246.05	159.38
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.46	158.87
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	247.67	158.87
	MW-28[3]	1228116.11	163843.88	398.73	172.15	162.65	DRY	DRY
	MW-29[4]	1228375.59	163681.26	413.85	172.83	158.63	244.48	169.37
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	205.08	180.88

Notes:

1. Water level measurements made by SWD personnel.
2. Reference datum for eastings and northings is the North American Datum of 1983 (NAD83/11).
3. MW-28 requires 2 foot rise in groundwater levels. MW-28 screen installed at contact between Unit D and unit below (Unit E). Historically reported as a dry well (Aspect 2020).
4. MW-29 top and bottom of screen elevations were reported differently in Table A-1 of previous reports. This did not impact outcomes for generated groundwater maps and data reported in Table A-2 of related reports.
5. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).

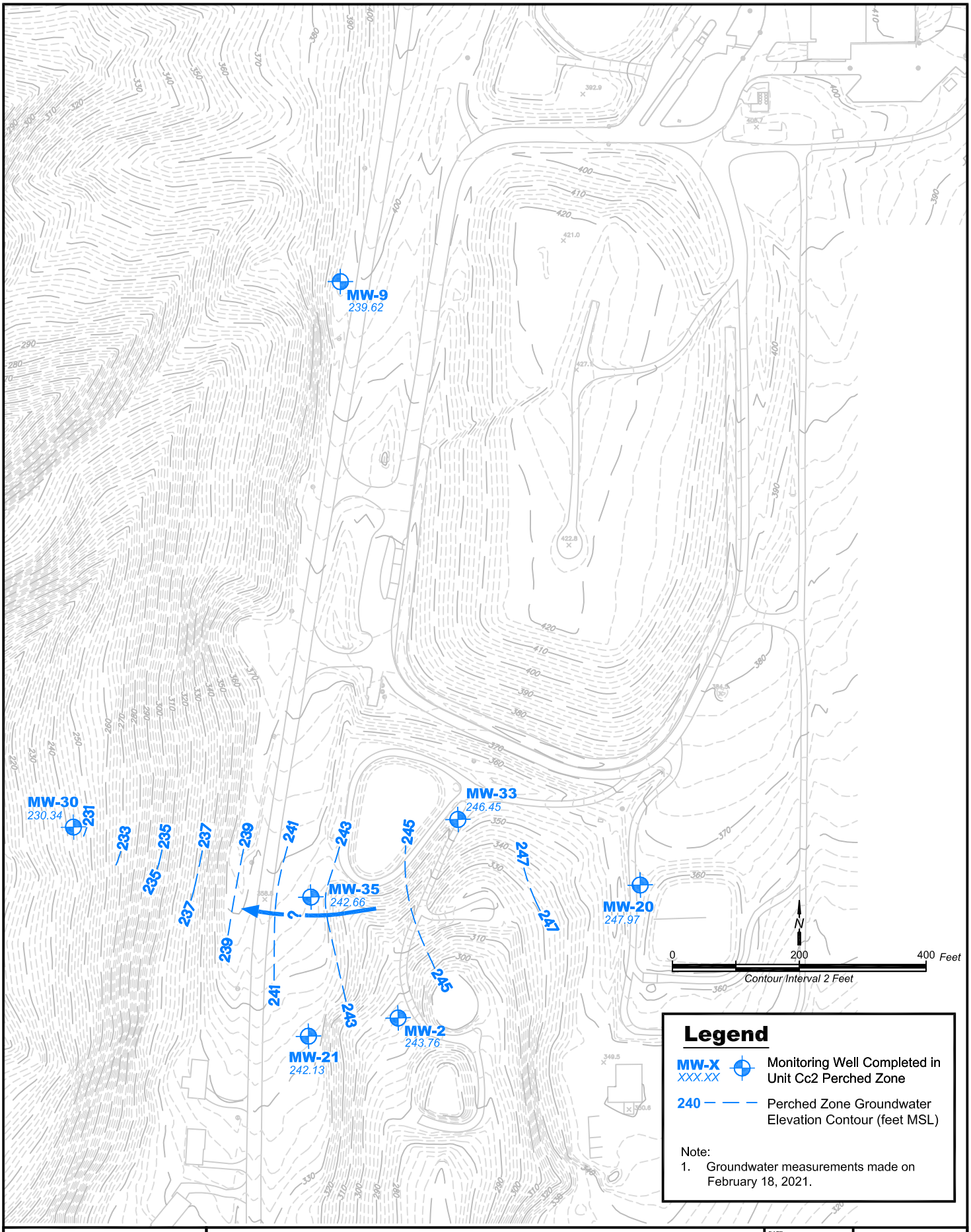
DRY Well indicated as dry, less than 2 ft of moisture detected within screen interval.

Table A-2: Groundwater Parameters – First Quarter 2021
Vashon Island Closed Landfill
King County, Washington

					February 18, 2021		
	Horizontal Hydraulic Conductivity (K)[1,2]			Effective Porosity (n_{eff})[1]	Horizontal Hydraulic Gradient (DH/DL)[3]	Horizontal Groundwater Velocity (v)	General Groundwater Flow Direction
Water Bearing Zone	Range	(cm/s)	(ft/d)		(ft/ft)	(ft/d)	
Unit Cc2 - Property Wide[4,6]	Low	5.7E-04	1.61	20%	0.007	0.05	West-northwest
	High	1.6E-02	46.1		0.032	7.37	
	Average[6]	2.9E-03	8.21		0.019	0.79	
Unit Cc2 - South Slope Area[5,6]	Low	5.7E-04	1.61		0.007	0.05	West to West-southwest
	High	6.8E-03	19.4		0.019	1.84	
	Average[6]	2.1E-03	5.81		0.013	0.37	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.031	0.68	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			7.14	
	Average	3.6E-03	10.2			1.58	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.014	0.31	Southwest - away from divide
	High	1.6E-02	46.1			3.28	
	Average	3.6E-03	10.2			0.73	

Notes:

1. Horizontal hydraulic conductivity values and effective porosity values from Aspect 2020.
2. Average horizontal hydraulic conductivity values are the geometric mean of values reported per well and unit (Aspect 2020).
3. Horizontal hydraulic gradients based on average of gradients measured at several points from the maps shown on Figures A-1 and A-2.
4. Calculations for property wide Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35. (Aspect 2020).
5. Calculations for South Slope Area Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-20, MW-21, MW-33, and MW-35. (Aspect 2020).
6. Calculations of average hydraulic conductivities for Unit Cc2 did not include data obtained in 1986 from MW-2 as the value was significantly lower than a remeasurement completed in 2015 (Aspect 2020).

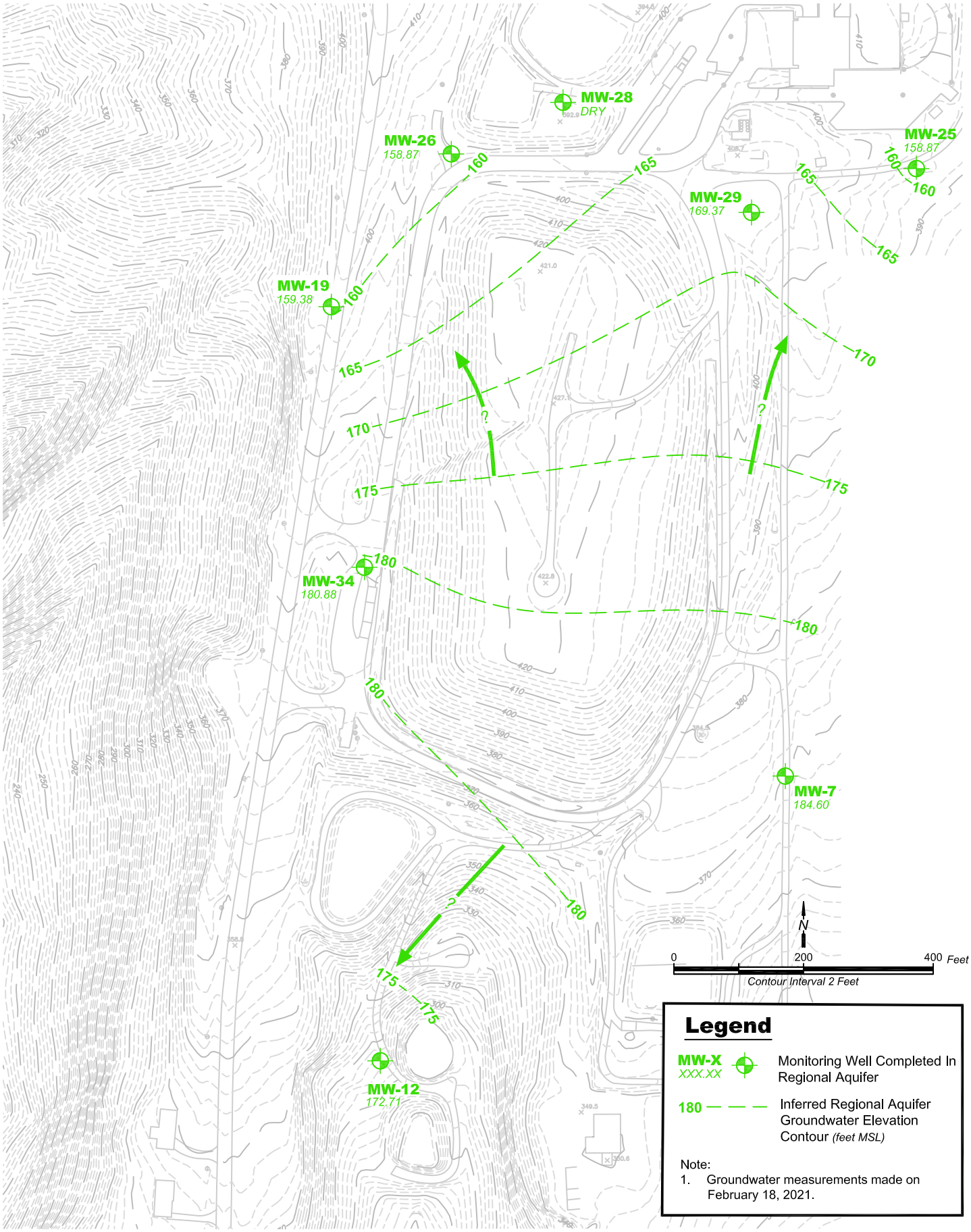


King County

Groundwater Potentiometric Surface Map
First Quarter 2021 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: April 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: SB	

VI_1Q2021_Cc2Perched.dwg



King County

Groundwater Potentiometric Surface Map
First Quarter 2021 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: April 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: SB	

VI_1Q2021_UnitD.dwg

King County

Water and Land Resources Division
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 5600
Seattle, WA 98104-3855
206-477-4800 Fax 206-296-0192
TTY Relay: 711

TECHNICAL MEMORANDUM

August 13, 2021

TO: Marisa Baptiste, Engineer III, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks (DNRP)

FM: Sevin Bilir, Environmental Scientist IV, Science and Technical Support Section, Water and Land Resources Division, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Second Quarter 2021 Results
Vashon Island Closed Landfill, King County, Washington
Project No. 1033601 – Task 29.14.137.45

The King County Water and Land Resources Division (WLRD) submits this memorandum report on groundwater conditions during the second quarter of 2021 for the middle channel deposit in the Cc2 perched zone and the Unit D aquifer beneath the Vashon Island Closed Landfill (Landfill), in accordance with the *Proposal for Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations* (WLRD, 2021). King County Solid Waste Division (SWD) personnel measured groundwater levels at the Landfill on May 14, 2021. These measurements were received by WLRD on July 1, 2021 and were used to:

1. Evaluate the potentiometric groundwater surface elevation for the Cc2 perched zone and the Unit D aquifer;
2. Determine the groundwater flow direction and horizontal gradient for the Cc2 perched zone and the Unit D aquifer; and
3. Calculate the groundwater velocity of the Cc2 perched zone and the Unit D aquifer.

There have been no significant changes in the interpreted groundwater conditions for the Cc2 perched zone and the Unit D aquifer since the report submitted for the first quarter of 2021.

Groundwater Elevation Data

The SWD attempted groundwater level measurements at 15 monitoring wells during the second quarter of 2021. These wells are completed in the Cc2 perched zone and the Unit D aquifer, as referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect 2020).

Table A-1 lists the groundwater monitoring well identifications, locations, construction details, measured depth to groundwater levels and calculated groundwater elevations for monitoring wells screened in the Cc2 perched zone and Unit D aquifer.

Cc2 Perched Zone

Three separate coarse-grained perched zones are identified within variable fine-grained sediment in the Cc2 perched zone (Aspect 2020). The Cc2 channel deposit perched zone is not laterally extensive across the Landfill as it was not identified in borings southeast and northwest of the landfill closure area (Aspect 2020). Groundwater in this perched zone is monitored by wells MW-2, MW-9, MW-20, MW-21, MW-30, MW-33, and MW-35 (Aspect 2020).

According to Aspect (2020), water levels in the Unit Cc2 perched zone generally indicate unconfined groundwater conditions, with the exception of monitoring wells MW-20 and MW-33. Groundwater elevations in these two wells are above coarse-grained layers indicating confined conditions (Aspect 2020). During this quarter, the water level in monitoring well MW-33 was measured at almost 17 feet above the top of the screen and may be influenced by confining conditions.

Figure A-1 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Cc2 perched zone based on measurements taken on May 14, 2021.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, MW-28, MW-29, and MW-34 (Aspect 2020). Measured water levels in monitoring wells MW-7, MW-12, MW-19, MW-25, and MW-34 were at least 16.3 feet above the top of the screen and may be influenced by vertical gradients, permeability differences (Aspect 2020), or confining conditions in the Unit D aquifer. Monitoring well

MW-28, historically reported as "dry"[1], was again reported as dry as water was noted below the screen bottom elevation.

Figure A-2 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Unit D aquifer based on measurements taken on May 14, 2021.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on May 14, 2021, are shown in Figures A-1 and A-2. Table A-2 lists the flow direction for the Cc2 perched zone and Unit D aquifer beneath the Landfill based on measurements and mapping of groundwater elevation contours taken during the second quarter of 2021.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the west-northwest property-wide with a west to west-southwest component in the south slope area (Figure A-1).

Unit D Aquifer

As per Aspect (2020), groundwater flow direction in Unit D is strongly influenced by the typically higher water levels in MW-7 and MW-34 and this is seen in quarterly mapping of the potentiometric surface forming a groundwater divide running generally west-east beneath the southern area of the landfill footprint. Calculated groundwater elevations and interpreted groundwater potentiometric surface contours during the second quarter of 2021 indicate that groundwater in the Unit D aquifer flows generally southwesterly in the area south of the divide and northerly in the area north of the divide with components of flow to the northeast and northwest (Figure A-2). The groundwater gradient south of the divide is less steep than that north of the divide.

Groundwater Parameters

Table A-2 presents a summary of the groundwater parameters. Hydraulic conductivity and effective porosity values are based on the ranges referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect 2020).

The average horizontal hydraulic conductivity for the Cc2 perched zone beneath the Landfill is reported to be 8.21 feet per day (ft/d) property wide and 5.81 ft/d in the south

[1] The screen for MW-28 was installed at the contact between Unit D and unit below (Unit E) and requires a two foot rise in surrounding groundwater levels to reach the screen bottom.

slope area (Aspect 2020). The average horizontal hydraulic conductivity in the Unit D aquifer beneath the landfill is reported to be 10.2 ft/d (Aspect 2020). The effective porosity is reported as 20 percent for both the Cc2 perched zone and the Unit D aquifer (Aspect 2020).

Average hydraulic gradients for the Cc2 perched zone are approximately 0.020 ft/ft property wide and 0.012 ft/ft for the south slope area based on measurements made during the second quarter of 2021. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the second quarter of 2021, are approximately 0.033 and 0.016 ft/ft in the northerly and southerly flow directions, respectively.

Average horizontal groundwater velocities calculated for the Cc2 perched zone and Unit D aquifer beneath the Landfill, are based on spatial differences in aquifer parameters, hydraulic gradients, and calculations using the following formula:

where: $$v = \frac{1}{n_{eff}} K \frac{\Delta H}{\Delta L}$$

v = Groundwater velocity [L/t]

n_{eff} = Effective porosity [dimensionless]

K = Hydraulic conductivity [L/t]

$\frac{\Delta H}{\Delta L}$ = Hydraulic gradient [L/L]

The average horizontal groundwater velocities in the Cc2 perched zone are approximately 0.83 ft/d property wide and 0.34 ft/d in the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.68 and 0.82 ft/d in the northerly and southerly direction, respectively.

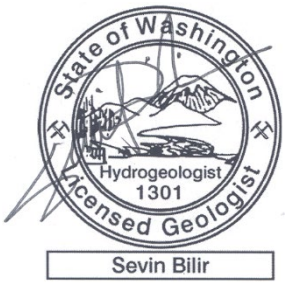
References

Aspect Consulting, LLC. (Aspect). 2020. Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1 (Contract Number E00102E08; Task No. 310.3 – D310.3.1.3). AGENCY DRAFT. November 6. FINAL.

King County Water and Land Resources Division (WLRD). 2021. Proposal for 2021 Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations; King County Closed Landfills (Cedar Falls, Enumclaw, Hobart, and Vashon Island) and Cedar Hills Regional Landfill. April.

Thank you for the opportunity to provide hydrogeologic services to SWD. If you have any questions, please feel free to contact me at 206-477-4646 or sevin.bilir@kingcounty.gov.

Sincerely,



Sevin Bilir, WA LHG
Environmental Scientist IV
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – Second Quarter 2021
Table A-2:	Groundwater Parameters – Second Quarter 2021
Figure A-1:	Groundwater Potentiometric Surface Map – Second Quarter 2021 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – Second Quarter 2021 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – Second Quarter 2021
Vashon Island Closed Landfill
King County, Washington

							May 14, 2021	
	Well Identification	Easting[2] (ft)	Northing[2] (ft)	Top of Casing Elevation[4] (ft MSL)	Top of Screen Elevation[4] (ft MSL)	Bottom of Screen Elevation[4] (ft MSL)	Measured Depth to Water[1] (ft)	Groundwater Elevations[4] (ft MSL)
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	73.90	244.07
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	165.34	239.83
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	122.01	248.31
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.63	242.42
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	5.90	229.77
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	112.41	246.76
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.36	242.98
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	191.73	185.02
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	142.56	172.97
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	246.03	159.40
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.54	158.79
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	247.67	158.87
	MW-28[3]	1228116.11	163843.88	398.73	172.15	162.65	DRY	NA
	MW-29	1228375.59	163681.26	413.85	172.83	158.63	244.37	169.48
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	204.63	181.33

Notes:
1. Water level measurements made by SWD personnel.
2. Reference datum for eastings and northings is the North American Datum of 1983 (NAD83/11).
3. MW-28 requires 2 foot rise in groundwater levels. MW-28 screen installed at contact between Unit D and unit below (Unit E). Historically reported as a dry well (Aspect 2020).
4. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).

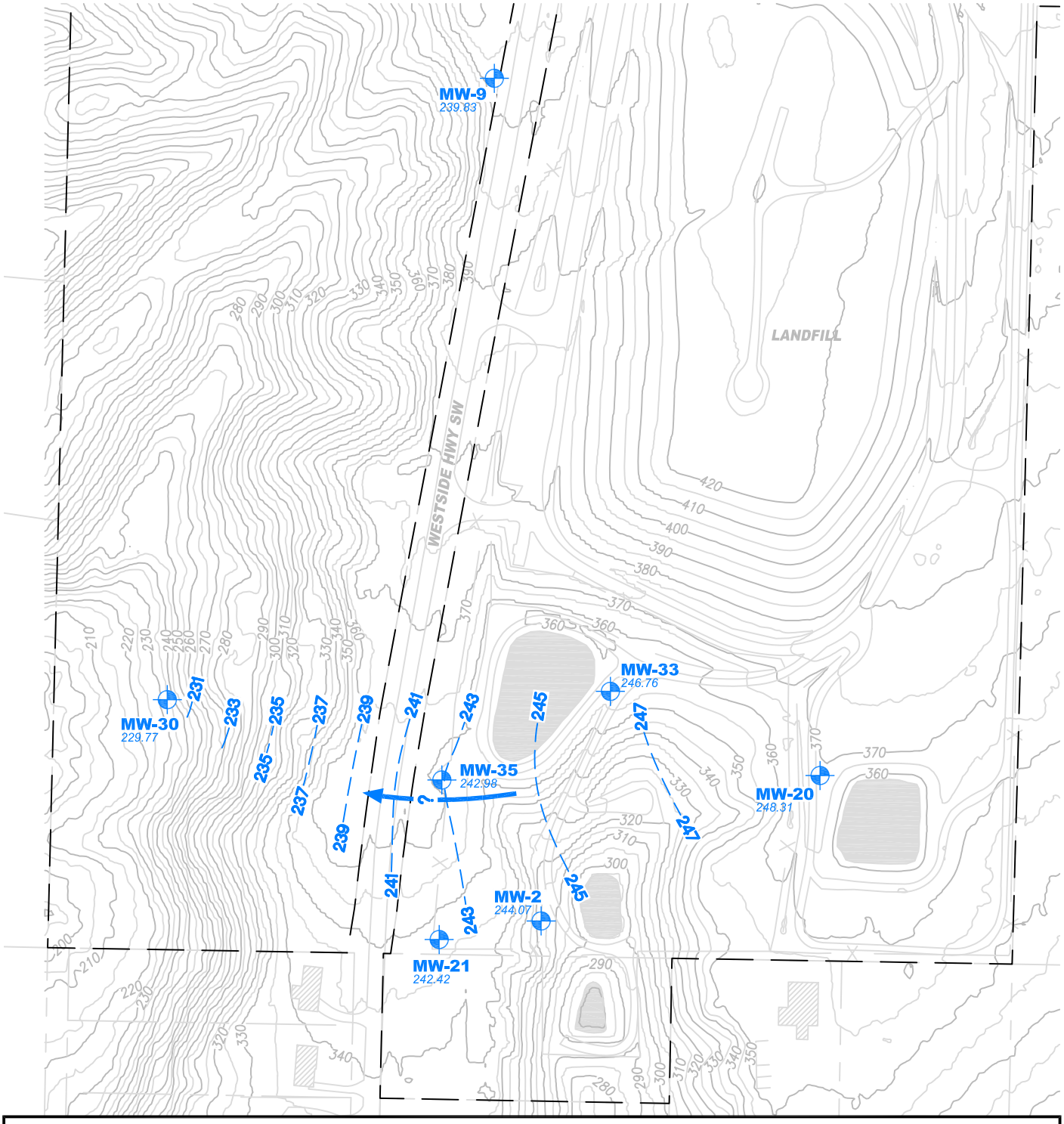
DRY Well indicated as dry, water detected below the screen.
NA Not applicable.

Table A-2: Groundwater Parameters – Second Quarter 2021
Vashon Island Closed Landfill
King County, Washington

					May 14, 2021		
	Horizontal Hydraulic Conductivity (K)[1,2]			Effective Porosity (n_{eff})[1]	Horizontal Hydraulic Gradient (DH/DL)[3]	Horizontal Groundwater Velocity (v)	General Groundwater Flow Direction
Water Bearing Zone	Range	(cm/s)	(ft/d)		(ft/ft)	(ft/d)	
Unit Cc2 - Property Wide[4,6]	Low	5.7E-04	1.61	20%	0.007	0.05	West-northwest
	High	1.6E-02	46.1		0.034	7.83	
	Average[6]	2.9E-03	8.21		0.020	0.83	
Unit Cc2 - South Slope Area[5,6]	Low	5.7E-04	1.61		0.007	0.05	West to West-southwest
	High	6.8E-03	19.4		0.017	1.64	
	Average[6]	2.1E-03	5.81		0.012	0.34	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.033	0.72	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			7.60	
	Average	3.6E-03	10.2			1.68	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.016	0.35	Southwest - away from divide
	High	1.6E-02	46.1			3.69	
	Average	3.6E-03	10.2			0.82	

Notes:

1. Horizontal hydraulic conductivity values and effective porosity values from Aspect 2020.
2. Average horizontal hydraulic conductivity values are the geometric mean of values reported per well and unit (Aspect 2020).
3. Horizontal hydraulic gradients based on average of gradients measured at several points from the maps shown on Figures A-1 and A-2.
4. Calculations for property wide Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35. (Aspect 2020).
5. Calculations for South Slope Area Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-20, MW-21, MW-33, and MW-35. (Aspect 2020).
6. Calculations of average hydraulic conductivities for Unit Cc2 did not include data obtained in 1986 from MW-2 as the value was significantly lower than a remeasurement completed in 2015 (Aspect 2020).



Legend

- **MW-X** *XXX.XX* — Monitoring Well Completed in Unit Cc2 Perched Zone Elevation *(feet mean sea level (MSL))*
- 240 — Perched Zone Groundwater Elevation Contour *(feet MSL)*
- Inferred Horizontal Groundwater Flow Path
- Pond
- Road
- Ditch
- Fence
- King County Landfill Property
- Building

Note:
1. Groundwater measurements made on May 14, 2021.

N

0 200 400 Feet

Contour Interval 5 Feet

Locations surveyed on Washington State Plane Coordinate System. North Zone (NAD 83/11)

Elevations reported in feet above mean sea level based on the North American Vertical Datum of 1988 (NAVD 88).

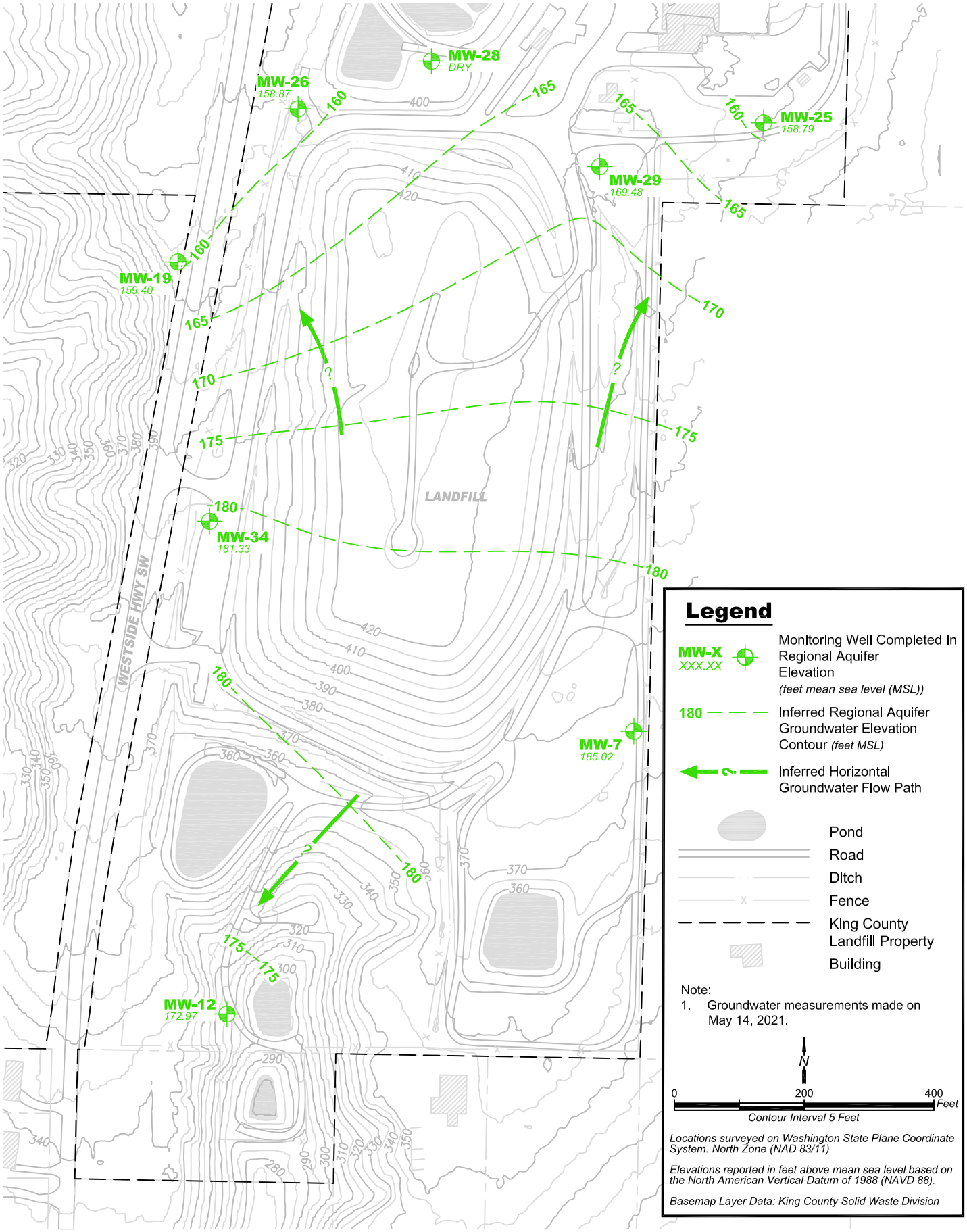
Basemap Layer Data: King County Solid Waste Division

King County

Groundwater Potentiometric Surface Map
Second Quarter 2021 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: August 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: SB	

VI_2Q2021_Cc2Perched.dwg



King County

Groundwater Potentiometric Surface Map
Second Quarter 2021 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: August 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: SB	

VI_2Q2021_UnitD.dwg

King County

Water and Land Resources Division
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 5600
Seattle, WA 98104-3855
206-477-4800 Fax 206-296-0192
TTY Relay: 711

TECHNICAL MEMORANDUM

November 19, 2021

TO: Marisa Baptiste, Engineer III, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks (DNRP)

FM: Sevin Bilir, Environmental Scientist IV, Science and Technical Support Section, Water and Land Resources Division, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Third Quarter 2021 Results
Vashon Island Closed Landfill, King County, Washington
Project No. 1033601 – Task 29.14.137.45

The King County Water and Land Resources Division (WLRD) submits this memorandum report on groundwater conditions during the third quarter of 2021 for the middle channel deposit in the Cc2 perched zone and the Unit D aquifer beneath the Vashon Island Closed Landfill (Landfill), in accordance with the *Proposal for Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations* (WLRD, 2021). King County Solid Waste Division (SWD) personnel measured groundwater levels at the Landfill on August 6, 2021. These measurements were received by WLRD on October 1, 2021 and were used to:

1. Evaluate the potentiometric groundwater surface elevation for the Cc2 perched zone and the Unit D aquifer;
2. Determine the groundwater flow direction and horizontal gradient for the Cc2 perched zone and the Unit D aquifer; and
3. Calculate the groundwater velocity of the Cc2 perched zone and the Unit D aquifer.

There are no significant changes in the interpreted groundwater conditions for the Cc2 perched zone and the Unit D aquifer in this quarter, when compared to the report submitted for the second quarter of 2021.

Groundwater Elevation Data

The SWD attempted groundwater level measurements at 15 monitoring wells during the third quarter of 2021. These wells are completed in the Cc2 perched zone and the Unit D aquifer, as referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect, 2020).

Table A-1 lists the groundwater monitoring well identifications, locations, construction details, measured depth to groundwater levels and calculated groundwater elevations for monitoring wells screened in the Cc2 perched zone and Unit D aquifer.

Cc2 Perched Zone

Three separate coarse-grained perched zones are identified within variable fine-grained sediment in the Cc2 perched zone (Aspect, 2020). The Cc2 channel deposit perched zone is not laterally extensive across the Landfill as it was not identified in borings southeast and northwest of the landfill closure area (Aspect, 2020). Groundwater in this perched zone is monitored by wells MW-2, MW-9, MW-20, MW-21, MW-30, MW-33, and MW-35 (Aspect, 2020).

According to Aspect (2020), water levels in the Unit Cc2 perched zone generally indicate unconfined groundwater conditions, with the exception of monitoring wells MW-20 and MW-33. Groundwater elevations in these two wells are above coarse-grained layers indicating confined conditions (Aspect, 2020). During this quarter, the water level in monitoring well MW-33 was measured at almost 17 feet above the top of the screen and may be influenced by confining conditions. Measured water levels in these wells are on average 0.25 ft lower than those measured in the second quarter of 2021.

Figure A-1 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Cc2 perched zone based on measurements taken on August 6, 2021.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, MW-28, MW-29, and MW-34 (Aspect, 2020). Measured water levels in monitoring wells MW-7, MW-12, MW-19, MW-25, and MW-34 were at least 16.04 feet above the top of the screen and may be influenced by vertical gradients, permeability differences (Aspect, 2020), or confining conditions in the Unit D aquifer. Measured water levels in these wells are on average 0.28 ft lower than those measured in the

second quarter of 2021. Monitoring well MW-28, historically reported as "dry"[1], was again reported as dry as water was noted below the screen bottom elevation.

Figure A-2 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Unit D aquifer based on measurements taken on August 6, 2021.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on August 6, 2021, are shown in Figures A-1 and A-2. Table A-2 lists the flow direction for each portion of the Cc2 perched zone and Unit D aquifer beneath the Landfill based on measurements taken on August 6, 2021 and mapping of groundwater elevation contours taken during the third quarter of 2021.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the west-northwest property-wide with a west to west-southwest component in the south slope area (Figure A-1). Flow directions for the Cc2 perched zone in the third quarter of 2021 are similar to those for the second quarter of 2021.

Unit D Aquifer

As per Aspect (2020), groundwater flow direction in Unit D is strongly influenced by the typically higher water levels in MW-7 and MW-34 and this is seen in quarterly mapping of the potentiometric surface forming a groundwater divide running generally west-east beneath the southern area of the landfill footprint. Calculated groundwater elevations and interpreted groundwater potentiometric surface contours during the third quarter of 2021 indicate that groundwater in the Unit D aquifer flows generally southwesterly in the area south of the divide and northerly in the area north of the divide with components of flow to the northeast and northwest (Figure A-2). The groundwater gradient south of the divide is less steep than that north of the divide. Flow directions for the Unit D aquifer in the third quarter of 2021 are similar to those for the second quarter of 2021.

Groundwater Parameters

Table A-2 presents a summary of the groundwater parameters. Hydraulic conductivity and effective porosity values are based on the ranges referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect, 2020).

---

[1] The screen for MW-28 was installed at the contact between Unit D and unit below (Unit E) and requires a two foot rise in surrounding groundwater levels to reach the screen bottom.

The average horizontal hydraulic conductivity for the Cc2 perched zone beneath the Landfill is reported to be 8.21 feet per day (ft/d) property wide and 5.81 ft/d in the south slope area (Aspect, 2020). The average horizontal hydraulic conductivity in the Unit D aquifer beneath the landfill is reported to be 10.2 ft/d (Aspect, 2020). The effective porosity is reported as 20 percent for both the Cc2 perched zone and the Unit D aquifer (Aspect, 2020).

Gradients

The hydraulic gradient for the Cc2 perched zone and Unit D aquifer was determined using potentiometric surface maps (Figures A-1 and A-2). Table A-2 lists the gradients for different portions of the Cc2 perched zone and the Unit D aquifer beneath the Landfill.

Average hydraulic gradients for the Cc2 perched zone are approximately 0.020 ft/ft property wide and 0.012 ft/ft for the south slope area based on measurements made during the third quarter of 2021. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the third quarter of 2021, are approximately 0.035 and 0.015 ft/ft in the northerly and southerly flow directions, respectively. The gradients calculated for the third quarter of 2021 are within the range of gradients calculated during the second quarter of 2021.

Groundwater Velocities

Average horizontal groundwater velocities calculated for the Cc2 perched zone and Unit D aquifer beneath the Landfill, are based on spatial differences in aquifer parameters, hydraulic gradients, and calculations using the following formula:

where: $$v = \frac{1}{n_{eff}} K \frac{\Delta H}{\Delta L}$$

v = Groundwater velocity [L/t]

n_{eff} = Effective porosity [dimensionless]

K = Hydraulic conductivity [L/t]

$\frac{\Delta H}{\Delta L}$ = Hydraulic gradient [L/L]

Table A-2 summarizes the groundwater parameters used to calculate a groundwater velocity for different portions of the Cc2 perched zone and the Unit D aquifer beneath the Landfill. The average horizontal groundwater velocities in the Cc2 perched zone are approximately 0.82 ft/d property wide and 0.34ft/d in the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.78 and 0.76 ft/d in the northerly and southerly direction, respectively. The velocities calculated for

the third quarter of 2021 are within the range of groundwater velocities calculated during the second quarter of 2021.

References

Aspect Consulting, LLC. (Aspect). 2020. *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1 (Contract Number E00102E08; Task No. 310.3 – D310.3.1.3).* FINAL. Prepared in in conjunction with Anchor QEA and BHC Consultants. November 6.

King County Water and Land Resources Division (WLRD). 2021. *Proposal for 2021 Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations; King County Closed Landfills (Cedar Falls, Enumclaw, Hobart, and Vashon Island) and Cedar Hills Regional Landfill.* April.

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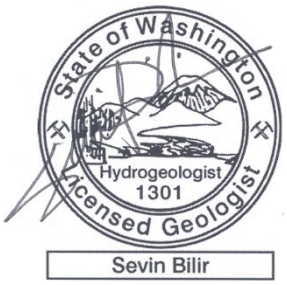

Sevin Bilir, WA LHG
Environmental Scientist IV
King County Water and Land Resources Division

Enclosures:

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Table A-2:	Groundwater Parameters – Third Quarter 2021
Figure A-1:	Groundwater Potentiometric Surface Map – Third Quarter 2021 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – Third Quarter 2021 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – Third Quarter 2021
Vashon Island Closed Landfill
King County, Washington

							August 6, 2021	
	Well Identification	Easting[1]	Northing[1]	Top of Casing Elevation[2]	Top of Screen Elevation[2]	Bottom of Screen Elevation[2]	Measured Depth to Water[3]	Groundwater Elevations[2]
		ft	ft	ft MSL	ft MSL	ft MSL	ft	ft MSL
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	74.09	243.88
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	165.87	239.30
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	122.23	248.09
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.78	242.27
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	6.11	229.56
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	112.60	246.57
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.63	242.71
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	192.17	184.58
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	142.89	172.64
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	MW-29	1228375.59	163681.26	413.85	172.83	158.63	244.56	169.29
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	205.06	180.90

Notes:
1. Reference datum for eastings and northings is the North American Datum of 1983 (NAD83/11).
2. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).
3. Water level measurements made by SWD personnel.
4. MW-28 requires 2 foot rise in groundwater levels. MW-28 screen installed at contact between Unit D and unit below (Unit E). Historically reported as a dry well (Aspect, 2020).

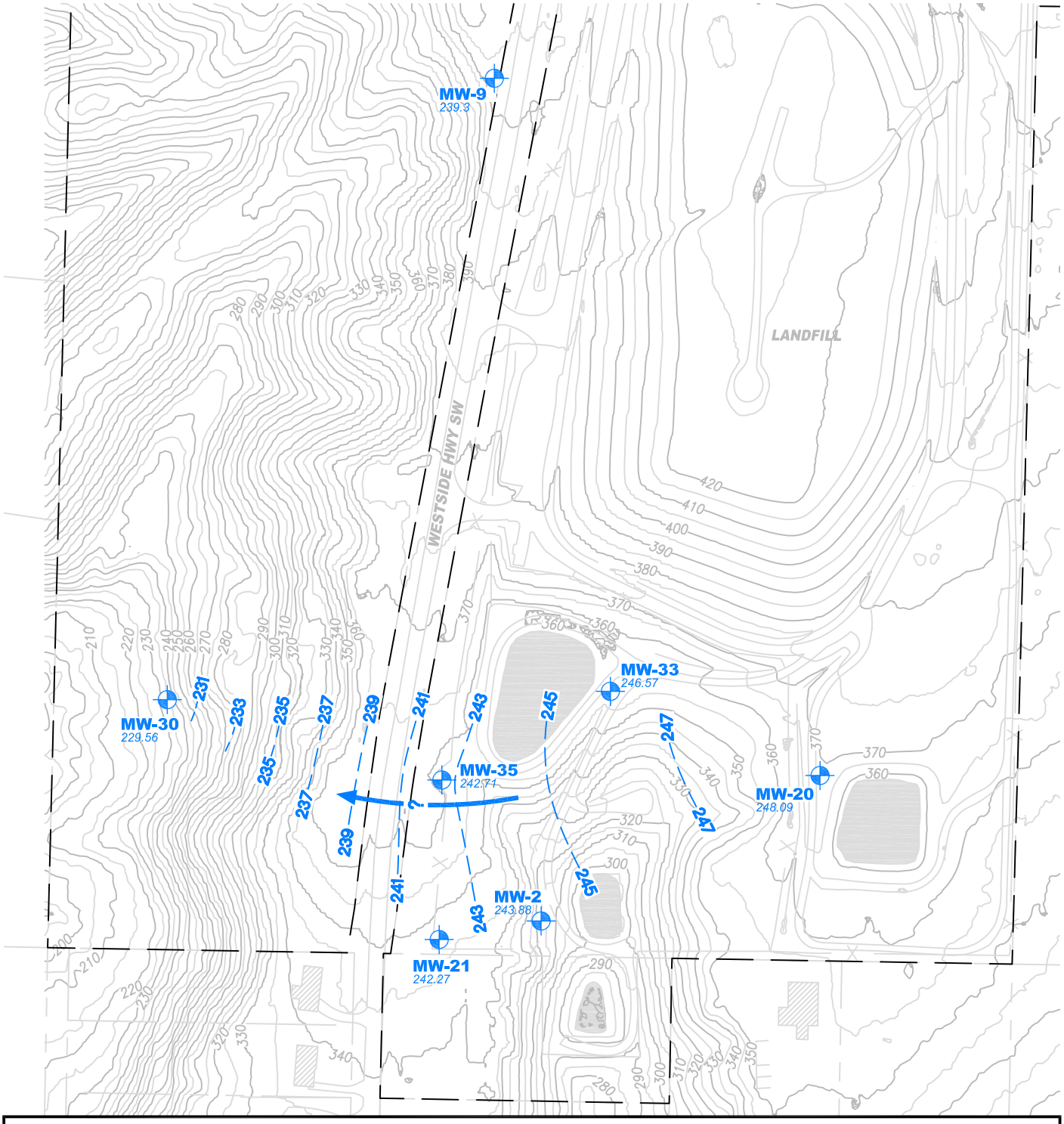
DRY Well indicated as dry, water detected below the screen.
NA Not applicable.

Table A-2: Groundwater Parameters – Third Quarter 2021
Vashon Island Closed Landfill
King County, Washington

						August 6, 2021		
		Horizontal Hydraulic Conductivity[1,2] (K)			Effective Porosity[1] (n_{eff})	Horizontal Hydraulic Gradient[3] (DH/DL)	Horizontal Groundwater Velocity (v)	General Groundwater Flow Direction
Water Bearing Zone		Range	cm/s	ft/d		ft/ft	ft/d	
Unit Cc2	Property Wide[4,5]	Low	5.7E-04	1.61	20%	0.006	0.05	West-northwest
		High	1.6E-02	46.1		0.034	7.83	
		Average[5]	2.9E-03	8.21		0.020	0.82	
	South Slope Area[5,6]	Low	5.7E-04	1.61		0.006	0.05	West to West-southwest
		High	6.8E-03	19.4		0.017	1.64	
		Average[6]	2.1E-03	5.81		0.012	0.33	
Unit D	Northerly flow direction	Low	1.5E-03	4.4		0.035	0.76	North - with flow to the northeast and northwest
		High	1.6E-02	46.1			8.07	
		Average	3.6E-03	10.2			1.78	
	Southerly flow direction	Low	1.5E-03	4.4		0.015	0.33	Southwest - away from divide
		High	1.6E-02	46.1			3.46	
		Average	3.6E-03	10.2			0.76	

Notes:
1. Horizontal hydraulic conductivity values and effective porosity values from Aspect (2020).
2. Average horizontal hydraulic conductivity values are the geometric mean of values reported per well and unit (Aspect, 2020).
3. Horizontal hydraulic gradients based on average of gradients measured at several points from the maps shown on Figures A-1 and A-2.
4. Calculations for property wide Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35. (Aspect, 2020).
5. Calculations of average hydraulic conductivities for Unit Cc2 did not include data obtained in 1986 from MW-2 as the value was significantly lower than a remeasurement completed in 2015 (Aspect, 2020).
6. Calculations for South Slope Area Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-20, MW-21, MW-33, and MW-35. (Aspect, 2020).

cm/s centimeter per second
ft/d feet per day
ft/ft feet per feet



Legend

- MW-X XXX.XX — Monitoring Well Completed in Unit Cc2 Perched Zone Elevation *(feet mean sea level (MSL))*
- 240 — Perched Zone Groundwater Elevation Contour *(feet MSL)*
- Inferred Horizontal Groundwater Flow Path
- Pond
- Road
- Ditch
- Fence
- King County Landfill Property
- Building

Note:
1. Groundwater measurements made on August 6, 2021.

N

0 200 400 Feet

Contour Interval 5 Feet

Locations surveyed on Washington State Plane Coordinate System. North Zone (NAD 83/11)

Elevations reported in feet above mean sea level based on the North American Vertical Datum of 1988 (NAVD 88).

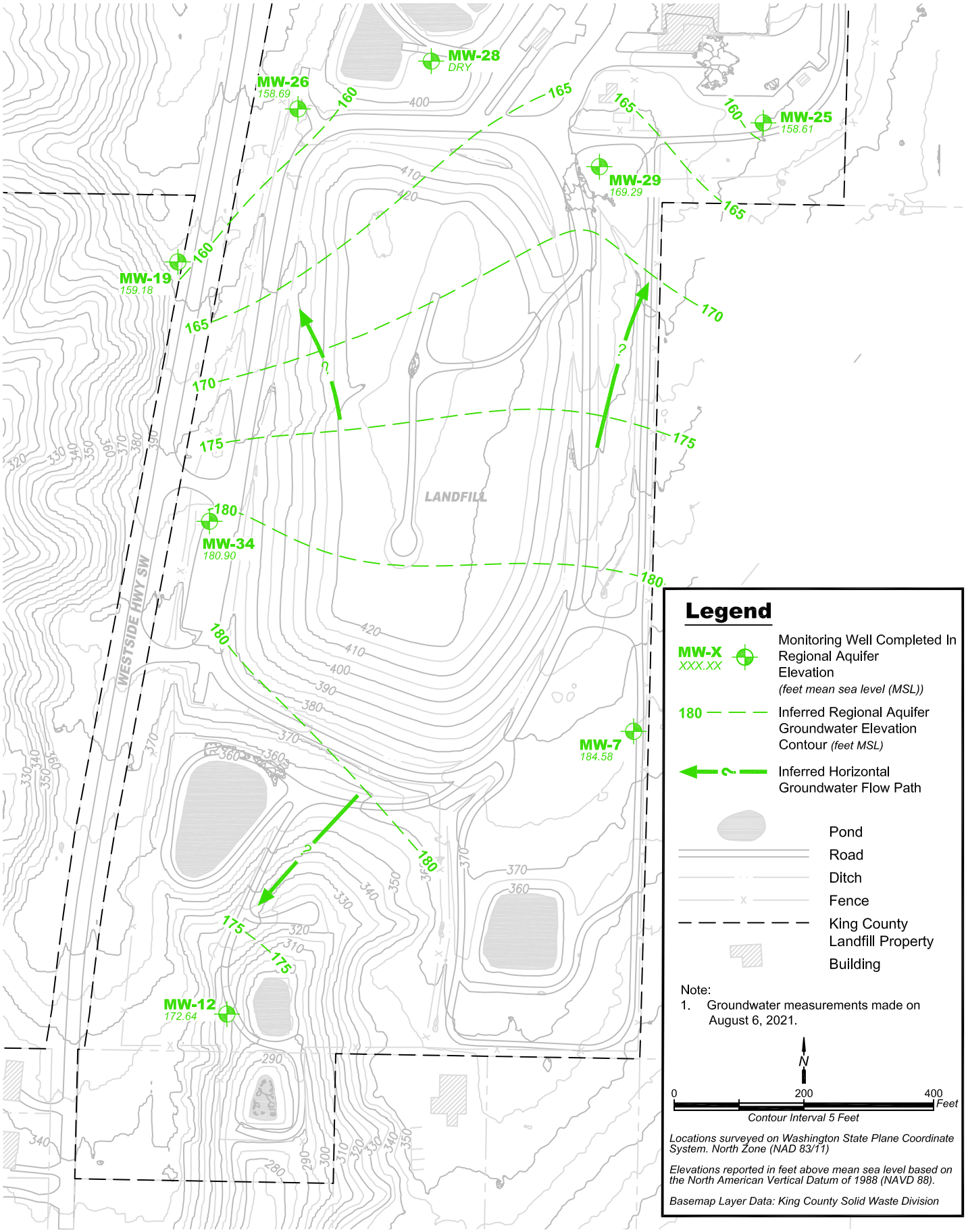
Basemap Layer Data: King County Solid Waste Division

King County

Groundwater Potentiometric Surface Map
Third Quarter 2021 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: November 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: SB	

VI_3Q2021_Cc2Perched.dwg



King County

Groundwater Potentiometric Surface Map
Third Quarter 2021 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: November 2021	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: SB	

VI_3Q2021_UnitD.dwg

King County

Water and Land Resources Division

Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 5600
Seattle, WA 98104-3855

206-477-4800 Fax 206-296-0192
TTY Relay: 711

TECHNICAL MEMORANDUM

March 3, 2022[1]

TO: Marisa Baptiste, Engineer III, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks (DNRP)

FM: Sevin Bilir, Environmental Scientist IV, Science and Technical Support Section, Water and Land Resources Division, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Fourth Quarter 2021 Results
Vashon Island Closed Landfill, King County, Washington
Project No. 1033601 – Task 29.14.137.45

The King County Water and Land Resources Division (WLRD) submits this memorandum report on groundwater conditions during the fourth quarter of 2021 for the middle channel deposit in the Cc2 perched zone and the Unit D aquifer beneath the Vashon Island Closed Landfill (Landfill), in accordance with the *Proposal for Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations* (WLRD, 2021). King County Solid Waste Division (SWD) personnel measured groundwater levels at the Landfill on November 10, 2021. These measurements were received by WLRD on January 3, 2022 and were used to:

1. Evaluate the potentiometric groundwater surface elevation for the Cc2 perched zone and the Unit D aquifer;
2. Determine the groundwater flow direction and horizontal gradient for the Cc2 perched zone and the Unit D aquifer; and
3. Calculate the groundwater velocity of the Cc2 perched zone and the Unit D aquifer.

[1] Originally sent February 18, 2022. This version has corrected text. See "Gradients" section.

There are no significant changes in the interpreted groundwater conditions for the Cc2 perched zone and the Unit D aquifer in this quarter, when compared to the report submitted for the third quarter of 2021.

Groundwater Elevation Data

The SWD attempted groundwater level measurements at 15 monitoring wells during the fourth quarter of 2021. These wells are completed in the Cc2 perched zone and the Unit D aquifer, as referred to in *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1* (Aspect, 2020).

Table A-1 lists the groundwater monitoring well identifications, locations, construction details, measured depth to groundwater levels and calculated groundwater elevations for monitoring wells screened in the Cc2 perched zone and Unit D aquifer.

Cc2 Perched Zone

Three separate coarse-grained perched zones are identified within variable fine-grained sediment in the Cc2 perched zone (Aspect, 2020). The Cc2 channel deposit perched zone is not laterally extensive across the Landfill as it was not identified in borings southeast and northwest of the landfill closure area (Aspect, 2020). Groundwater in this perched zone is monitored by wells MW-2, MW-9, MW-20, MW-21, MW-30, MW-33, and MW-35 (Aspect, 2020).

According to Aspect (2020), water levels in the Unit Cc2 perched zone generally indicate unconfined groundwater conditions, with the exception of monitoring wells MW-20 and MW-33. Groundwater elevations in these two wells are above coarse-grained layers indicating confined conditions (Aspect, 2020). During this quarter, the water level in monitoring well MW-33 was measured at almost 16.5 feet above the top of the screen and may be influenced by confining conditions. Measured water levels in wells screened in the Unit Cc2 perched zone are on average 0.26 ft lower than those measured in the third quarter of 2021.

Figure A-1 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Cc2 perched zone based on measurements taken on November 10, 2021.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, MW-28, MW-29, and MW-34 (Aspect, 2020). Measured water levels in monitoring wells MW-7, MW-12, MW-19, MW-25, and MW-34 were at least 15.8 feet above the top of the screen and may be influenced by vertical gradients, permeability differences (Aspect, 2020), or confining conditions in the Unit D aquifer. Measured water levels in wells screened in the Unit D aquifer are on average 0.35 ft lower than

those measured in the third quarter of 2021. Monitoring well MW-28, historically reported as "dry"[2], was again reported as dry as water was noted below the screen bottom elevation.

Figure A-2 shows calculated groundwater elevations at monitoring well locations and interpreted groundwater potentiometric surface contours for the Unit D aquifer based on measurements taken on November 10, 2021.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on November 10, 2021, are shown in Figures A-1 and A-2. Table A-2 lists the flow direction for each portion of the Cc2 perched zone and Unit D aquifer beneath the Landfill based on measurements taken on November 10, 2021 and mapping of groundwater elevation contours taken during the Fourth Quarter of 2021.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the west-northwest property-wide with a west to west-southwest component in the south slope area (Figure A-1). Flow directions for the Cc2 perched zone in the fourth quarter of 2021 are similar to those for the third quarter of 2021.

Unit D Aquifer

As per Aspect (2020), groundwater flow direction in Unit D is strongly influenced by the typically higher water levels in MW-7 and MW-34 and this is seen in quarterly mapping of the potentiometric surface forming a groundwater divide running generally west-east beneath the southern area of the landfill footprint. Calculated groundwater elevations and interpreted groundwater potentiometric surface contours during the fourth quarter of 2021 indicate that groundwater in the Unit D aquifer flows generally southwesterly in the area south of the divide and northerly in the area north of the divide with components of flow to the northeast and northwest (Figure A-2). The groundwater gradient south of the divide is less steep than that north of the divide. Flow directions for the Unit D aquifer in the fourth quarter of 2021 are similar to those for the third quarter of 2021.

Groundwater Parameters

Table A-2 presents a summary of the groundwater parameters. Hydraulic conductivity and effective porosity values are based on the ranges referred to in *Remedial*

[2] The screen for MW-28 was installed at the contact between Unit D and unit below (Unit E) and requires a two foot rise in surrounding groundwater levels to reach the screen bottom.

Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1 (Aspect, 2020).

The average horizontal hydraulic conductivity for the Cc2 perched zone beneath the Landfill is reported to be 8.21 feet per day (ft/d) property wide and 5.81 ft/d in the south slope area (Aspect, 2020). The average horizontal hydraulic conductivity in the Unit D aquifer beneath the landfill is reported to be 10.2 ft/d (Aspect, 2020). The effective porosity is reported as 20 percent for both the Cc2 perched zone and the Unit D aquifer (Aspect, 2020).

Gradients

The hydraulic gradient for the Cc2 perched zone and Unit D aquifer was determined using potentiometric surface maps (Figures A-1 and A-2). Table A-2 lists the gradients for different portions of the Cc2 perched zone and the Unit D aquifer beneath the Landfill.

Average hydraulic gradients for the Cc2 perched zone are approximately 0.018 ft/ft property wide and 0.013 ft/ft for the south slope area based on measurements made during the fourth quarter of 2021. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the fourth quarter of 2021, are approximately 0.033[3] and 0.014 ft/ft in the northerly and southerly flow directions, respectively. The gradients calculated for the fourth quarter of 2021 are within the range of gradients calculated during the third quarter of 2021.

Groundwater Velocities

Average horizontal groundwater velocities calculated for the Cc2 perched zone and Unit D aquifer beneath the Landfill, are based on spatial differences in aquifer parameters, hydraulic gradients, and calculations using the following formula:

where: $$v = \frac{1}{n_{eff}} K \frac{\Delta H}{\Delta L}$$

v = Groundwater velocity [L/t]

n_{eff} = Effective porosity [dimensionless]

K = Hydraulic conductivity [L/t]

$\frac{\Delta H}{\Delta L}$ = Hydraulic gradient [L/L]

Table A-2 summarizes the groundwater parameters used to calculate a groundwater velocity for different portions of the Cc2 perched zone and the Unit D aquifer beneath the Landfill. The average horizontal groundwater velocities in the Cc2 perched zone are

[3] February 18, 2022 version incorrectly noted this as 0.035 ft/ft.

approximately 0.75 ft/d property wide and 0.36 ft/d in the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.68 and 0.71 ft/d in the northerly and southerly direction, respectively. The velocities calculated for the fourth quarter of 2021 are within the range of groundwater velocities calculated during the third quarter of 2021.

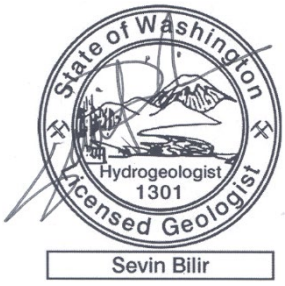
References

Aspect Consulting, LLC. (Aspect). 2020. *Remedial Investigation Report, Phase 1 – Vashon Island Closed Landfill, Volume 1 (Contract Number E00102E08; Task No. 310.3 – D310.3.1.3).* FINAL. Prepared in in conjunction with Anchor QEA and BHC Consultants. November 6.

King County Water and Land Resources Division (WLRD). 2021. *Proposal for 2021 Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations; King County Closed Landfills (Cedar Falls, Enumclaw, Hobart, and Vashon Island) and Cedar Hills Regional Landfill.* April.

Thank you for the opportunity to provide hydrogeologic services to SWD. If you have any questions, please feel free to contact me at 206-477-4646 or sevin.bilir@kingcounty.gov.

Sincerely,



Sevin Bilir, WA LHG
Environmental Scientist IV
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – Fourth Quarter 2021
Table A-2:	Groundwater Parameters – Fourth Quarter 2021
Figure A-1:	Groundwater Potentiometric Surface Map – Fourth Quarter 2021 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – Fourth Quarter 2021 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – Fourth Quarter 2021
Vashon Island Closed Landfill
King County, Washington

							November 10, 2021	
	Well Identification	Easting[1]	Northing[1]	Top of Casing Elevation[2]	Top of Screen Elevation[2]	Bottom of Screen Elevation[2]	Measured Depth to Water[3]	Groundwater Elevations[2]
		ft	ft	ft MSL	ft MSL	ft MSL	ft	ft MSL
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	74.54	243.43
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	166.21	238.96
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	122.82	247.50
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	107.20	241.85
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	5.16	230.51
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	113.16	246.01
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	119.05	242.29
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	192.95	183.80
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	143.37	172.16
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	246.48	158.95
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.93	158.40
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	248.11	158.43
	MW-28[4]	1228116.11	163843.88	398.73	172.15	162.65	DRY	NA
	MW-29	1228375.59	163681.26	413.85	172.83	158.63	244.62	169.23
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	205.46	180.50

Notes:
1. Reference datum for eastings and northings is the North American Datum of 1983 (NAD83/11).
2. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).
3. Water level measurements made by SWD personnel.
4. MW-28 requires 2 foot rise in groundwater levels. MW-28 screen installed at contact between Unit D and unit below (Unit E). Historically reported as a dry well (Aspect, 2020).

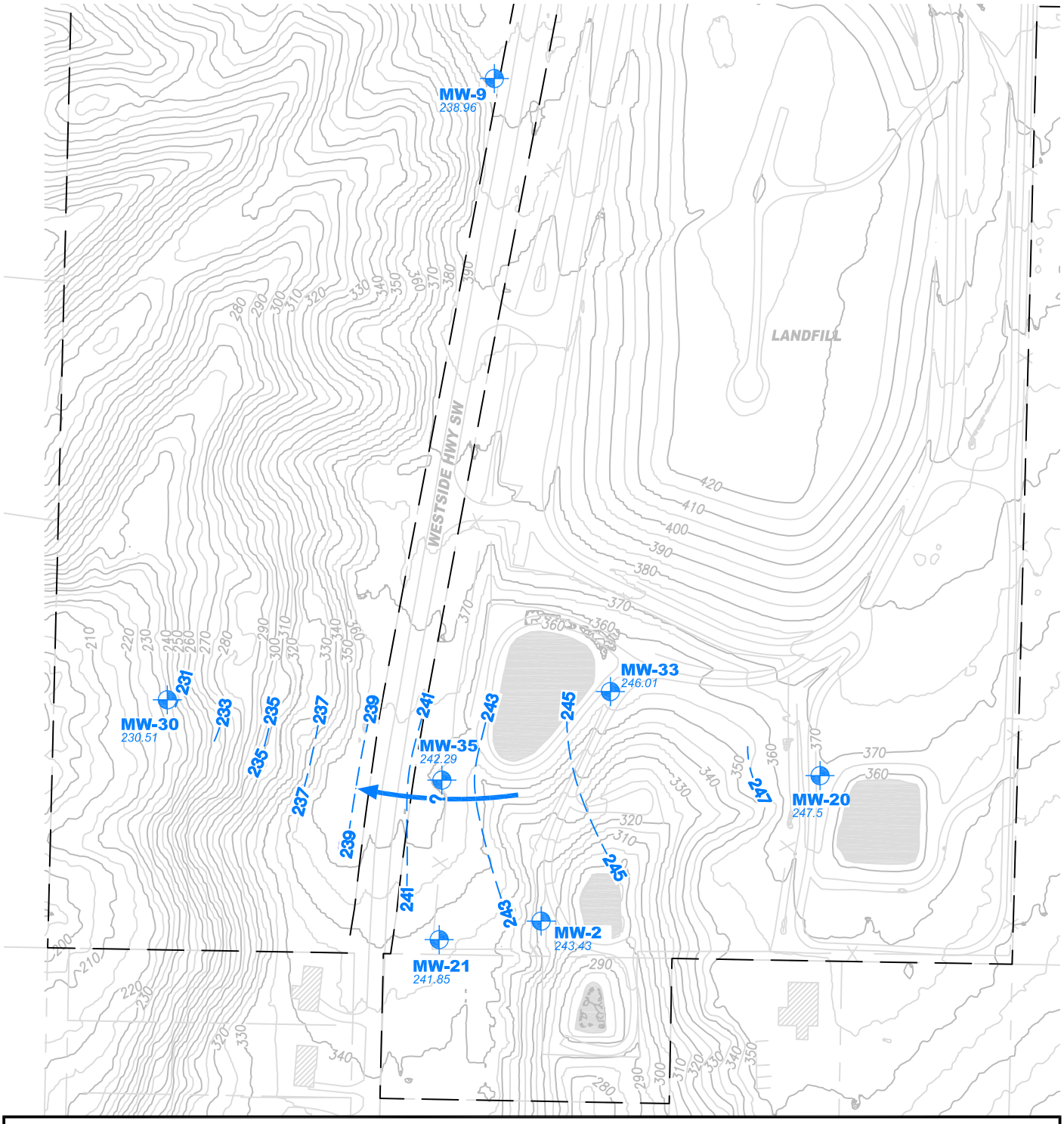
DRY Well indicated as dry, water detected below the screen.
NA Not applicable.

Table A-2: Groundwater Parameters – Fourth Quarter 2021
Vashon Island Closed Landfill
King County, Washington

		Fourth Quarter 2021 - November 10, 2021						
		Horizontal Hydraulic Conductivity[1,2] (K)			Effective Porosity[1] (n_{eff})	Horizontal Hydraulic Gradient[3] (DH/DL)	Horizontal Groundwater Velocity (v)	General Groundwater Flow Direction
Water Bearing Zone		Range	cm/s	ft/d		ft/ft	ft/d	
Unit Cc2	Property Wide[4,5]	Low	5.7E-04	1.61	20%	0.006	0.05	West-northwest
		High	1.6E-02	46.1		0.031	7.03	
		Average[5]	2.9E-03	8.21		0.018	0.75	
	South Slope Area[5,6]	Low	5.7E-04	1.61		0.006	0.05	West to West-southwest
		High	6.8E-03	19.4		0.019	1.84	
		Average[6]	2.1E-03	5.81		0.013	0.36	
Unit D	Northerly flow direction	Low	1.5E-03	4.4		0.033	0.72	North - with flow to the northeast and northwest
		High	1.6E-02	46.1			7.60	
		Average	3.6E-03	10.2			1.68	
	Southerly flow direction	Low	1.5E-03	4.4		0.014	0.31	Southwest - away from divide
		High	1.6E-02	46.1			3.23	
		Average	3.6E-03	10.2			0.71	

Notes:
1. Horizontal hydraulic conductivity values and effective porosity values from Aspect (2020).
2. Average horizontal hydraulic conductivity values are the geometric mean of values reported per well and unit (Aspect, 2020).
3. Horizontal hydraulic gradients based on average of gradients measured at several points from the maps shown on Figures A-1 and A-2.
4. Calculations for property wide Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35. (Aspect, 2020).
5. Calculations of average hydraulic conductivities for Unit Cc2 did not include data obtained in 1986 from MW-2 as the value was significantly lower than a remeasurement completed in 2015 (Aspect, 2020).
6. Calculations for South Slope Area Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-20, MW-21, MW-33, and MW-35. (Aspect, 2020).

cm/s centimeter per second
ft/d feet per day
ft/ft feet per feet



Legend

- **MW-X** *XXX.XX* — Monitoring Well Completed in Unit Cc2 Perched Zone Elevation *(feet mean sea level (MSL))*
- 240 — Perched Zone Groundwater Elevation Contour *(feet MSL)*
- Inferred Horizontal Groundwater Flow Path
- Pond
- Road
- Ditch
- Fence
- King County Landfill Property
- Building

Note:
1. Groundwater measurements made on November 10, 2021.

N

0 200 400 Feet

Contour Interval 5 Feet

Locations surveyed on Washington State Plane Coordinate System. North Zone (NAD 83/11)

Elevations reported in feet above mean sea level based on the North American Vertical Datum of 1988 (NAVD 88).

Basemap Layer Data: King County Solid Waste Division

King County

Groundwater Potentiometric Surface Map
Fourth Quarter 2021 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: February 2022	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: SB	

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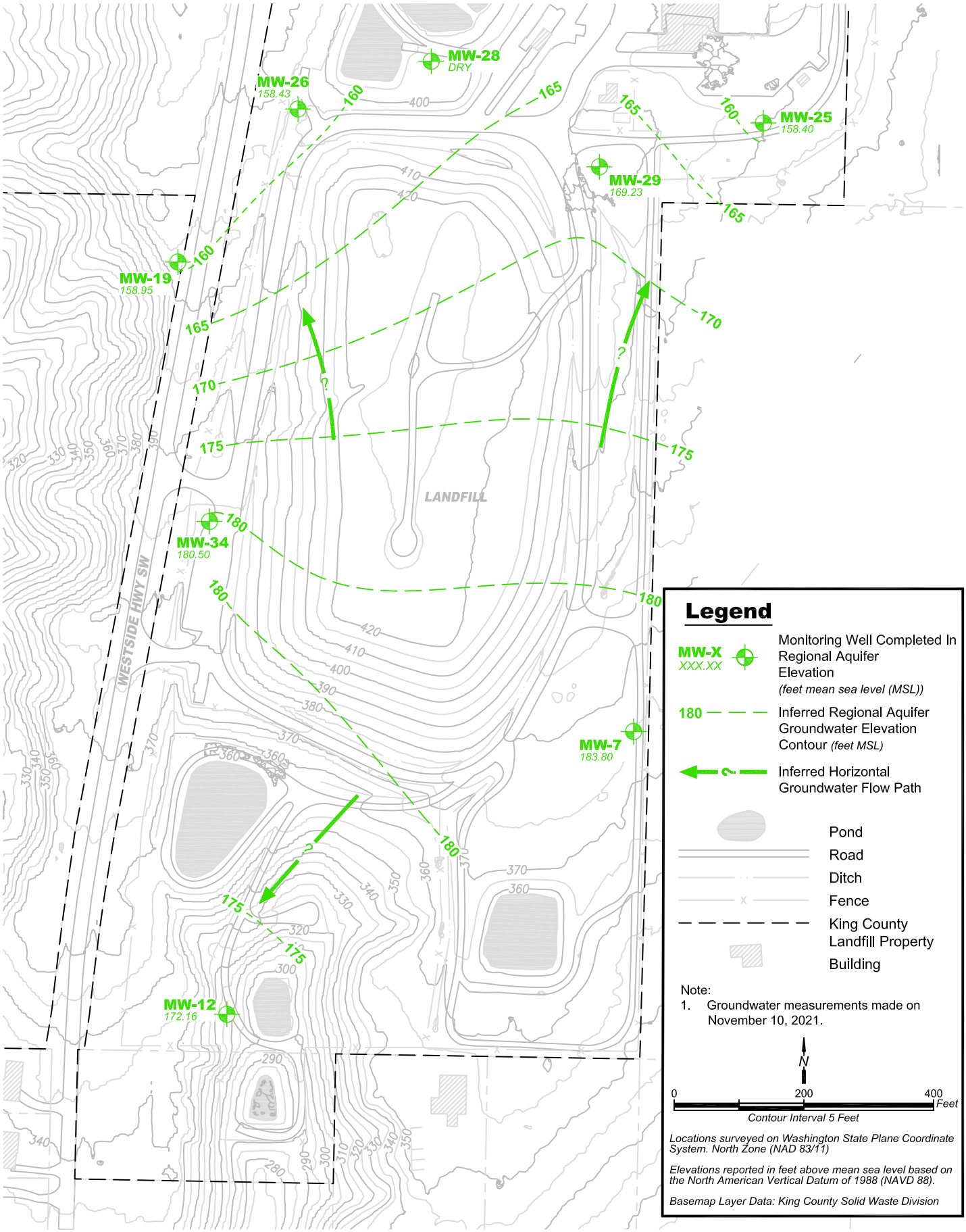


King County

Groundwater Potentiometric Surface Map
Fourth Quarter 2021 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: February 2022	PROJECT NO. 1033601
DESIGNED BY: SB	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: SB	

VI_4Q2021_UnitD.dwg

Appendix H

Groundwater Monitoring Data

Table H-1
Groundwater - Static Water Levels

Groundwater - Static Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation
Well #	Measurement Date	(feet)	(feet)	(feet above MSL)
Unit B				
MW-24	2/18/2021	377.48	89.91	287.57
MW-24	5/14/2021	377.48	88.46	289.02
MW-24	8/6/2021	377.48	88.41	289.07
MW-24	11/10/2021	377.48	89.22	288.26
Channel Cc1				
MW-3	2/18/2021	318.02	38.75	279.27
MW-3	5/14/2021	318.02	40.14	277.88
MW-3	8/6/2021	318.02	41.78	276.24
MW-3	11/10/2021	318.02	40.40	277.62
MW-4	2/18/2021	377.18	107.20	269.98
MW-4	5/14/2021	377.18	106.42	270.76
MW-4	8/6/2021	377.18	106.01	271.17
MW-4	11/10/2021	377.18	106.96	270.22
MW-10	2/18/2021	409.94	145.53	264.41
MW-10	5/14/2021	409.94	145.41	264.53
MW-10	8/6/2021	409.94	145.54	264.40
MW-10	11/10/2021	409.94	145.82	264.12
MW-13	2/18/2021	377.28	100.88	276.40
MW-13	5/14/2021	377.28	100.30	276.98
MW-13	8/6/2021	377.28	100.60	276.68
MW-13	11/10/2021	377.28	101.48	275.80
Channel Cc2				
MW-2	2/18/2021	317.97	74.21	243.76
MW-2	5/14/2021	317.97	73.90	244.07
MW-2	8/6/2021	317.97	74.09	243.88
MW-2	11/10/2021	317.97	74.54	243.43
MW-9	2/18/2021	405.17	165.55	239.62
MW-9	5/14/2021	405.17	165.34	239.83
MW-9	8/6/2021	405.17	165.87	239.30
MW-9	11/10/2021	405.17	166.21	238.96
MW-20	2/18/2021	370.32	122.35	247.97
MW-20	5/14/2021	370.32	122.01	248.31
MW-20	8/6/2021	370.32	122.23	248.09
MW-20	11/10/2021	370.32	122.82	247.50
MW-21	2/18/2021	349.05	106.92	242.13
MW-21	5/14/2021	349.05	106.63	242.42
MW-21	8/6/2021	349.05	106.78	242.27
MW-21	11/10/2021	349.05	107.20	241.85
MW-30	2/18/2021	235.67	5.33	230.34
MW-30	5/14/2021	235.67	5.90	229.77
MW-30	8/6/2021	235.67	6.11	229.56
MW-30	11/10/2021	235.67	5.16	230.51
MW-33	2/18/2021	359.17	112.72	246.45
MW-33	5/14/2021	359.17	112.41	246.76
MW-33	8/6/2021	359.17	112.60	246.57
MW-33	11/10/2021	359.17	113.16	246.01
MW-35	2/18/2021	361.34	118.68	242.66
MW-35	5/14/2021	361.34	118.36	242.98
MW-35	8/6/2021	361.34	118.63	242.71
MW-35	11/10/2021	361.34	119.05	242.29

Table H-1 *(continued)*
Groundwater - Static Water Levels

Groundwater - Static Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation
Well #	Measurement Date	(feet)	(feet)	(feet above MSL)
Channel Cc3				
MW-8	2/18/2021	386.00	176.65	209.35
MW-8	5/14/2021	386.00	175.90	210.10
MW-8	8/6/2021	386.00	176.42	209.58
MW-8	11/10/2021	386.00	176.88	209.12
MW-36	2/18/2021	378.19	151.51	226.68
MW-36	5/14/2021	378.19	151.28	226.91
MW-36	8/6/2021	378.19	151.49	226.70
MW-36	11/10/2021	378.19	151.85	226.34
Unit D Aquifer				
MW-7	2/18/2021	376.75	192.15	184.60
MW-7	5/14/2021	376.75	191.73	185.02
MW-7	8/6/2021	376.75	192.17	184.58
MW-7	11/10/2021	376.75	192.95	183.80
MW-12	2/18/2021	315.53	142.82	172.71
MW-12	5/14/2021	315.53	142.56	172.97
MW-12	8/6/2021	315.53	142.89	172.64
MW-12	11/10/2021	315.53	143.37	172.16
MW-19	2/18/2021	405.43	246.05	159.38
MW-19	5/14/2021	405.43	246.03	159.40
MW-19	8/6/2021	405.43	246.25	159.18
MW-19	11/10/2021	405.43	246.48	158.95
MW-25	2/18/2021	402.33	243.46	158.87
MW-25	5/14/2021	402.33	243.54	158.79
MW-25	8/6/2021	402.33	243.72	158.61
MW-25	11/10/2021	402.33	243.93	158.40
MW-26	2/18/2021	406.54	247.67	158.87
MW-26	5/14/2021	406.54	247.67	158.87
MW-26	8/6/2021	406.54	247.85	158.69
MW-26	11/10/2021	406.54	248.11	158.43
MW-28	2/18/2021	398.73	DRY	DRY
MW-28	5/14/2021	398.73	DRY	DRY
MW-28	8/6/2021	398.73	DRY	DRY
MW-28	11/10/2021	398.73	DRY	DRY
MW-29	2/18/2021	413.85	244.48	169.37
MW-29	5/14/2021	413.85	244.37	169.48
MW-29	8/6/2021	413.85	244.56	169.29
MW-29	11/10/2021	413.85	244.62	169.23
MW-34	2/18/2021	385.96	205.08	180.88
MW-34	5/14/2021	385.96	204.63	181.33
MW-34	8/6/2021	385.96	205.06	180.90
MW-34	11/10/2021	385.96	205.46	180.50

Table H-2
Groundwater - Sampling Water Levels

Groundwater - Sampling Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation (feet above MSL)
Well #	Measurement Date	(feet)	(feet)	
Channel Cc1				
MW-3	2/23/2021	318.02	38.63	279.39
MW-3	5/24/2021	318.02	40.43	277.59
MW-3	8/10/2021	318.02	41.70	276.32
MW-3	11/15/2021	318.02	39.55	278.47
MW-4	2/25/2021	377.18	107.07	270.11
MW-4	5/18/2021	377.18	106.50	270.68
MW-4	8/10/2021	377.18	105.91	271.27
MW-4	11/15/2021	377.18	106.58	270.60
MW-10	2/22/2021	409.94	145.58	264.36
MW-10	5/18/2021	409.94	145.55	264.39
MW-10	8/10/2021	409.94	145.59	264.35
MW-10	11/16/2021	409.94	145.93	264.01
MW-13	2/22/2021	377.28	100.81	276.47
MW-13	5/17/2021	377.28	100.27	277.01
MW-13	8/12/2021	377.28	100.63	276.65
MW-13	11/16/2021	377.28	101.50	275.78
Channel Cc2				
MW-2	2/25/2021	317.97	74.09	243.88
MW-2	5/24/2021	317.97	73.95	244.02
MW-2	8/18/2021	317.97	74.18	243.79
MW-2	11/18/2021	317.97	74.33	243.64
MW-9	2/22/2021	405.17	165.49	239.68
MW-9	5/19/2021	405.17	165.57	239.60
MW-9	8/12/2021	405.17	165.73	239.44
MW-9	11/17/2021	405.17	166.21	238.96
MW-20	2/25/2021	370.32	122.13	248.19
MW-20	5/24/2021	370.32	122.10	248.22
MW-20	8/18/2021	370.32	122.49	247.83
MW-20	11/18/2021	370.32	122.45	247.87
MW-21	2/25/2021	349.05	106.86	242.19
MW-21	5/24/2021	349.05	106.72	242.33
MW-21	8/18/2021	349.05	106.96	242.09
MW-21	11/18/2021	349.05	106.92	242.13
MW-33	2/25/2021	359.17	112.54	246.63
MW-33	5/24/2021	359.17	112.59	246.58
MW-33	8/18/2021	359.17	112.75	246.42
MW-33	11/18/2021	359.17	112.81	246.36
MW-35	2/25/2021	361.34	118.57	242.77
MW-35	5/24/2021	361.34	118.57	242.77
MW-35	8/19/2021	361.34	118.75	242.59
MW-35	11/18/2021	361.34	118.79	242.55

Table H-2 *(continued)*
Groundwater - Sampling Water Levels

Groundwater - Sampling Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation (feet above MSL)
Well #	Measurement Date	(feet)	(feet)	
Channel Cc3				
MW-8	2/22/2021	386.00	176.68	209.32
MW-8	5/18/2021	386.00	176.03	209.97
MW-8	8/10/2021	386.00	176.44	209.56
MW-8	11/16/2021	386.00	176.93	209.07
MW-36	2/22/2021	378.19	151.54	226.65
MW-36	5/18/2021	378.19	151.39	226.80
MW-36	8/11/2021	378.19	151.47	226.72
MW-36	11/16/2021	378.19	151.82	226.37
Unit D Aquifer				
MW-7	2/23/2021	376.75	192.20	184.55
MW-7	5/19/2021	376.75	191.87	184.88
MW-7	8/12/2021	376.75	192.32	184.43
MW-7	11/16/2021	376.75	193.03	183.72
MW-12	2/22/2021	315.33	142.81	172.52
MW-12	5/17/2021	315.53	142.60	172.93
MW-12	8/10/2021	315.53	142.90	172.63
MW-12	11/15/2021	315.53	142.80	172.73
MW-19	2/22/2021	405.43	246.08	159.35
MW-19	5/25/2021	405.43	246.06	159.37
MW-19	8/12/2021	405.43	246.05	159.38
MW-19	11/16/2021	405.43	246.53	158.90
MW-26	2/23/2021	406.54	248.02	158.52
MW-26	5/19/2021	406.54	247.70	158.84
MW-26	8/11/2021	406.54	247.67	158.87
MW-26	11/17/2021	406.54	248.00	158.54
MW-29	2/23/2021	413.85	244.74	169.11
MW-29	5/19/2021	413.85	244.52	169.33
MW-29	8/11/2021	413.85	244.70	169.15
MW-29	11/17/2021	413.85	244.55	169.30
MW-34	2/23/2021	385.96	205.24	180.72
MW-34	5/19/2021	385.96	204.77	181.19
MW-34	8/12/2021	385.96	204.89	181.07
MW-34	11/17/2021	385.96	205.51	180.45

Table H-3
Groundwater - Field Parameters

Groundwater - Field Parameters			Dissolved Oxygen (DO) (Field)	Oxidation-Reduction Potential	pH (Field)	Specific Conductance (Field)	Temperature (Field)	Turbidity (Field)	Volume Purged
Well #	Sample Date	Sample ID	(mg/L)	(mV)	(std. units)	(µmhos/cm)	(°C)	(NTU)	(gal)
Channel Cc1									
MW-3	2/23/2021	WV3-210223-	9.6	287.6	5.6	65.6	9.15	4.93	2
MW-3	5/24/2021	WV3-210524-	9.09	337.3	5.58	54.1	9.32	0.39	1
MW-3*	--	--	--	--	--	--	--	--	--
MW-3	11/15/2021	WV3-211115-	10.34	431.8	5.68	57.3	9.88	0.8	0.75
MW-4	2/25/2021	WV4-210225-	--	--	7.45	155	8	0.2	3.75
MW-4	5/18/2021	WV4-210518-	--	--	6.71	256.5	11.79	0.45	2
MW-4	8/10/2021	WV4-210810-	--	--	6.55	290	13.67	3.7	2
MW-4*	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	4.7	368.9	6.85	129.7	10.14	0.58	3
MW-10	5/18/2021	WV10210518-	5.16	246.6	7.18	136.8	10.57	0.32	2.25
MW-10	8/10/2021	WV10210810-	5.15	158.9	7.04	134.8	11.64	0.19	3
MW-10	11/16/2021	WV10211116-	4.76	153.7	7	127.3	10.48	0.45	2.5
MW-13	2/22/2021	WV13210222-	5.1	250.1	6.63	142.3	10.32	0.27	4
MW-13	5/17/2021	WV13210517-	8.35	302	6.94	136.9	11.08	0.3	1
MW-13	8/12/2021	WV13210812-	8.08	183.5	7.16	134.5	11.42	0.34	1.5
MW-13	8/12/2021	WV13210812D	8.08	183.5	7.16	134.5	11.42	0.34	1.5
MW-13	11/16/2021	WV13211116-	7.5	220.1	7.14	130.2	10.54	0.51	2.5
Channel Cc2									
MW-2	2/25/2021	WV2-210225-	1.33	364.5	6.85	284.8	9.33	0.34	1.75
MW-2	5/24/2021	WV2-210524-	0.84	286.8	6.73	286.3	9.26	0.21	3
MW-2	5/24/2021	WV2-210524D	0.84	286.8	6.73	286.3	9.26	0.21	3
MW-2	8/18/2021	WV2-210818-	0.97	314.8	6.57	272.1	9.63	0.47	2.5
MW-2	11/18/2021	WV2-211118-	0.7	466.7	6.98	273.1	9.44	0.37	2.25
MW-9	2/22/2021	WV9-210222-	7.6	248.5	6.91	167.3	10.05	0.41	2.5
MW-9	5/19/2021	WV9-210519-	5.68	305.4	6.81	160.6	10.21	0.24	2.25
MW-9	8/12/2021	WV9-210812-	8.1	274.8	6.65	178.6	10.32	0.38	2.5
MW-9	11/17/2021	WV9-211117-	8.51	391.8	7.27	167.4	9.95	0.62	3.5
MW-20	2/25/2021	WV20210225-	1.98	146.8	7.45	165.4	10.04	1.84	2
MW-20	5/24/2021	WV20210524-	1.06	112.5	7.47	162.8	11.04	1	4
MW-20	8/18/2021	WV20210818-	1.86	-63.9	7.45	196.6	12.7	0.88	2.1
MW-20	11/18/2021	WV20211118-	0.42	-58.8	7.89	160.3	10.72	0.58	4.25
MW-21	2/25/2021	WV21210225-	1.1	235.1	6.8	274	9.665	4.52	4.75
MW-21	5/24/2021	WV21210524-	1.17	64.3	6.55	299	10.02	2.6	3
MW-21	8/18/2021	WV21210818-	0.96	3.8	6.82	281.7	10.6	2.17	3.4
MW-21	11/18/2021	WV21211118-	1.06	74.5	6.66	267.6	9.46	1.71	8
MW-33	2/25/2021	WV33210225-	0.7	-65.7	6.85	576	12.37	0.55	2.5
MW-33	5/24/2021	WV33210524-	0.6	17.2	6.58	589.4	13.9	0.54	3.5
MW-33	8/18/2021	WV33210818-	0.69	-37.9	6.58	588	13.78	0.4	2.5
MW-33	11/18/2021	WV33211118-	0.73	-39.3	6.61	548.3	13.37	1.75	2.4
MW-35	2/25/2021	WV35210225-	0.69	-36.2	6.54	585	9.73	30.7	2
MW-35	5/24/2021	WV35210524-	0.49	-44.4	6.38	620	10.63	24.4	2
MW-35	8/19/2021	WV35210819-	0.65	-63.2	6.56	597	11.08	4.64	3.75
MW-35	11/18/2021	WV35211118-	2.25	-48.6	6.39	542.1	10.5	86.8	2

Table H-3 *(continued)*
Groundwater - Field Parameters

Groundwater - Field Parameters			Dissolved Oxygen (DO) (Field)	Oxidation-Reduction Potential	pH (Field)	Specific Conductance (Field)	Temperature (Field)	Turbidity (Field)	Volume Purged
Well #	Sample Date	Sample ID	(mg/L)	(mV)	(std. units)	(µmhos/cm)	(°C)	(NTU)	(gal)
Channel Cc3									
MW-8	2/22/2021	WV8-210222-	10.34	432.3	6.37	151	10.51	0.44	2.25
MW-8	5/18/2021	WV8-210518-	10.25	295.3	6.36	156.7	10.25	0.3	3
MW-8	8/10/2021	WV8-210810-	10.14	180	6.29	153.4	11.44	0.14	5
MW-8	11/16/2021	WV8-211116-	10.27	203.6	6.33	146.1	10.43	1.31	2.1
MW-36	2/22/2021	WV36210222-	3.64	416	7.59	156	11.55	0.4	3
MW-36	5/18/2021	WV36210518-	3.63	210.3	7.72	165.8	11.28	0.22	2.75
MW-36	8/11/2021	WV36210811-	4.1	138.4	7.66	164.3	12.83	0.57	1.6
MW-36	11/16/2021	WV36211116-	3.41	293.6	7.33	158.1	11.27	4.31	3.75
MW-36	11/16/2021	WV36211116D	3.41	293.6	7.33	158.1	11.27	4.31	3.75
Unit D Aquifer									
MW-7	2/23/2021	WV7-210223-	0.82	71	7.82	168.9	9.99	1.48	5.5
MW-7	2/23/2021	WV7-210223D	0.82	71	7.82	168.9	9.99	1.48	5.5
MW-7	5/19/2021	WV7-210519-	0.84	132.7	7.52	176.8	10.98	1.37	6.5
MW-7	8/12/2021	WV7-210812-	1.36	-18.3	7.74	175.5	12.3	2.6	3.75
MW-7	11/16/2021	WV7-211116-	1.7	98.7	7.7	165.6	10.28	2.53	4.5
MW-12	2/22/2021	WV12210222-	5.23	250.1	6.95	147.4	9.44	1.25	2.5
MW-12	5/17/2021	WV12210517-	5.24	269.5	7.12	151.2	9.12	0.38	4
MW-12	8/10/2021	WV12210810-	5.32	289.2	6.98	145.3	10.09	0.59	2.75
MW-12	11/15/2021	WV12211115-	5.06	373.6	7.18	141.4	9.74	0.22	5
MW-19	2/22/2021	WV19210222-	0.64	-11.1	7.4	195.4	9.81	3.63	6.75
MW-19	5/25/2021	WV19210525-	0.56	200.2	7.4	202.9	9.67	7.96	4.75
MW-19	8/12/2021	WV19210812-	0.93	49.4	7.13	194.8	10.01	1.37	4.25
MW-19	11/16/2021	WV19211116-	1.23	231.4	7.28	192.9	9.69	8.41	3.75
MW-26	2/23/2021	WV26210223-	1.19	-75.5	7.77	172.6	10.25	5.35	4.75
MW-26	5/19/2021	WV26210519-	1.66	42.7	8.01	179.8	10.65	4.46	3
MW-26	8/11/2021	WV26210811-	0.94	43.2	7.71	171.9	10.54	3.64	5.5
MW-26	11/17/2021	WV26211117-	1.13	121.1	7.92	171.7	9.81	6.6	5
MW-29	2/23/2021	WV29210223-	0.96	-66.1	7.11	214.7	10.04	53.5	5.2
MW-29	5/19/2021	WV29210519-	1.21	68.4	7.33	213.1	10.82	13.1	4.75
MW-29	8/11/2021	WV29210811-	1.13	-23.1	7.08	213.9	11.19	6.26	3.75
MW-29	11/17/2021	WV29211117-	1.04	-22.4	7.39	212	9.88	10.3	5.5
MW-34	2/23/2021	WV34210223-	6.1	141.4	6.65	176.6	12.22	0.15	2.5
MW-34	5/19/2021	WV34210519-	6.2	313.3	6.47	176.7	12.53	0.26	2.75
MW-34	8/12/2021	WV34210812-	5.98	242.9	6.64	177.3	12.25	0.34	3.5
MW-34	11/17/2021	WV34211117-	6.05	406.4	6.75	172.7	11.64	0.31	3
Field Blanks									
FIELD BLANK	2/22/2021	WV10210222F	--	--	5.21	0.7	14.29	--	--
FIELD BLANK	2/25/2021	WV33210225F	--	--	5.93	0.6	11.19	--	--
FIELD BLANK	5/19/2021	WV26210519F	--	--	6.85	1.5	12.51	--	--
FIELD BLANK	8/18/2021	WV20210818F	9.16	242.8	5.02	1.2	16.3	0.14	--
FIELD BLANK	11/18/2021	WV2-211118F	--	363.2	5.98	0.7	13.18	0.23	--
Offsite Domestic Wells									
DW-85	2/24/2021	WV85210224-	1.73	329.4	6.81	293.1	9.743	0.35	1.5
DW-85	9/20/2021	WV85210920-	0.28	-94.9	7.73	139	10.08	0.52	60
DW-LS	3/24/2021	WVLS210324-	8.18	364.7	7.07	239.7	9.88	1.12	75
DW-LS	8/9/2021	WVLS210809-	8.33	317.3	6.89	253	12.64	0.7	60
DW-PA	2/24/2021	WVPA210224-	8.54	364.1	7.02	162.7	8.27	0.52	60
DW-PA	8/9/2021	WVPA210809-	8.54	348.8	6.52	166.5	11.65	0.43	75

Notes:

*Insufficient water to collect a sample

-- = parameter is not sampled for

Table H-4
Groundwater - Conventionals

Groundwater - Conventionals			Alkalinity, Total (as $CACO_3$)	Ammonia as N	Chloride	Nitrate	Specific Conductance (Lab)	Sulfate	Total Dissolved Solids	Total Organic Carbon	Total Solids	Total Suspended Solids
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(µmhos/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc1												
MW-3	2/23/2021	WV3-210223-	23.6	0.002 U	2.12	0.273	75.3	4.99	62.7	0.59 T	62 B	1.7
MW-3	5/24/2021	WV3-210524-	18.5	0.002 U	1.47	0.236	57.9	4.03	42.7	0.6 T	48.7	0.5 U
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	11/15/2021	WV3-211115-	18.8	0.002 U	1.42	0.631	64.9	4.55	40	0.53 T	46	0.7 T
MW-4	2/25/2021	WV4-210225-	57	0.002 U	7.14	1.79	184	13.7	130	0.5 U	148	0.5 U
MW-4	5/18/2021	WV4-210518-	79.9	0.002 U	3.62	2.74	295	15.8	213	0.6 T	204	0.53 U
MW-4	8/10/2021	WV4-210810-	80.8	0.002 U	16.6	3.58	311	33.9	247	0.85 T	243	0.5 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	56.8	0.002 U	3.41	0.424	150	9.21	109	0.62 T	109	0.7 T
MW-10	5/18/2021	WV10210518-	57.1	0.002 U	3.52	0.461	145	9.22	109	0.5 U	99.3	1 U
MW-10	8/10/2021	WV10210810-	56.8	0.002 U	3.53	0.433	147	9.16	131	0.5 U	103	0.51 U
MW-10	11/16/2021	WV10211116-	56.6	0.002 U	3.41	0.412	148	9.12	96	0.5 U	114	0.5 U
MW-13	2/22/2021	WV13210222-	63.2	0.002 U	2.73	0.238	163	11.7	117	0.51 T	115	0.5 U
MW-13	5/17/2021	WV13210517-	59.8	0.002 U	2.68	0.418	146	8.39	111	0.5 U	105	0.5 T
MW-13	8/12/2021	WV13210812-	60.7	0.002 U	2.67	0.345	151	9.78	109	0.56 T	108	0.51 U
MW-13	8/12/2021	WV13210812D	61.2	0.002 U	2.74	0.346	152	9.85	106	0.5 U	117	0.52 U
MW-13	11/16/2021	WV13211116-	60.9	0.002 U	2.58	0.391	152	9.02	101	0.5 U	102	0.53 U
Channel Cc2												
MW-2	2/25/2021	WV2-210225-	143	0.002 U	2.53	0.755	320	15.1	195	0.5 U	198	0.51 U
MW-2	5/24/2021	WV2-210524-	142	0.002 U	2.22	0.799	307	13.2	182	0.6 T	191	0.5 U
MW-2	5/24/2021	WV2-210524D	142	0.002 U	2.21	0.796	307	13.2	183	0.61 T	188	0.5 U
MW-2	8/18/2021	WV2-210818-	140	0.002 U	2.26	0.734	310	13.9	187	0.68 T	190	0.5 U
MW-2	11/18/2021	WV2-211118-	134	0.002 U	2.31	1.08	302	14.1	162	0.71 T	181	0.53 U
MW-9	2/22/2021	WV9-210222-	72.4	0.002 U	4.58	0.38	190	12.2	130	0.51 T	132	0.51 U
MW-9	5/19/2021	WV9-210519-	69.7	0.002 U	4.33	0.403	177	12.5	125	0.5 U	121	0.5 U
MW-9	8/12/2021	WV9-210812-	75.3	0.002 U	5.84	0.753	199	13.4	133	0.52 T	142	0.5 U
MW-9	11/17/2021	WV9-211117-	73.4	0.002 U	4.8	0.508	193	12.2	115	0.5 U	119	1.5
MW-20	2/25/2021	WV20210225-	72.6	0.0157	3.26	0.01 U	190	15.7	142	0.5 U	143	1.47
MW-20	5/24/2021	WV20210524-	72.1	0.0152	3.06	0.01 U	181	14.9	129	0.5 U	139	0.51 U
MW-20	8/18/2021	WV20210818-	71	0.015	3.21	0.01 U	185	15.8	128	0.5 U	130	0.5 T
MW-20	11/18/2021	WV20211118-	71	0.0155	3.17	0.01 U	185	15.6	121	0.5 U	121	0.5 U
MW-21	2/25/2021	WV21210225-	144	0.0091 T	2.09	0.278	315	14.1	193	0.59 T	208	6.6
MW-21	5/24/2021	WV21210524-	146	0.0108	1.85	0.231	308	12.8	195	0.71 T	201	1.6
MW-21	8/18/2021	WV21210818-	142	0.0108	1.91	0.265	305	13.5	189	0.57 T	191	1.7
MW-21	11/18/2021	WV21211118-	141	0.0091 T	1.91	0.343	305	13.5	173	0.66 T	175	1 T
MW-33	2/25/2021	WV33210225-	332	0.0313	3.5	0.05 U	642	17.2	375	1.54	397	5.05
MW-33	5/24/2021	WV33210524-	349	0.0292	3.29	0.01 U	647	16	391	1.76	409	6.18
MW-33	8/18/2021	WV33210818-	342	0.0309	3.55	0.01 U	654	17.1	383	2.06	405	4.5
MW-33	11/18/2021	WV33211118-	319	0.031	3.41	0.01 U	619	17	363	2.18	350	8.67
MW-35	2/25/2021	WV35210225-	325	0.0715	4.26	0.1 U	649	27.2	434	3.15	495	159
MW-35	5/24/2021	WV35210524-	345	0.0681	4	0.05 U	659	24.7	433	3.78	572	237
MW-35	8/19/2021	WV35210819-	332	0.0654	4.11	0.05 U	652	27	421	3.36	481	195
MW-35	11/18/2021	WV35211118-	321	0.0638	3.89	0.01 U	641	29.9	406 J	3.74	609 J	385 J

Table H-4 *(continued)*
Groundwater - Conventionals

Groundwater - Conventionals			Alkalinity, Total (as $CACO_3$)	Ammonia as N	Chloride	Nitrate	Specific Conductance (Lab)	Sulfate	Total Dissolved Solids	Total Organic Carbon	Total Solids	Total Suspended Solids
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(µmhos/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc3												
MW-8	2/22/2021	WV8-210222-	59.1	0.002 U	4.24	2.71	175	7.91	124	0.61 T	121	0.51 U
MW-8	5/18/2021	WV8-210518-	56.1	0.002 U	4.28	3.25	166	7.23	128	0.5 U	118	0.5 U
MW-8	8/10/2021	WV8-210810-	54.9	0.002 U	4.69	3.32	166	7.19	118	0.5 U	132	0.5 T
MW-8	11/16/2021	WV8-211116-	55.5	0.002 U	4.1	3.43	168	7.06	103	0.5 U	109	1.8
MW-36	2/22/2021	WV36210222-	68.8	0.002 U	3.03	0.018 T	179	13.9	133	0.5 U	132	0.5 U
MW-36	5/18/2021	WV36210518-	69.6	0.002 U	3.1	0.017 T	175	14.2	133	0.5 U	131	0.5 U
MW-36	8/11/2021	WV36210811-	69.4	0.002 U	3.1	0.018 T	177	14.2	130	0.5 U	139	0.5 U
MW-36	11/16/2021	WV36211116-	68	0.002 U	2.96	0.02 T	176	13.9	119	0.5 U	125	0.5 U
MW-36	11/16/2021	WV36211116D	68.2	0.002 U	2.97	0.02 T	177	13.9	119	0.5 U	118	0.5 U
Unit D Aquifer												
MW-7	2/23/2021	WV7-210223-	78.7	0.25	3.36	0.01 U	192	11.2	136	0.5 U	137	1.3
MW-7	2/23/2021	WV7-210223D	78.7	0.25	3.36	0.01 U	193	11.1	129	0.5 U	142	1.2 T
MW-7	5/19/2021	WV7-210519-	79.6	0.238	3.4	0.01 U	186	11.1	135	0.5 U	131	1.1
MW-7	8/12/2021	WV7-210812-	79.3	0.233	3.38	0.012 T	191	11.2	132	0.5 U	141	1.2
MW-7	11/16/2021	WV7-211116-	77.8	0.225	3.34	0.023 T	189	11	123	0.5 U	127	1.1
MW-12	2/22/2021	WV12210222-	63.4	0.002 U	3.11	0.693	166	10.1	117	0.5 U	119	0.6 T
MW-12	5/17/2021	WV12210517-	63	0.002 U	3.13	0.697	159	9.8	109	0.5 U	131	0.5 U
MW-12	8/10/2021	WV12210810-	63.6	0.002 U	3.09	0.677	163	9.94	115	0.5 U	124	0.5 U
MW-12	11/15/2021	WV12211115-	62.5	0.002 U	3.02	0.687	161	9.63	99.3	0.5 U	101	0.5 U
MW-19	2/22/2021	WV19210222-	85.1	0.0286	4.53	0.01 U	221	17.2	147	0.58 T	153	1.6
MW-19	5/25/2021	WV19210525-	86.3	0.0176	4.43	0.013 T	217	16.3	143	0.5 U	163	12.6
MW-19	8/12/2021	WV19210812-	85.6	0.0345	4.64	0.01 U	218	17.3	147	0.5 U	149	0.8 T
MW-19	11/16/2021	WV19211116-	84.5	0.0293	4.57	0.01 T	217	16.5	135	0.5 U	131	0.5 U
MW-26	2/23/2021	WV26210223-	76.3	0.261	3.74	0.015 T	196	13.6	133	0.5 U	150	8
MW-26	5/19/2021	WV26210519-	77.4	0.256	3.79	0.018 T	189	13.5	143	0.5 U	141	5.6
MW-26	8/11/2021	WV26210811-	76.3	0.241	3.78	0.016 T	192	13.7	153	0.5 U	151	15.9
MW-26	11/17/2021	WV26211117-	75.7	0.242	3.72	0.028 T	193	13.3	126	0.5 U	131	5.4
MW-29	2/23/2021	WV29210223-	100	0.002 U	3.56	0.01 U	243	16.2	145	0.5 U	180	30.2
MW-29	5/19/2021	WV29210519-	101	0.002 T	17.4	0.01 U	236	33.2	159	0.5 U	157	8.5
MW-29	8/11/2021	WV29210811-	99.7	0.0028 T	3.61	0.01 U	236	14.9	159	0.5 U	157	6.4
MW-29	11/17/2021	WV29211117-	98.6	0.0026 T	3.52	0.01 U	239	15.9	135	0.5 U	148	6.8
MW-34	2/23/2021	WV34210223-	70.4	0.002 U	4.86	1.6	201	13.5	126	0.58 T	135	0.52 U
MW-34	5/19/2021	WV34210519-	71.1	0.002 U	5.2	1.63	194	13.6	138	0.5 U	127	0.51 U
MW-34	8/12/2021	WV34210812-	70.9	0.002 U	5.01	1.69	199	13.5	127	0.5 U	135	0.5 U
MW-34	11/17/2021	WV34211117-	69.8	0.002 U	4.78	1.73	198	13	117	0.5 U	118	0.5 U
Field Blanks												
FIELD BLANK	2/22/2021	WV10210222F	1 U	0.002 U	0.05 U	0.01 U	1.2 T	0.1 U	10 U	0.5 U	10 U	0.52 U
FIELD BLANK	2/25/2021	WV33210225F	1 U	0.002 U	0.05 U	0.01 U	1.6 T	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	5/19/2021	WV26210519F	1 U	0.002 U	0.05 U	0.01 U	1.3 T	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	8/18/2021	WV20210818F	1 U	0.002 U	0.276	0.01 U	1.9 T	0.1 U	10 U	0.5 U	10 U	0.51 U
FIELD BLANK	11/18/2021	WV2-211118F	1 U	0.002 U	0.106	0.01 U	1.3 T	0.1 U	10 U	0.5 U	10 U	0.52 U
Offsite Domestic Wells												
DW-85	2/24/2021	WV85210224-	69.9	0.251	2.66	0.01 U	155	2.23	100	0.5 U	101 B	0.5 U
DW-85	9/20/2021	WV85210920-	69.7	0.275	2.57	0.01 U	153	2.11	97.3	0.53 T	103	0.5 U
DW-LS	3/24/2021	WVLS210324-	110	0.002 U	6.73	2.03	275	12.1	182	0.5 U	175	0.5 U
DW-LS	8/9/2021	WVLS210809-	113	0.002 U	7.12	2.26	283	12.5	192	0.59 T	211	1.1
DW-PA	2/24/2021	WVPA210224-	68.3	0.002 U	5.7	0.77	189	12.5	119	0.5 U	127 B	0.5 U
DW-PA	8/9/2021	WVPA210809-	68.6	0.002 U	5.81	0.931	185	11.5	131	0.5 U	138	0.51 U

Notes:
*Insufficient water to collect a sample
-- = parameter is not sampled for

Table H-5
Groundwater - Metals (Dissolved & Total)

Groundwater - Metals (Dissolved & Total)			Antimony, Dissolved	Antimony, Total	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Calcium, Dissolved	Calcium, Total	Chromium, Dissolved	Chromium, Total	Cobalt, Dissolved	Cobalt, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc1																								
MW-3	2/23/2021	WV3-210223-	0.0003 U	0.0003 U	5.17E-05	0.000163	0.0179	0.0204	0.0001 U	0.0001 U	5E-05 U	5E-05 U	6.66	6.62	0.0002 U	0.000425	5E-05 U	0.000102	0.000508	0.000532	0.01 U	0.211	0.0001 U	0.000208
MW-3	5/24/2021	WV3-210524-	0.0003 U	0.0003 U	5E-05 U	5E-05 U	0.0116	0.0116	0.0001 U	0.0001 U	5E-05 U	5E-05 U	5.08	5.18	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.000407	0.000668	0.01 U	0.0192	0.0001 U	0.0001 U
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	11/15/2021	WV3-211115-	0.0003 U	0.0003 U	5.92E-05	5.87E-05	0.0156	0.0151	0.0001 U	0.0001 U	5E-05 U	5E-05 U	5.72	5.71	0.0002 U	0.0002 DU	5E-05 U	5E-05 U	0.000245	0.000274	0.01 U	0.0422	0.0001 U	0.0001 U
MW-4	2/25/2021	WV4-210225-	0.0003 U	0.0003 U	0.000362	0.000363	0.00443	0.00433	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.8	13.8	0.01	0.0101	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-4	5/18/2021	WV4-210518-	0.0003 U	0.0003 U	0.000393	0.000398	0.00632	0.00653	0.0001 U	0.0001 U	5E-05 U	5E-05 U	22.3	23.3	0.00662	0.00649	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-4	8/10/2021	WV4-210810-	0.0003 U	0.0003 U	0.000381	0.000391	0.00783	0.00796	0.0001 U	0.0001 U	5E-05 U	5E-05 U	25.6	26	0.00526	0.00549	5E-05 U	5E-05 U	0.000231	0.00072	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	0.0003 U	0.0003 U	0.00168	0.00168	0.0032	0.00343	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.87	9.87	0.00266	0.00266	5E-05 U	5E-05 U	0.0002 U	0.000268	0.01 U	0.0181	0.0001 U	0.0001 U
MW-10	5/18/2021	WV10210518-	0.0003 U	0.0003 U	0.00167	0.00166	0.00327	0.00323	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.68	9.78	0.00292	0.00296	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-10	8/10/2021	WV10210810-	0.0003 U	0.0003 U	0.0017	0.00168	0.00332	0.00325	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.77	9.87	0.00278	0.00285	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-10	11/16/2021	WV10211116-	0.0003 U	0.0003 U	0.00178	0.00171	0.00351	0.00329	0.0001 U	0.0001 U	5E-05 U	5E-05 U	10.3	10	0.00241	0.00249 D	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-13	2/22/2021	WV13210222-	0.0003 U	0.0003 U	0.00194	0.00194	0.00412	0.00417	0.0001 U	0.0001 U	5.09E-05	5E-05 U	9.47	9.44	0.00162	0.00157	5E-05 U	5E-05 U	0.000324	0.000239	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-13	5/17/2021	WV13210517-	0.0003 U	0.0003 U	0.00205	0.00228 D	0.00422	0.00412	0.0001 U	0.0001 U	5E-05 U	5E-05 U	8.87	8.45	0.00243	0.00287	5E-05 U	5E-05 U	0.000251	0.000924	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-13	8/12/2021	WV13210812-	0.0003 U	0.0003 U	0.00206	0.00212	0.00424	0.00406	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.16	9.08	0.00235	0.00231	5E-05 U	5E-05 U	0.000247	0.000224	0.01 U	0.01 U	0.000202	0.000204
MW-13	8/12/2021	WV13210812D	0.0003 U	0.0003 U	0.00208	0.00213	0.00418	0.00421	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.03	8.83	0.00237	0.0023	5E-05 U	5E-05 U	0.000271	0.000237	0.01 U	0.01 U	0.000202	0.000207
MW-13	11/16/2021	WV13211116-	0.0003 U	0.0003 U	0.0023	0.00223	0.00452	0.00434	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.34	8.9	0.00237	0.00235 D	5E-05 U	5E-05 U	0.000246	0.000258	0.01 U	0.0125	0.0001 U	0.0001 U
Channel Cc2																								
MW-2	2/25/2021	WV2-210225-	0.0003 U	0.0003 U	0.00083	0.000836	0.00621	0.00618	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.7	21.8	0.0002 U	0.000208	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-2	5/24/2021	WV2-210524-	0.0003 U	0.0003 U	0.000915	0.00095	0.0064	0.00702	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20	19.8	0.0002 U	0.0002 U	5E-05 U	5.03E-05	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-2	5/24/2021	WV2-210524D	0.0003 U	0.0003 U	0.000904	0.000977	0.00649	0.00677	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.4	20.8	0.0002 U	0.000231	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-2	8/18/2021	WV2-210818-	0.0003 U	0.0003 U	0.000952	0.000915	0.00665	0.00651	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21	20.4	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-2	11/18/2021	WV2-211118-	0.0003 U	0.0003 U	0.000982	0.000929	0.00681	0.00689	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	21.6	20.7	0.0002 U	0.000315	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-9	2/22/2021	WV9-210222-	0.0003 U	0.0003 U	0.0024	0.00237	0.00372	0.00351	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.3	14	0.00371	0.00349	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-9	5/19/2021	WV9-210519-	0.0003 U	0.0003 U	0.00235	0.00234	0.00374	0.0036	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.3	13	0.0026	0.00263	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-9	8/12/2021	WV9-210812-	0.0003 U	0.0003 U	0.00231	0.00221	0.00401	0.00391	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.6	14.7	0.00328	0.00339	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.000169	0.000209
MW-9	11/17/2021	WV9-211117-	0.0003 U	0.0003 U	0.00236	0.00234	0.00407	0.00404	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.9	14.6	0.0037	0.00418	5E-05 U	5E-05 U	0.0002 U	0.00145	0.01 U	0.0346	0.0001 U	0.0001 U
MW-20	2/25/2021	WV20210225-	0.0003 U	0.0003 U	0.00201	0.00221	0.00509	0.00518	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.2	13.3	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.211	0.354	0.0001 U	0.0001 U
MW-20	5/24/2021	WV20210524-	0.0003 U	0.0003 U	0.00195	0.00219	0.00508	0.0055	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.1	13.2	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.12	0.264	0.0001 U	0.0001 U
MW-20	8/18/2021	WV20210818-	0.0003 U	0.0003 U	0.00192	0.00203	0.00518	0.00521	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.3	13.3	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.104	0.204	0.0001 U	0.0001 U
MW-20	11/18/2021	WV20211118-	0.0003 U	0.0003 U	0.00207	0.00222	0.00549	0.0059	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	13.4	13.2	0.0002 U	0.000813	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.12	0.248	0.0001 U	0.0001 U
MW-21	2/25/2021	WV21210225-	0.0003 U	0.0003 U	0.000879	0.00272	0.00869	0.00977	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.5	21.2	0.0002 U	0.0002 U	0.000262	0.000371	0.0002 U	0.0002 U	0.398	1.39	0.0001 U	0.0001 U
MW-21	5/24/2021	WV21210524-	0.0003 U	0.0003 U	0.000871	0.00161	0.0087	0.0096	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.7	22.2	0.0002 U	0.0002 U	0.000263	0.000303	0.0002 U	0.0002 U	0.405	0.809	0.0001 U	0.0001 U
MW-21	8/18/2021	WV21210818-	0.0003 U	0.0003 U	0.00106	0.00171	0.00959	0.00947	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.1	21.1	0.0002 U	0.0002 U	0.000277	0.000302	0.0002 U	0.0002 U	0.558	0.921	0.0001 U	0.0001 U
MW-21	11/18/2021	WV21211118-	0.0003 U	0.0003 U	0.00115	0.00166	0.00989	0.01	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	21.6	20.5	0.0002 U	0.000562	0.000321	0.000347	0.0002 U	0.000371	0.564	0.836	0.0001 U	0.0001 U
MW-33	2/25/2021	WV33210225-	0.0003 U	0.0003 U	0.0375	0.0381	0.0214	0.0215	0.0001 U	0.0001 U	5E-05 U	5E-05 U	56	55.9	0.0002 U	0.0002 U	0.00101	0.00103	0.0002 U	0.0002 U	5.78	5.91	0.0001 U	0.0001 U
MW-33	5/24/2021	WV33210524-	0.0003 U	0.0003 U	0.0371	0.0389	0.0226	0.0242	0.0001 U	0.0001 U	5E-05 U	5E-05 U	58.6	59.2	0.0002 U	0.0002 U	0.00106	0.00104	0.000321	0.0002 U	5.83	5.87	0.0001 U	0.0001 U
MW-33	8/18/2021	WV33210818-	0.0003 U	0.0003 U	0.0388	0.038	0.0233	0.0231	0.0001 U	0.0001 U	5E-05 U	5E-05 U	59	58.2	0.0002 U	0.0002 U	0.00107	0.00101	0.0002 U	0.0002 U	5.77	5.68	0.0001 U	0.0001 U
MW-33	11/18/2021	WV33211118-	0.0003 U	0.0003 U	0.0417	0.0431	0.023	0.0221	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	56.3	55.3	0.000269	0.000227	0.00113	0.0011	0.0002 U	0.0002 U	5.77	5.83	0.0001 U	0.0001 U
MW-35	2/25/2021	WV35210225-	0.0003 U	0.0003 U	0.0276	0.0435	0.0218	0.0323	0.0001 U	0.0001 U	5E-05 U	5E-05 U	64.4	65.4	0.0002 U	0.00188	0.00215	0.00269	0.0002 U	0.00149	14.8	17.4	0.0001 U	0.00032
MW-35	5/24/2021	WV35210524-	0.0003 U	0.0003 U	0.0293	0.0373	0.0217	0.0362	0.0001 U	0.0001 U	5E-05 U	5E-05 U	67.4	64.2	0.000208	0.00415	0.00227	0.00311	0.0002 U	0.00189	14.6	17.7	0.0001 U	0.000378
MW-35	8/19/2021	WV35210819-	0.0003 U	0.0003 U	0.027	0.0284	0.0212	0.0257	0.0001 U	0.0001 U	5E-05 U	5E-05 U	61	60.5	0.0002 U	0.0023	0.00184	0.00238	0.0002 U	0.000988	13.4	14.6	0.000357	0.00046
MW-35	11/18/2021	WV35211118-	0.0003 U	0.0003 U	0.0237	0.0371	0.0213	0.0495	0.0001 U	0.0001 DU	5E-05 U	8.82E-05	61.4	59.4	0.000211	0.00658	0.00219	0.00385	0.0002 U	0.00475	13.2	17.9	0.0001 U	0.00122

Table H-5 *(continued)*
Groundwater - Metals (Dissolved & Total)

Groundwater - Metals (Dissolved & Total)			Magnesium, Dissolved	Magnesium, Total	Manganese, Dissolved	Manganese, Total	Mercury, Dissolved	Mercury, Total	Nickel, Dissolved	Nickel, Total	Potassium, Dissolved	Potassium, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Sodium, Dissolved	Sodium, Total	Thallium, Dissolved	Thallium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc1																								
MW-3	2/23/2021	WV3-210223-	2.1	2.06	0.000387	0.00728	5E-05 U	5E-05 U	0.000213	0.000599	1.64	1.64	0.0005 U	0.0005 U	4E-05 U	4E-05 U	3.8	3.77	0.0001 U	0.0001 U	0.0002	0.000693	0.000851	0.000836
MW-3	5/24/2021	WV3-210524-	2.22	2.18	0.000353	0.000808	5E-05 U	5E-05 U	0.000292	0.000283	1.16	1.17	0.0005 U	0.0005 U	4E-05 U	4E-05 U	2.17	2.11	0.0001 U	0.0001 U	8.15E-05	9.02E-05	0.0005 U	0.0005 U
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3	11/15/2021	WV3-211115-	2.31	2.2	0.000621	0.00203	5E-05 U	5E-05 U	0.000317	0.000293	1.26	1.19	0.0005 U	0.0005 U	4E-05 U	4E-05 U	2.36	2.49	7.5E-05 U	7.5E-05 U	0.000208	0.000149 D	0.000547	0.00056
MW-4	2/25/2021	WV4-210225-	9.39	9.65	0.000101	0.00108	5E-05 U	5E-05 U	0.000572	0.000623	1.03	1.01	0.000689	0.000641	4E-05 U	4E-05 U	7.89	8	0.0001 U	0.0001 U	0.00257	0.00255	0.0005 U	0.0005 U
MW-4	5/18/2021	WV4-210518-	15.9	15.6	0.00032	0.00767	5E-05 U	5E-05 U	0.000863	0.00119	1.23	1.24	0.000535	0.000503	4E-05 U	4E-05 U	8.92	8.54	0.0001 U	0.0001 U	0.00282	0.00284	0.0005 U	0.0005 U
MW-4	8/10/2021	WV4-210810-	18	17.7	0.000112	0.0103	5E-05 U	5E-05 U	0.00114	0.00163	1.2	1.24	0.0005 U	0.000605	4E-05 U	4E-05 U	9.06	9.18	7.5E-05 U	7.5E-05 U	0.00258	0.00258 D	0.0005 U	0.0005 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	9.37	9.33	0.0001 U	0.000428	5E-05 U	5E-05 U	0.000317	0.000583	1.4	1.43	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.16	5.1	0.0001 U	0.0001 U	0.00407	0.00405	0.0005 U	0.00124
MW-10	5/18/2021	WV10210518-	9.71	9.78	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.000318	0.000316	1.46	1.47	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.43	5.24	0.0001 U	0.0001 U	0.00412	0.00418	0.0005 U	0.0005 U
MW-10	8/10/2021	WV10210810-	9.35	9.34	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.000309	0.000347	1.35	1.39	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5	4.99	7.5E-05 U	7.5E-05 U	0.00408	0.00412 D	0.0005 U	0.0005 U
MW-10	11/16/2021	WV10211116-	9.59	9.24	0.0001 U	0.000135	5E-05 U	5E-05 U	0.000315	0.000334	1.52	1.42	0.0005 U	0.0005 U	4E-05 U	4E-05 U	4.4	4.71	7.5E-05 U	7.5E-05 U	0.00375	0.00402 D	0.0005 U	0.0005 U
MW-13	2/22/2021	WV13210222-	11.1	11	0.000531	0.00059	5E-05 U	5E-05 U	0.001	0.000962	1.68	1.67	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.1	5.95	0.0001 U	0.0001 U	0.00598	0.00587	0.0005 U	0.0005 U
MW-13	5/17/2021	WV13210517-	10.8	10.2	0.000226	0.000518	5E-05 U	5E-05 U	0.000935	0.00105	1.68	1.72	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.28	6.05	0.0001 U	0.0001 U	0.00638	0.0068 D	0.0005 U	0.0005 U
MW-13	8/12/2021	WV13210812-	10.6	10.8	0.00026	0.000401	5E-05 U	5E-05 U	0.000947	0.000892	1.77	1.65	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6	6.23	7.5E-05 U	7.5E-05 U	0.00669 D	0.0067	0.0005 U	0.0005 U
MW-13	8/12/2021	WV13210812D	10.5	10.7	0.000252	0.000302	5E-05 U	5E-05 U	0.000948	0.000884	1.75	1.6	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.04	6.15	7.5E-05 U	7.5E-05 U	0.00653 D	0.00644	0.0005 U	0.00059
MW-13	11/16/2021	WV13211116-	10.6	9.95	0.0001 U	0.00057	5E-05 U	5E-05 U	0.000962	0.000902	1.75	1.62	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.64	5.41	7.5E-05 U	7.5E-05 U	0.00644	0.00673	0.0005 U	0.0005 U
Channel Cc2																								
MW-2	2/25/2021	WV2-210225-	23	23.2	0.0122	0.0308	5E-05 U	5E-05 U	0.00133	0.00139	2.08	2.11	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.02	9.23	0.0001 U	0.0001 U	0.0031	0.00312	0.0005 U	0.0005 U
MW-2	5/24/2021	WV2-210524-	23	22.8	0.0467	0.0552	5E-05 U	5E-05 U	0.00316	0.00349	2.13	2.2	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.35	9.11	0.0001 U	0.0001 U	0.00378	0.00396	0.0005 U	0.0005 U
MW-2	5/24/2021	WV2-210524D	23.3	23.4	0.0459	0.0562	5E-05 U	5E-05 U	0.00318	0.00345	2.16	2.25	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.4	9.01	0.0001 U	0.0001 U	0.0038	0.00402	0.0005 U	0.0005 U
MW-2	8/18/2021	WV2-210818-	22.5	22.6	0.0574	0.0636	5E-05 U	5E-05 U	0.00314	0.00295	2.32	2.07	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.19	9.08	7.5E-05 U	7.5E-05 U	0.00419 D	0.00387	0.000573	0.0005 U
MW-2	11/18/2021	WV2-211118-	22.7	21.5	0.0218	0.0273	5E-05 U	5E-05 U	0.00178	0.00168	2.26	2.07	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.8	8.58	7.5E-05 U	7.5E-05 U	0.00326	0.00358	0.00123	0.000863
MW-9	2/22/2021	WV9-210222-	11.5	11	0.0001 U	0.000274	5E-05 U	5E-05 U	0.000144	0.000148	2.09	2.05	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.14	5.87	0.0001 U	0.0001 U	0.00502	0.00486	0.00162	0.0005 U
MW-9	5/19/2021	WV9-210519-	11	11	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.000132	0.000204	2.07	2.11	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.24	6.04	0.0001 U	0.0001 U	0.00493	0.00496	0.0005 U	0.0005 U
MW-9	8/12/2021	WV9-210812-	11.7	11.8	0.0001 U	0.00018	5E-05 U	5E-05 U	0.000181	0.000156	2.04	2.11	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6	6.21	7.5E-05 U	7.5E-05 U	0.00477	0.00479	0.0005 U	0.0005 U
MW-9	11/17/2021	WV9-211117-	12.1	11.2	0.0001 U	0.00157	5E-05 U	5E-05 U	0.000308	0.000312	2.28	2.11	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.29	5.62	7.5E-05 U	7.5E-05 U	0.0043	0.00498	0.0005 U	0.00154
MW-20	2/25/2021	WV20210225-	11.7	11.9	0.133	0.136	5E-05 U	5E-05 U	0.000309	0.000228	2	2	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.98	6.09	0.0001 U	0.0001 U	0.000117	0.000124	0.0005 U	0.0005 U
MW-20	5/24/2021	WV20210524-	12.1	11.6	0.127	0.137	5E-05 U	5E-05 U	0.00021	0.000311	2.12	2.2	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.42	6.19	0.0001 U	0.0001 U	0.000114	0.000195	0.0005 U	0.0005 U
MW-20	8/18/2021	WV20210818-	11.6	11.6	0.135	0.129	5E-05 U	5E-05 U	0.000164	0.000184	2.2	2.03	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.1	6.13	7.5E-05 U	7.5E-05 U	0.000189 D	0.000145	0.0005 U	0.0005 U
MW-20	11/18/2021	WV20211118-	11.7	11.1	0.14	0.134	5E-05 U	5E-05 U	0.000218	0.000556	2.18	2.01	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.15	5.64	7.5E-05 U	7.5E-05 U	0.000223	0.000186	0.0005 U	0.00107
MW-21	2/25/2021	WV21210225-	22.5	22.2	0.374	0.505	5E-05 U	5E-05 U	0.00186	0.00216	2.26	2.24	0.0005 U	0.0005 U	4E-05 U	4E-05 U	10.7	10.6	0.0001 U	0.0001 U	0.000627	0.00105	0.000642	0.000563
MW-21	5/24/2021	WV21210524-	22.9	21.6	0.505	0.527	5E-05 U	5E-05 U	0.00195	0.00209	2.41	2.47	0.0005 U	0.0005 U	4E-05 U	4E-05 U	11.4	10.8	0.0001 U	0.0001 U	0.000574	0.00085	0.0005 U	0.0005 U
MW-21	8/18/2021	WV21210818-	21.3	21.8	0.494	0.536	5E-05 U	5E-05 U	0.00196	0.00198	2.47	2.25	0.0005 U	0.0005 U	4E-05 U	4E-05 U	10.5	10.7	7.5E-05 U	7.5E-05 U	0.000658 D	0.000787	0.0005 U	0.0005 U
MW-21	11/18/2021	WV21211118-	22	21.5	0.397	0.425	5E-05 U	5E-05 U	0.00209	0.00227	2.4	2.24	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.93	9.66	7.5E-05 U	7.5E-05 U	0.000772	0.000873	0.000967	0.00133
MW-33	2/25/2021	WV33210225-	44.1	44.7	0.888	0.899	5E-05 U	5E-05 U	0.00462	0.00464	3.03	3.01	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.9	17.3	0.0001 U	0.0001 U	0.000609	0.000645	0.0005 U	0.0005 U
MW-33	5/24/2021	WV33210524-	48	46.1	0.878	0.897	5E-05 U	5E-05 U	0.00517	0.00525	3.29	3.38	0.0005 U	0.0005 U	4E-05 U	4E-05 U	18	17.2	0.0001 U	0.0001 U	0.000641	0.000664	0.0005 U	0.0005 U
MW-33	8/18/2021	WV33210818-	45.2	45.5	0.887	0.916	5E-05 U	5E-05 U	0.005	0.00462	3.32	3.12	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.9	17.3	7.5E-05 U	7.5E-05 U	0.00066 D	0.000616	0.0005 U	0.00242
MW-33	11/18/2021	WV33211118-	44.7	42.3	0.927	0.921	5E-05 U	5E-05 U	0.00535	0.00501	3.3	3	0.0005 U	0.0005 U	4E-05 U	4E-05 U	15.4	16.3	7.5E-05 U	7.5E-05 U	0.000694	0.000685	0.00122	0.00082
MW-35	2/25/2021	WV35210225-	46.7	47.5	2.55	2.57	5E-05 U	5E-05 U	0.00329	0.00598	3.13	3.16	0.0005 U	0.0005 U	4E-05 U	4E-05 U	17.3	17.5	0.0001 U	0.0001 U	0.000296	0.00201	0.00288	0.0141
MW-35	5/24/2021	WV35210524-	47.4	46.1	2.46	2.52	5E-05 U	5E-05 U	0.00428	0.00993	3.24	3.43	0.0005 U	0.0005 U	4E-05 U	4E-05 U	18.1	17.8	0.0001 U	0.0001 U	0.000281	0.00327	0.0026	0.0117
MW-35	8/19/2021	WV35210819-	45.2	44.6	2.46	2.4	5E-05 U	5E-05 U	0.0034	0.00662	3.14	3.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.9	17.1	7.5E-05 U	7.5E-05 U	0.000239	0.00179	0.00133	0.00674
MW-35	11/18/2021	WV35211118-	45.8	42.9	2.32	2.41	5E-05 U	5E-05 U	0.00344	0.0113	3.37	3.27	0.0005 U	0.0005 U	4E-05 U	4E-05 U	15.6	16.3	7.5E-05 U	7.5E-05 U	0.00026	0.00594	0.002	0.0486

Table H-5 *(continued)*
Groundwater - Metals (Dissolved & Total)

Groundwater - Metals (Dissolved & Total)			Antimony, Dissolved	Antimony, Total	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Calcium, Dissolved	Calcium, Total	Chromium, Dissolved	Chromium, Total	Cobalt, Dissolved	Cobalt, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc3																								
MW-8	2/22/2021	WV8-210222-	0.0003 U	0.0003 U	0.000518	0.000503	0.00368	0.00377	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.1	12.2	0.00207	0.00204	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-8	5/18/2021	WV8-210518-	0.0003 U	0.0003 U	0.000494	0.000497	0.00359	0.0036	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.7	11.6	0.00199	0.00196	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-8	8/10/2021	WV8-210810-	0.0003 U	0.0003 U	0.000508	0.000504	0.00371	0.00358	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.7	11.7	0.00176	0.00179	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-8	11/16/2021	WV8-211116-	0.0003 U	0.0003 U	0.000566	0.000522	0.00382	0.00376	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.1	12.1	0.00167	0.00182 D	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0137	0.0001 U	0.0001 U
MW-36	2/22/2021	WV36210222-	0.0003 U	0.0003 U	0.00173	0.00173	0.00743	0.00737	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14	13.9	0.000565	0.000566	5E-05 U	5E-05 U	0.000363	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-36	5/18/2021	WV36210518-	0.0003 U	0.0003 U	0.00184	0.00182	0.00738	0.00748	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.8	13.8	0.000597	0.000596	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-36	8/11/2021	WV36210811-	0.0003 U	0.0003 U	0.00172	0.00169	0.00752	0.00761	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.3	13.9	0.00081	0.000827	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-36	11/16/2021	WV36211116-	0.0003 U	0.0003 U	0.00204	0.00194	0.00805	0.00756	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.7	14.4	0.00049	0.000487 D	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-36	11/16/2021	WV36211116D	0.0003 U	0.0003 U	0.00203	0.00194	0.00776	0.00745	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.6	14.3	0.000461	0.000515 D	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
Unit D Aquifer																								
MW-7	2/23/2021	WV7-210223-	0.0003 U	0.0003 U	0.00488	0.00523	0.0127	0.0158	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.2	16.1	0.0002 U	0.0002 U	5E-05 U	7.10E-05	0.0002 U	0.0002 U	0.0142	0.129	0.0001 U	0.0001 U
MW-7	2/23/2021	WV7-210223D	0.0003 U	0.0003 U	0.00488	0.00516	0.013	0.0153	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.7	15.8	0.0002 U	0.0002 U	5E-05 U	6.22E-05	0.0002 U	0.0002 U	0.0136	0.128	0.0001 U	0.0001 U
MW-7	5/19/2021	WV7-210519-	0.0003 U	0.0003 U	0.00485	0.00497	0.0127	0.0151	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.8	15.7	0.0002 U	0.000202	5E-05 U	6.95E-05	0.0002 U	0.0002 U	0.0185	0.112	0.0001 U	0.0001 U
MW-7	8/12/2021	WV7-210812-	0.0003 U	0.0003 U	0.00475	0.00531	0.0133	0.0146	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.9	15.8	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.017	0.19	0.000213	0.000227
MW-7	11/16/2021	WV7-211116-	0.0003 U	0.0003 U	0.00512	0.00534	0.0135	0.0146	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.9	16.1	0.0002 U	0.0002 DU	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0189	0.181	0.0001 U	0.0001 U
MW-12	2/22/2021	WV12210222-	0.0003 U	0.0003 U	0.00206	0.00205	0.00451	0.00445	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.7	11.5	0.0037	0.0037	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0202	0.0001 U	0.0001 U
MW-12	5/17/2021	WV12210517-	0.0003 U	0.0003 U	0.00203	0.00208 D	0.00458	0.00462	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.5	11.4	0.00396	0.00394	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-12	8/10/2021	WV12210810-	0.0003 U	0.0003 U	0.00213	0.00206	0.00457	0.00503	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.6	11.7	0.00382	0.00389	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0202	0.0001 U	0.0001 U
MW-12	11/15/2021	WV12211115-	0.0003 U	0.0003 U	0.00217	0.00206	0.00485	0.00456	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.1	11.7	0.00357	0.0035 D	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-19	2/22/2021	WV19210222-	0.0003 U	0.0003 U	0.00102	0.00133	0.0157	0.0171	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15	15.3	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0619	0.372	0.0001 U	0.0001 U
MW-19	5/25/2021	WV19210525-	0.0003 U	0.0003 U	0.000967	0.00154	0.0135	0.0223	0.0001 U	0.0001 U	5E-05 U	8.49E-05	15.1	15.3	0.0002 U	0.000411	5E-05 U	0.000138	0.000303	0.00167	0.0139	0.86	0.0001 U	0.000337
MW-19	8/12/2021	WV19210812-	0.0003 U	0.0003 U	0.000997	0.00107	0.0162	0.0166	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15	14.9	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.00179	0.0766	0.176	0.000182	0.000377
MW-19	11/16/2021	WV19211116-	0.0003 U	0.0003 U	0.000997	0.00102	0.0177	0.0166	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.5	15.5	0.0002 U	0.0002 DU	5.09E-05	5E-05 U	0.0002 U	0.000209	0.0501	0.11	0.0001 U	0.0001 U
MW-26	2/23/2021	WV26210223-	0.0003 U	0.0003 U	0.00297	0.00343	0.00893	0.011	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.6	17.6	0.0002 U	0.000325	5E-05 U	7.00E-05	0.0002 U	0.000207	0.0908	0.735	0.0001 U	0.0001 U
MW-26	5/19/2021	WV26210519-	0.0003 U	0.0003 U	0.00289	0.00362	0.00903	0.0115	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.5	18	0.0002 U	0.000211	5E-05 U	6.46E-05	0.0002 U	0.000212	0.0911	1.01	0.0001 U	0.0001 U
MW-26	8/11/2021	WV26210811-	0.0003 U	0.0003 U	0.00299	0.00334	0.00884	0.0107	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.3	17.6	0.0002 U	0.000752	5E-05 U	0.000113	0.0002 U	0.00329	0.101	0.68	0.0001 U	0.0001 U
MW-26	11/17/2021	WV26211117-	0.0003 U	0.0003 U	0.00317	0.00352	0.00957	0.0111	0.0001 U	0.0001 U	5E-05 U	5E-05 U	18.6	17.9	0.0002 U	0.000302	5E-05 U	6.97E-05	0.0002 U	0.0002 U	0.0957	0.547	0.0001 U	0.0001 U
MW-29	2/23/2021	WV29210223-	0.0003 U	0.0003 U	0.00401	0.0181	0.00983	0.0177	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	20.4	0.0002 U	0.000247	5E-05 U	5.37E-05	0.0002 U	0.000208	0.729	6.09	0.0001 U	0.0001 U
MW-29	5/19/2021	WV29210519-	0.0003 U	0.0003 U	0.00395	0.0119	0.0102	0.0152	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	19.9	0.0002 U	0.000224	5E-05 U	5E-05 U	0.000869	0.0002 U	0.703	4.03	0.0001 U	0.0001 U
MW-29	8/11/2021	WV29210811-	0.0003 U	0.0003 U	0.00412	0.0065	0.01	0.0111	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.7	19.9	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.000214	0.774	1.8	0.0001 U	0.0001 U
MW-29	11/17/2021	WV29211117-	0.0003 U	0.0003 U	0.00414	0.00747	0.0105	0.0131	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.4	20.3	0.0002 U	0.000412	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.742	2.09	0.0001 U	0.0001 U
MW-34	2/23/2021	WV34210223-	0.0003 U	0.0003 U	0.00129	0.00128	0.00452	0.0043	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.5	13.8	0.000987	0.00105	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-34	5/19/2021	WV34210519-	0.0003 U	0.0003 U	0.00127	0.00128	0.00443	0.0044	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.5	13.6	0.0011	0.00112	5E-05 U	5E-05 U	0.0002 U	0.00024	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-34	8/12/2021	WV34210812-	0.0003 U	0.0003 U	0.0013	0.00129	0.00447	0.00432	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.9	13.5	0.00106	0.00107	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.000215	0.0002
MW-34	11/17/2021	WV34211117-	0.0003 U	0.0003 U	0.00141	0.00138	0.00467	0.00477	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.3	13.9	0.00113	0.0011	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0211	0.0001 U	0.0001 U
Field Blanks																								
FIELD BLANK	2/22/2021	WV10210222F	0.0003 U	0.0003 U	5E-05 U	5E-05 U	0.0005 U	0.0005 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.05 U	0.05 U	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.000314	0.000371	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	2/25/2021	WV33210225F	0.0003 U	0.0003 U	5E-05 U	5E-05 U	0.0005 U	0.0005 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.05 U	0.05 U	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.000216	0.000206	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	5/19/2021	WV26210519F	0.0003 U	0.0003 U	7.35E-05	5E-05 U	0.0005 U	0.0005 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	1.72	0.05 U	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0293	0.000272	0.01 U	0.01 U	0.000225	0.0001 U
FIELD BLANK	8/18/2021	WV20210818F	0.0003 U	0.0003 U	5E-05 U	5E-05 U	0.0005 U	0.0005 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.05 U	0.05 U	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.000414	0.000361	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	11/18/2021	WV2-211118F	0.0003 U	0.0003 U	5E-05 U	5E-05 U	0.0005 U	0.0005 U	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	0.05 U	0.05 U	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.000364	0.000418	0.01 U	0.01 U	0.0001 U	0.0001 U
Offsite Domestic Wells																								
DW-85	2/24/2021	WV85210224-	0.0003 U	0.0003 U	0.000429	0.000407	0.00943	0.00948	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.3	14.2	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0684	0.0756	0.0001 U	0.0001 U
DW-85	9/20/2021	WV85210920-	0.0003 U	0.0003 U	0.00044	0.000455	0.0096	0.00954	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.5	14.5	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0383	0.0625	0.0711	0.0001 U	0.000733
DW-LS	3/24/2021	WVLS210324-	0.0003 U	0.0003 U	0.00154	0.00161	0.00551	0.00566	0.0001 U	0.0001 U	5E-05 U	5E-05 U	22.5	22.3	0.00376	0.00377	5E-05 U	5E-05 U	0.0257	0.0305	0.01 U	0.0976	0.0001 U	0.000248
DW-LS	8/9/2021	WVLS210809-	0.0003 U	0.0003 U	0.00165	0.00166	0.00624	0.00744	0.0001 U	0.0001 U	5E-05 U	5E-05 U	23.1	23.3	0.00391	0.00419	5E-05 U	5E-05 U	0.0472	0.121	0.01 U	0.0192	0.0001 U	0.000929
DW-PA	2/24/2021	WVPA210224-	0.0003 U	0.0003 U	0.00127	0.00129	0.00382	0.00378	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.3	13.2	0.00119	0.00123	5E-05 U	5E-05 U	0.00826	0.0119	0.01 U	0.0229	0.000107	0.000277
DW-PA	8/9/2021	WVPA210809-	0.0003 U	0.0003 U	0.00153	0.00149	0.00402	0.00394	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13	13.3	0.00173	0.00176	5E-05 U	5E-05 U	0.013	0.0557	0.01 U	0.01 U	0.000199	0.00134

Notes:
*Insufficient water to collect a sample
-- = parameter is not sampled for

Table H-5 *(continued)*
Groundwater - Metals (Dissolved & Total)

Groundwater - Metals (Dissolved & Total)			Magnesium, Dissolved	Magnesium, Total	Manganese, Dissolved	Manganese, Total	Mercury, Dissolved	Mercury, Total	Nickel, Dissolved	Nickel, Total	Potassium, Dissolved	Potassium, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Sodium, Dissolved	Sodium, Total	Thallium, Dissolved	Thallium, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
Well #	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Channel Cc3																								
MW-8	2/22/2021	WV8-210222-	9.9	10	0.0001 U	0.000117	5E-05 U	5E-05 U	0.000578	0.000615	1.12	1.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.65	6.63	0.0001 U	0.0001 U	0.00251	0.00249	0.0005 U	0.0005 U
MW-8	5/18/2021	WV8-210518-	9.83	9.33	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.0006	0.000601	1.16	1.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.7	6.51	0.0001 U	0.0001 U	0.00249	0.00243	0.0005 U	0.0005 U
MW-8	8/10/2021	WV8-210810-	9.47	9.36	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.000592	0.000606	1.07	1.1	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.44	6.33	7.5E-05 U	7.5E-05 U	0.00248	0.00248 D	0.0005 U	0.0005 U
MW-8	11/16/2021	WV8-211116-	9.56	9.41	0.0001 U	0.000252	5E-05 U	5E-05 U	0.000618	0.000586	1.21	1.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.69	5.99	7.5E-05 U	7.5E-05 U	0.00241	0.00255 D	0.0005 U	0.0005 U
MW-36	2/22/2021	WV36210222-	9.5	9.5	0.000685	0.00193	5E-05 U	5E-05 U	0.00037	0.000178	2.64	2.64	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.41	6.47	0.0001 U	0.0001 U	0.00191	0.00195	0.0005 U	0.0005 U
MW-36	5/18/2021	WV36210518-	9.73	9.88	0.000638	0.00107	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.72	2.75	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.76	6.63	0.0001 U	0.0001 U	0.00187	0.00186	0.0005 U	0.0005 U
MW-36	8/11/2021	WV36210811-	9.28	9.65	0.000347	0.000606	5E-05 U	5E-05 U	0.0001 U	0.00011	2.87	2.6	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.29	6.48	7.5E-05 U	7.5E-05 U	0.00205 D	0.00193 D	0.0005 U	0.0005 U
MW-36	11/16/2021	WV36211116-	9.56	9.35	0.00065	0.00158	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.86	2.73	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.91	5.96	7.5E-05 U	7.5E-05 U	0.00175	0.00186	0.0005 U	0.0005 U
MW-36	11/16/2021	WV36211116D	9.78	9.41	0.000642	0.00126	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.92	2.69	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.03	6	7.5E-05 U	7.5E-05 U	0.0018	0.00181	0.0005 U	0.0005 U
Unit D Aquifer																								
MW-7	2/23/2021	WV7-210223-	10	10	0.149	0.34	5E-05 U	5E-05 U	0.00012	0.000162	2.69	2.67	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.44	6.37	0.0001 U	0.0001 U	0.000132	0.000163	0.0005 U	0.00116
MW-7	2/23/2021	WV7-210223D	10.1	9.99	0.15	0.305	5E-05 U	5E-05 U	0.000117	0.000183	2.68	2.68	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.52	6.43	0.0001 U	0.0001 U	0.000134	0.000164	0.0005 U	0.00112
MW-7	5/19/2021	WV7-210519-	10.1	9.83	0.134	0.244	5E-05 U	5E-05 U	0.000142	0.00027	2.75	2.74	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.42	6.43	0.0001 U	0.0001 U	0.000124	0.000139	0.0005 U	0.00239
MW-7	8/12/2021	WV7-210812-	9.6	10.1	0.136	0.196	5E-05 U	5E-05 U	0.0001	0.000122	2.89	2.67	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.26	6.6	7.5E-05 U	7.5E-05 U	0.000218 D	0.000147	0.0005 U	0.000949
MW-7	11/16/2021	WV7-211116-	10.5	9.86	0.144	0.187	5E-05 U	5E-05 U	0.000171	0.000161	2.97	2.71	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.68	5.89	7.5E-05 U	7.5E-05 U	0.000276	0.000166 D	0.0005 U	0.000821
MW-12	2/22/2021	WV12210222-	9.7	9.51	0.000281	0.000707	5E-05 U	5E-05 U	0.000224	0.000268	1.75	1.78	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.95	5.81	0.0001 U	0.0001 U	0.00513	0.00511	0.0005 U	0.0005 U
MW-12	5/17/2021	WV12210517-	9.7	9.52	0.0001 U	0.000191	5E-05 U	5E-05 U	0.000207	0.000256	1.84	1.91	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.01	5.9	0.0001 U	0.0001 U	0.00502	0.00509 D	0.0005 U	0.0005 U
MW-12	8/10/2021	WV12210810-	9.79	9.78	0.0001 U	0.000405	5E-05 U	5E-05 U	0.000225	0.000235	1.74	1.77	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.01	5.98	7.5E-05 U	7.5E-05 U	0.00519	0.0051 D	0.0005 U	0.0005 U
MW-12	11/15/2021	WV12211115-	9.83	9.41	0.0001 U	0.000148	5E-05 U	5E-05 U	0.000213	0.000182	1.92	1.82	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.22	5.37	7.5E-05 U	7.5E-05 U	0.00481	0.00498 D	0.000844	0.0005 U
MW-19	2/22/2021	WV19210222-	13.9	14	0.487	0.548	5E-05 U	5E-05 U	0.000136	0.000155	2.33	2.41	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.04	6.98	0.0001 U	0.0001 U	7.5E-05 U	0.000115	0.0005 U	0.0005 U
MW-19	5/25/2021	WV19210525-	14.1	13.9	0.317	0.653	5E-05 U	5E-05 U	0.000174	0.000779	2.34	2.52	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.94	6.92	0.0001 DU	0.0001 U	7.5E-05 U	0.000562	0.0017 D	0.00934
MW-19	8/12/2021	WV19210812-	14	14.3	0.533	0.572	5E-05 U	5E-05 U	0.000212	0.000256	2.26	2.37	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.85	7.1	7.5E-05 U	7.5E-05 U	7.96E-05	0.000121	0.000519	0.00157
MW-19	11/16/2021	WV19211116-	13.8	13.7	0.499	0.517	5E-05 U	5E-05 U	0.000122	0.000179	2.53	2.44	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.57	6.49	7.5E-05 U	7.5E-05 U	7.5E-05 DU	0.0005 U	0.001	
MW-26	2/23/2021	WV26210223-	7.5	7.47	0.0591	0.0655	5E-05 U	5E-05 U	0.000136	0.000335	2.96	2.98	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.61	9.38	0.0001 U	0.0001 U	0.000111	0.000253	0.000518	0.00897
MW-26	5/19/2021	WV26210519-	7.51	7.62	0.0577	0.0695	5E-05 U	5E-05 U	0.000118	0.000258	3.1	3.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	10.1	10	0.0001 U	0.0001 U	7.97E-05	0.000184	0.0005 U	0.00721
MW-26	8/11/2021	WV26210811-	7.38	7.48	0.0643	0.0736	5E-05 U	5E-05 U	0.000343	0.000888	2.82	2.94	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.04	9.45	7.5E-05 U	7.5E-05 U	8.04E-05	0.000297 D	0.000502	0.0131
MW-26	11/17/2021	WV26211117-	7.77	7.22	0.0627	0.0905	5E-05 U	5E-05 U	0.000307	0.000505	3.22	3.01	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.42	8.63	7.5E-05 U	7.5E-05 U	0.000232	0.00023	0.000502	0.0061
MW-29	2/23/2021	WV29210223-	14.5	14.5	0.0867	0.171	5E-05 U	5E-05 U	0.000141	0.000343	2.09	2.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.86	6.83	0.0001 U	0.0001 U	7.57E-05	0.000369	0.0005 U	0.00151
MW-29	5/19/2021	WV29210519-	14.6	14.5	0.101	0.27	5E-05 U	5E-05 U	0.000137	0.000281	2.16	2.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.9	6.74	0.0001 U	0.0001 U	7.5E-05 U	0.000224	0.000706	0.00102
MW-29	8/11/2021	WV29210811-	14.1	14.5	0.0965	0.111	5E-05 U	5E-05 U	0.000138	0.000264	2.02	2.09	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.56	6.77	7.5E-05 U	7.5E-05 U	9.13E-05 D	0.0005 U	0.00131	
MW-29	11/17/2021	WV29211117-	14.8	13.9	0.0919	0.102	5E-05 U	5E-05 U	0.000151	0.000418	2.31	2.13	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.02	6.31	7.5E-05 U	7.5E-05 U	0.000245	0.000235	0.0005 U	0.00236
MW-34	2/23/2021	WV34210223-	12.2	12.6	0.0001 U	0.000133	5E-05 U	5E-05 U	0.00121	0.00123	1.46	1.52	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.95	6.99	0.0001 U	0.0001 U	0.00274	0.00272	0.000638	0.0005 U
MW-34	5/19/2021	WV34210519-	12.8	12.6	0.0001 U	0.000235	5E-05 U	5E-05 U	0.00132	0.0015	1.55	1.55	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.11	7.15	0.0001 U	0.0001 U	0.00271	0.00272	0.0005 U	0.000947
MW-34	8/12/2021	WV34210812-	11.8	12.4	0.00011	0.000449	5E-05 U	5E-05 U	0.00134	0.00128	1.64	1.49	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.74	7.07	7.5E-05 U	7.5E-05 U	0.00286 D	0.00271	0.000658	0.000593
MW-34	11/17/2021	WV34211117-	12.6	11.7	0.000151	0.000583	5E-05 U	5E-05 U	0.0016	0.00142	1.63	1.51	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.11	6.22	7.5E-05 U	7.5E-05 U	0.00257	0.00284	0.000999	0.00138
Field Blanks																								
FIELD BLANK	2/22/2021	WV10210222F	0.05 U	0.05 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.0001 U	0.0001 U	0.1 U	0.1 U	0.0005 U	0.0005 U	4E-05 U	4E-05 U	0.1 U	0.1 U	0.0001 U	0.0001 U	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U
FIELD BLANK	2/25/2021	WV33210225F	0.05 U	0.05 U	0.0001 U	0.000172	5E-05 U	5E-05 U	0.0001 U	0.0001 U	0.1 U	0.1 U	0.0005 U	0.0005 U	4E-05 U	4E-05 U	0.1 U	0.1 U	0.0001 U	0.0001 U	7.5E-05 U	7.5E-05 U	0.000614	0.0005 U
FIELD BLANK	5/19/2021	WV26210519F	0.205	0.05 U	0.000389	0.0001 U	5E-05 U	5E-05 U	0.0001 U	0.0001 U	0.1 U	0.1 U	0.0005 U	0.0005 U	4E-05 U	4E-05 U	0.472	0.1 U	0.0001 U	0.0001 U	9.92E-05	7.5E-05 U	0.00636	0.0005 U
FIELD BLANK	8/18/2021	WV20210818F	0.05 U	0.05 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.0001 U	0.0001 U	0.1 U	0.1 U	0.0005 U	0.0005 U	4E-05 U	4E-05 U	0.1 U	0.1 U	7.5E-05 U	7.5E-05 U	8.47E-05 D	7.5E-05 U	0.0005 U	0.0005 U
FIELD BLANK	11/18/2021	WV2-211118F	0.05 U	0.05 U	0.0001 U	0.0001 U	5E-05 U	5E-05 U	0.000111	0.0001 U	0.1 U	0.1 U	0.0005 U	0.0005 U	4E-05 U	4E-05 U	0.1 U	0.1 U	7.5E-05 U	7.5E-05 U	7.5E-05 U	7.5E-05 U	0.00079	0.000545
Offsite Domestic Wells																								
DW-85	2/24/2021	WV85210224-	6.6	6.63	0.0533	0.0526	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.44	2.42	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.87	6.05	0.0001 U	0.0001 U	0.000124	0.000125	0.0005 U	0.000728
DW-85	9/20/2021	WV85210920-	6.51	6.57	0.0533	0.0557	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.42	2.71	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.66	5.83	7.5E-05 U	7.5E-05 U	0.000106	0.000183	0.00151	0.0326
DW-LS	3/24/2021	WVLS210324-	16.8	16.3	0.000911	0.00282	5E-05 U	5E-05 U	0.0003 D	0.000352 D	1.62	1.63	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.77	7.95	0.0001 U	0.0001 U	0.00456	0.00459	0.0618	0.0662
DW-LS	8/9/2021	WVLS210809-	17.5	17.6	0.000216	0.000503	5E-05 U	5E-05 U	0.000618	0.00138	1.6	1.67	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.06	8.2	7.5E-05 U	7.5E-05 U	0.00461	0.00464 D	0.0482	0.0588
DW-PA	2/24/2021	WVPA210224-	11.3	11.4	0.000851	0.000946	5E-05 U	5E-05 U	0.00055	0.000553	1.49	1.48	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.77	6.78	0.0001 U	0.0001 U	0.00289	0.00295	0.00317	0.0042
DW-PA	8/9/2021	WVPA210809-	11.1	11.2	0.000135	0.000154	5E-05 U	5E-05 U	0.000555	0.000569	1.47	1.51	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.59	6.74	7.5E-05 U	7.5E-05 U	0.00334	0.00329 D	0.00215	0.00269

Notes:
*Insufficient water to collect a sample
-- = parameter is not sampled for

Table H-6
Groundwater - Volatile Organic Compounds

Groundwater - Volatile Organic Compounds			1,1,1,2-Tetrachloro-ethane	1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,2,3-Trichloro-propane	1,2-Dibromo-3-Chloropro-pane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-Pentanone	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon Disulfide	Carbon Tetra-chloride
	CAS #		630-20-6	71-55-6	79-34-5	79-00-5	75-34-3	75-35-4	96-18-4	96-12-8	106-93-4	95-50-1	107-06-2	78-87-5	106-46-7	78-93-3	591-78-6	108-10-1	67-64-1	107-13-1	71-43-2	74-97-5	75-27-4	75-25-2	74-83-9	75-15-0	56-23-5
Well #	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Channel Cc1																											
MW-3	2/23/2021	WV3-210223-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-3	5/24/2021	WV3-210524-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3*	11/15/2021	WV3-211115-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-4	2/25/2021	WV4-210225-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-4	5/18/2021	WV4-210518-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.19 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-4	8/10/2021	WV4-210810-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.28 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-10	5/18/2021	WV10210518-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-10	8/10/2021	WV10210810-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-10	11/16/2021	WV10211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-13	2/22/2021	WV13210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-13	5/17/2021	WV13210517-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-13	8/12/2021	WV13210812-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-13	8/12/2021	WV13210812D	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-13	11/16/2021	WV13211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
Channel Cc2																											
MW-2	2/25/2021	WV2-210225-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-2	5/24/2021	WV2-210524-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-2	5/24/2021	WV2-210524D	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-2	8/18/2021	WV2-210818-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-2	11/18/2021	WV2-211118-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-9	2/22/2021	WV9-210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-9	5/19/2021	WV9-210519-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-9	8/12/2021	WV9-210812-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-9	11/17/2021	WV9-211117-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	2/25/2021	WV20210225-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	5/24/2021	WV20210524-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	8/18/2021	WV20210818-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	11/18/2021	WV20211118-	1.25 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	12.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	2.5 U	12.5 U	12.5 U	0.175 U	0.5 U	0.5 U	1.25 U	2.5 U	0.5 U	0.5 U	1.25 U
MW-21	2/25/2021	WV21210225-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-21	5/24/2021	WV21210524-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-21	8/18/2021	WV21210818-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-21	11/18/2021	WV21211118-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	2/25/2021	WV33210225-	0.25 U	0.1 U	0.1 U	0.1 U	2.02	0.189 JT	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	8.31	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.964	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	5/24/2021	WV33210524-	0.25 U	0.1 U	0.1 U	0.1 U	2.06	0.18 JT	0.1 U	2.5 U	0.1 U	0.1 U	0.14 JT	7.94	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.949	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	8/18/2021	WV33210818-	0.25 U	0.1 U	0.1 U	0.1 U	1.3	0.13 JT	0.1 U	2.5 U	0.1 U	0.1 U	0.116 JT	5.69	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.707	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	11/18/2021	WV33211118-	0.25 U	0.1 U	0.1 U	0.1 U	1.75	0.202	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	7.73	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.958	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	2/25/2021	WV35210225-	0.25 U	0.1 U	0.1 U	0.1 U	0.292	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.517	0.1 U	1 U	0.5 U	2.5 U	2.54 JT	0.035 U	0.58	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	5/24/2021	WV35210524-	0.25 U	0.1 U	0.1 U	0.1 U	0.302	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.546	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.594	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	8/19/2021	WV35210819-	0.25 U	0.1 U	0.1 U	0.1 U	0.234	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.494	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.582	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	11/18/2021	WV35211118-	0.25 U	0.1 U	0.1 U	0.1 U	0.202	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.374	0.1 U	1 U	0.5 U	2.5 U	3.8 JT	0.035 U	0.509	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U

Table H-6 *(continued)*
Groundwater - Volatile Organic Compounds

Groundwater - Volatile Organic Compounds			Chloro-benzene	Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	Cis-1-2-Dichloro-ethene	Cis-1,3-Dichloro-propene	Dibromo-methane	Dichloro-difluoro-methane	Ethyl-benzene	M & P Xylene	Methyl Iodide	Methylene Chloride	O-Xylene	Styrene	Tetra-chloroethene	Toluene	Trans-1-2-Dichloro-ethene	Trans-1-3-Dichloro-propene	Trans-1-4-Dichloro-2-Butene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Acetate	Vinyl Chloride
	CAS #		108-90-7	124-48-1	75-00-3	67-66-3	74-87-3	156-59-2	10061-01-5	74-95-3	75-71-8	100-41-4	MPX	74-88-4	75-09-2	95-47-6	100-42-5	127-18-4	108-88-3	156-60-5	10061-02-6	110-57-6	79-01-6	75-69-4	108-05-4	75-01-4
Well #	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Channel Cc1																										
MW-3	2/23/2021	WV3-210223-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.159 JT	0.1 U	0.01 U
MW-3	5/24/2021	WV3-210524-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-3*	11/15/2021	WV3-211115-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-4	2/25/2021	WV4-210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	2.3	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.157 JT	0.1 U	0.01 U
MW-4	5/18/2021	WV4-210518-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	1.44	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-4	8/10/2021	WV4-210810-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	1.5	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	2/22/2021	WV10210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-10	5/18/2021	WV10210518-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-10	8/10/2021	WV10210810-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-10	11/16/2021	WV10211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-13	2/22/2021	WV13210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-13	5/17/2021	WV13210517-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-13	8/12/2021	WV13210812-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-13	8/12/2021	WV13210812D	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-13	11/16/2021	WV13211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
Channel Cc2																										
MW-2	2/25/2021	WV2-210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	3.81	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	2.18	0.1 U	0.01 U
MW-2	5/24/2021	WV2-210524-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.119 JT	0.25 U	0.1 U	1.85	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.16	0.1 U	0.0162 JT
MW-2	5/24/2021	WV2-210524D	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.115 JT	0.25 U	0.1 U	1.91	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.18	0.1 U	0.0132 JT
MW-2	8/18/2021	WV2-210818-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.127 JT	0.25 U	0.1 U	2.63	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.99	0.1 U	0.0265
MW-2	11/18/2021	WV2-211118-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	2.23	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.91	0.1 U	0.01 U
MW-9	2/22/2021	WV9-210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-9	5/19/2021	WV9-210519-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-9	8/12/2021	WV9-210812-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-9	11/17/2021	WV9-211117-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-20	2/25/2021	WV20210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.249	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-20	5/24/2021	WV20210524-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.147 JT	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-20	8/18/2021	WV20210818-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.174 JT	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-20	11/18/2021	WV20211118-	0.5 U	2.5 U	0.5 U	0.5 U	1.25 U	0.5 U	1.25 U	0.5 U	0.756 JT	0.5 U	0.5 U	0.5 U	12.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	25 U	0.5 U	0.5 U	0.5 U	0.05 U
MW-21	2/25/2021	WV21210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.586	0.25 U	0.1 U	2.34	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.32	0.1 U	0.074
MW-21	5/24/2021	WV21210524-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.595	0.25 U	0.1 U	1.45	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.823	0.1 U	0.0511
MW-21	8/18/2021	WV21210818-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.542	0.25 U	0.1 U	1.56	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.05	0.1 U	0.042
MW-21	11/18/2021	WV21211118-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.496	0.25 U	0.1 U	1.41	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.12	0.1 U	0.32
MW-33	2/25/2021	WV33210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	39.4	0.25 U	0.1 U	4.2	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.897	0.5 U	5 U	0.1 U	0.1 U	0.1 U	19.6
MW-33	5/24/2021	WV33210524-	0.1 U	0.5 U	0.435	0.1 U	0.25 U	32.8	0.25 U	0.1 U	3.31	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.103 JT	0.884	0.5 U	5 U	0.164 JT	0.1 U	0.1 U	17.8
MW-33	8/18/2021	WV33210818-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	23.9	0.25 U	0.1 U	2.68	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.715	0.5 U	5 U	0.135 JT	0.1 U	0.1 U	11.5
MW-33	11/18/2021	WV33211118-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	33.1	0.25 U	0.1 U	3.11	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.966	0.5 U	5 U	0.183 JT	0.1 U	0.1 U	14.6
MW-35	2/25/2021	WV35210225-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3.71	0.25 U	0.1 U	0.808	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.259	0.5 U	5 U	1.26	0.1 U	0.1 U	5.86
MW-35	5/24/2021	WV35210524-	0.1 U	0.5 U	0.101 JT	0.1 U	0.25 U	3.49	0.25 U	0.1 U	0.678	0.1 U	0.1 U	0.1 U	2.5 U	0.103 JT	0.1 U	0.1 U	0.1 U	0.235	0.5 U	5 U	1.24	0.1 U	0.1 U	5.14
MW-35	8/19/2021	WV35210819-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3.58	0.25 U	0.1 U	0.705	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.237	0.5 U	5 U	1.15	0.1 U	0.1 U	3.97
MW-35	11/18/2021	WV35211118-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3	0.25 U	0.1 U	0.509	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.24	0.5 U	5 U	1.21	0.1 U	0.1 U	1.62

Table H-6 *(continued)*
Groundwater - Volatile Organic Compounds

Groundwater - Volatile Organic Compounds			1,1,1,2-Tetrachloro-ethane	1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,2,3-Trichloro-propane	1,2-Dibromo-3-Chloropro-pane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-Pentanone	Acetone	Acrylo-nitrile	Benzene	Bromochloro-methane	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon Disulfide	Carbon Tetra-chloride
	CAS #		630-20-6	71-55-6	79-34-5	79-00-5	75-34-3	75-35-4	96-18-4	96-12-8	106-93-4	95-50-1	107-06-2	78-87-5	106-46-7	78-93-3	591-78-6	108-10-1	67-64-1	107-13-1	71-43-2	74-97-5	75-27-4	75-25-2	74-83-9	75-15-0	56-23-5
Well #	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Channel Cc3																											
MW-8	2/22/2021	WV8-210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-8	5/18/2021	WV8-210518-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-8	8/10/2021	WV8-210810-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-8	11/16/2021	WV8-211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	2/22/2021	WV36210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	5/18/2021	WV36210518-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	8/11/2021	WV36210811-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-36	11/16/2021	WV36211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	11/16/2021	WV36211116D	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
Unit D Aquifer																											
MW-7	2/23/2021	WV7-210223-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	4.59 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-7	2/23/2021	WV7-210223D	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-7	5/19/2021	WV7-210519-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-7	8/12/2021	WV7-210812-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-7	11/16/2021	WV7-211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-12	2/22/2021	WV12210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-12	5/17/2021	WV12210517-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	4.8 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-12	8/10/2021	WV12210810-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-12	11/15/2021	WV12211115-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	2/22/2021	WV19210222-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	5/25/2021	WV19210525-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	8/12/2021	WV19210812-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-19	11/16/2021	WV19211116-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-26	2/23/2021	WV26210223-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-26	5/19/2021	WV26210519-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-26	8/11/2021	WV26210811-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-26	11/17/2021	WV26211117-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-29	2/23/2021	WV29210223-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-29	5/19/2021	WV29210519-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-29	8/11/2021	WV29210811-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-29	11/17/2021	WV29211117-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-34	2/23/2021	WV34210223-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-34	5/19/2021	WV34210519-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-34	8/12/2021	WV34210812-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
MW-34	11/17/2021	WV34211117-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
Field Blank																											
FIELD BLANK	2/22/2021	WV10210222F	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
FIELD BLANK	2/25/2021	WV33210225F	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
FIELD BLANK	5/19/2021	WV26210519F	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
FIELD BLANK	8/18/2021	WV20210818F	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	5.49	0.5 U	2.5 U	10.5	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
FIELD BLANK	11/18/2021	WV2-211118F	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.19 JT	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
Offsite Domestic Wells																											
DW-85	2/24/2021	WV85210224-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-85	9/20/2021	WV85210920-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-LS	3/24/2021	WVLS210324-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-LS	8/9/2021	WVLS210809-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
DW-PA	2/24/2021	WVPA210224-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-PA	8/9/2021	WVPA210809-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U

Notes:
*Insufficient water to collect a sample
-- = parameter is not sampled for

Table H-6 *(continued)*
Groundwater - Volatile Organic Compounds

Groundwater - Volatile Organic Compounds			Chloro-benzene	Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	Cis-1-2-Dichloro-ethene	Cis-1,3-Dichloro-propene	Dibromo-methane	Dichloro-difluoro-methane	Ethyl-benzene	M & P Xylene	Methyl Iodide	Methylene Chloride	O-Xylene	Styrene	Tetra-chloroethene	Toluene	Trans-1-2-Dichloro-ethene	Trans-1-3-Dichloro-propene	Trans-1-4-Dichloro-2-Butene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Acetate	Vinyl Chloride
	CAS #		108-90-7	124-48-1	75-00-3	67-66-3	74-87-3	156-59-2	10061-01-5	74-95-3	75-71-8	100-41-4	MPX	74-88-4	75-09-2	95-47-6	100-42-5	127-18-4	108-88-3	156-60-5	10061-02-6	110-57-6	79-01-6	75-69-4	108-05-4	75-01-4
Well #	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Channel Cc3																										
MW-8	2/22/2021	WV8-210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-8	5/18/2021	WV8-210518-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-8	8/10/2021	WV8-210810-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-8	11/16/2021	WV8-211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-36	2/22/2021	WV36210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-36	5/18/2021	WV36210518-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-36	8/11/2021	WV36210811-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-36	11/16/2021	WV36211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-36	11/16/2021	WV36211116D	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
Unit D Aquifer																										
MW-7	2/23/2021	WV7-210223-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-7	2/23/2021	WV7-210223D	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-7	5/19/2021	WV7-210519-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-7	8/12/2021	WV7-210812-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-7	11/16/2021	WV7-211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-12	2/22/2021	WV12210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-12	5/17/2021	WV12210517-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-12	8/10/2021	WV12210810-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-12	11/15/2021	WV12211115-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-19	2/22/2021	WV19210222-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-19	5/25/2021	WV19210525-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-19	8/12/2021	WV19210812-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-19	11/16/2021	WV19211116-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-26	2/23/2021	WV26210223-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-26	5/19/2021	WV26210519-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-26	8/11/2021	WV26210811-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-26	11/17/2021	WV26211117-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-29	2/23/2021	WV29210223-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-29	5/19/2021	WV29210519-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-29	8/11/2021	WV29210811-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-29	11/17/2021	WV29211117-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-34	2/23/2021	WV34210223-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-34	5/19/2021	WV34210519-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
MW-34	8/12/2021	WV34210812-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
MW-34	11/17/2021	WV34211117-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
Field Blank																										
FIELD BLANK	2/22/2021	WV10210222F	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.126 JT	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
FIELD BLANK	2/25/2021	WV33210225F	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
FIELD BLANK	5/19/2021	WV26210519F	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 GU
FIELD BLANK	8/18/2021	WV20210818F	0.1 U	0.5 U	0.1 U	0.107 JT	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
FIELD BLANK	11/18/2021	WV2-211118F	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
Offsite Domestic Wells																										
DW-85	2/24/2021	WV85210224-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
DW-85	9/20/2021	WV85210920-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
DW-LS	3/24/2021	WVLS210324-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
DW-LS	8/9/2021	WVLS210809-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
DW-PA	2/24/2021	WVPA210224-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U
DW-PA	8/9/2021	WVPA210809-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 U

Notes:
*Insufficient water to collect a sample
-- = parameter is not sampled for

Table H-7
Groundwater - Volatile Organic Compounds Trip Blanks

Groundwater - Volatile Organic Compounds Trip Blanks			1,1,1,2-Tetrachloro-ethane	1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,2,3-Trichloro-propane	1,2-Dibromo-3-Chloro-propane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-Pentanone	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromoform	Bromo-methane	Carbon Disulfide	Carbon Tetrachloride
		CAS #	630-20-6	71-55-6	79-34-5	79-00-5	75-34-3	75-35-4	96-18-4	96-12-8	106-93-4	95-50-1	107-06-2	78-87-5	106-46-7	78-93-3	591-78-6	108-10-1	67-64-1	107-13-1	71-43-2	74-97-5	75-27-4	75-25-2	74-83-9	75-15-0	56-23-5
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
VOA TRIP BLANK	2/18/2021	VTRP210222X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/18/2021	VTRP210222Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.75 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/22/2021	VTRP210223Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.67 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/22/2021	VTRP210223Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/23/2021	VTRP210224Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/24/2021	VTRP210225X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/24/2021	VTRP210225Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/24/2021	VTRP210225Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	3/23/2021	VTRP210324-	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/13/2021	VTRP210517Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/13/2021	VTRP210518X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/13/2021	VTRP210519Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.54 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/17/2021	VTRP210518Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/18/2021	VTRP210519X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.89 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/18/2021	VTRP210524X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.62 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/18/2021	VTRP210524Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/18/2021	VTRP210525Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/20/2021	VTRP210524Y2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/20/2021	VTRP210524Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	8/5/2021	VTRP210809Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.61 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/5/2021	VTRP210810X2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/5/2021	VTRP210810Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.73 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/9/2021	VTRP210811X3	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.8 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/9/2021	VTRP210811Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.56 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/9/2021	VTRP210812Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.03 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/10/2021	VTRP210812X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/12/2021	VTRP210818X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	8/16/2021	VTRP210818Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	8/17/2021	VTRP210819Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	9/16/2021	VTRP210920Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.34 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/9/2021	VTRP211115X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/9/2021	VTRP211116Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/10/2021	VTRP211116Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/15/2021	VTRP211116X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/15/2021	VTRP211117Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/16/2021	VTRP211117X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/17/2021	VTRP211118X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/17/2021	VTRP211118Y	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/17/2021	VTRP211118Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U

Table H-7 *(continued)*
Groundwater - Volatile Organic Compounds Trip Blanks

Groundwater - Volatile Organic Compounds Trip Blanks			Chloro-benzene	Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	Cis-1-2-Dichloro-ethene	Cis-1,3-Dichloro-propene	Dibromo-methane	Dichloro-difluoro-methane	Ethylbenzene	M & P Xylene	Methyl Iodide	Methylene Chloride	O-Xylene	Styrene	Tetrachloro-ethene	Toluene	Trans-1-2-Dichloro-ethene	Trans-1-3-Dichloro-propene	Trans-1-4-Dichloro-2-Butene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Acetate	Vinyl Chloride
		CAS #	108-90-7	124-48-1	75-00-3	67-66-3	74-87-3	156-59-2	10061-01-5	74-95-3	75-71-8	100-41-4	MPX	74-88-4	75-09-2	95-47-6	100-42-5	127-18-4	108-88-3	156-60-5	10061-02-6	110-57-6	79-01-6	75-69-4	108-05-4	75-01-4
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
VOA TRIP BLANK	2/18/2021	VTRP210222X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	3.9 JT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/18/2021	VTRP210222Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/22/2021	VTRP210223Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/22/2021	VTRP210223Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/23/2021	VTRP210224Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/24/2021	VTRP210225X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/24/2021	VTRP210225Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/24/2021	VTRP210225Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	3/23/2021	VTRP210324-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/13/2021	VTRP210517Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/13/2021	VTRP210518X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/13/2021	VTRP210519Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/17/2021	VTRP210518Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 GU
VOA TRIP BLANK	5/18/2021	VTRP210519X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 GU
VOA TRIP BLANK	5/18/2021	VTRP210524X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/18/2021	VTRP210524Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 GU	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 GU
VOA TRIP BLANK	5/18/2021	VTRP210525Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/20/2021	VTRP210524Y2	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/20/2021	VTRP210524Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	4.04 JT	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/5/2021	VTRP210809Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/5/2021	VTRP210810X2	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/5/2021	VTRP210810Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/9/2021	VTRP210811X3	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/9/2021	VTRP210811Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/9/2021	VTRP210812Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/10/2021	VTRP210812X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/12/2021	VTRP210818X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/16/2021	VTRP210818Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/17/2021	VTRP210819Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	9/16/2021	VTRP210920Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	4.61	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/9/2021	VTRP211115X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/9/2021	VTRP211116Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/10/2021	VTRP211116Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/15/2021	VTRP211116X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/15/2021	VTRP211117Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/16/2021	VTRP211117X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/17/2021	VTRP211118X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/17/2021	VTRP211118Y	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/17/2021	VTRP211118Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U

Table H-8
Groundwater - Quarterly Appendix III Analytes for Channel Cc2 Wells

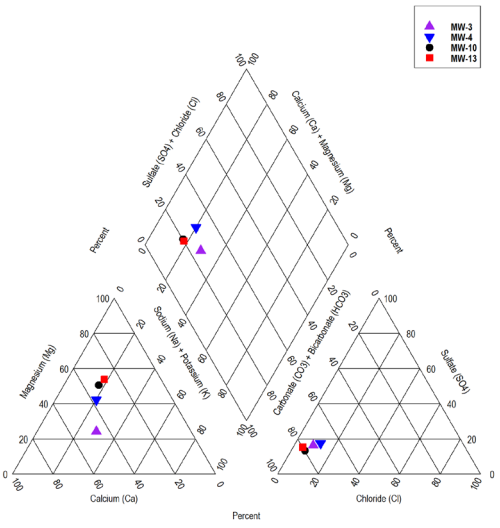
Groundwater - Quarterly Appendix III Analytes for Channel Cc2 Wells			2,4,5-TP Silvex	2-Methyl-1-Propanol	Bis(2-chloroethyl) Ether	Bis(2-ethylhexyl) Phthalate	Diethyl Phthalate
		CAS #	93-72-1	78-83-1	111-44-4	117-81-7	84-66-2
Well #	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Channel Cc2							
MW-2	2/25/2021	WV2-210225-	0.0103 U	2 U	0.253 U	0.505 U	0.505 U
MW-2	5/24/2021	WV2-210524-	0.0101 U	2 U	0.248 U	0.495 U	0.495 U
MW-2	5/24/2021	WV2-210524D	0.01 U	2 U	0.238 U	3.06	0.476 U
MW-2	8/18/2021	WV2-210818-	0.01 U	2 U	0.238 U	0.476 U	0.476 U
MW-2	11/18/2021	WV2-211118-	0.01 U	2 U	0.25 U	0.5 U	0.5 U
MW-20	2/25/2021	WV20210225-	0.0111 U	2 U	0.253 U	0.505 U	0.505 U
MW-20	5/24/2021	WV20210524-	0.0116 U	2 U	0.238 U	1.15	0.476 U
MW-20	8/18/2021	WV20210818-	0.01 U	2 U	0.243 U	0.485 U	0.485 U
MW-20	11/18/2021	WV20211118-	0.01 U	2 U	0.236 U	0.472 U	0.472 U
MW-21	2/25/2021	WV21210225-	0.0101 U	2 U	0.272 U	1 BJT	0.543 U
MW-21	5/24/2021	WV21210524-	0.0102 U	2 U	0.238 U	1.22	0.476 U
MW-21	8/18/2021	WV21210818-	0.01 U	2 U	0.266 JT	0.49 U	0.49 U
MW-21	11/18/2021	WV21211118-	0.0101 U	2 U	0.25 U	0.5 U	0.5 U
MW-33	2/25/2021	WV33210225-	0.054	2 U	5.39	18.4 BJ	1.06
MW-33	5/24/2021	WV33210524-	0.0467	2 U	1.44	0.476 U	1.04
MW-33	8/18/2021	WV33210818-	0.0319	2 U	4.78	2.69 B	1.51
MW-33	11/18/2021	WV33211118-	0.0397	2 U	2.91	25.4 J	1.4
MW-35	2/25/2021	WV35210225-	0.0471	2 U	1.28	20.2 B	0.476 U
MW-35	5/24/2021	WV35210524-	0.0477	2 U	0.363 JT	0.495 U	0.495 U
MW-35	8/19/2021	WV35210819-	0.0406	2 U	1.2	0.485 U	0.485 U
MW-35	11/18/2021	WV35211118-	0.0342	10 U	1.14	14	0.54 JT
Field Blanks							
FIELD BLANK	2/25/2021	WV33210225F	0.0101 U	2 U	0.245 U	0.49 U	0.49 U
FIELD BLANK	8/18/2021	WV20210818F	0.01 U	2 U	0.236 U	0.472 U	0.472 U
FIELD BLANK	11/18/2021	WV2-211118F	0.01 U	2 U	0.25 U	1.11	0.5 U

Appendix I

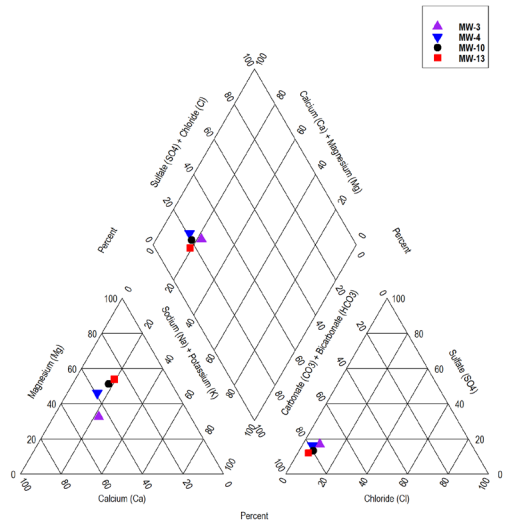
Ion Balance Summary and
Trilinear Diagrams

Figure I-1. Channel Cc1 Trilinear Diagrams

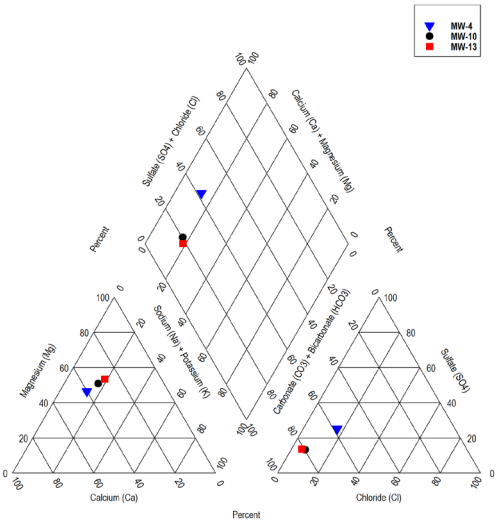
January 1, 2021 - December 31, 2021



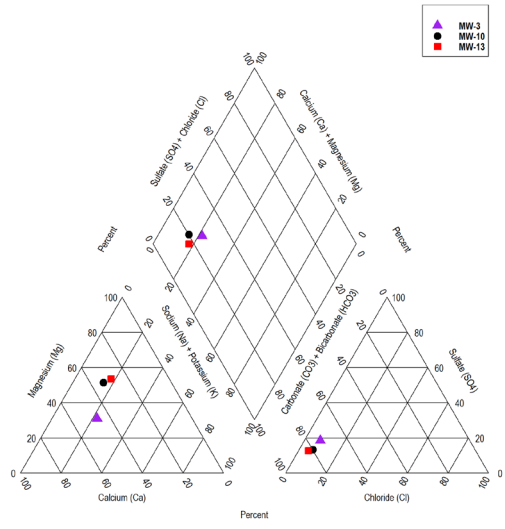
First Quarter: January 1, 2021 - March 31, 2021



Second Quarter: April 1, 2021 - June 30, 2021



Third Quarter: July 1, 2021 - September 30, 2021



Fourth Quarter: October 1, 2021 - December 31, 2021

NOTE: Third Quarter: There was insufficient water in MW-3 – no samples were collected.
Fourth Quarter: There was insufficient water in MW-4 and well went dry during purging – no samples were collected.

Table I-1

Channel Cc1: Ion Balance Summary for Groundwater

January 1, 2021 - March 31, 2021

			Well #	**MW-3**			**MW-4**			**MW-10**			**MW-13**		
			Sample Date	2/23/2021			2/25/2021			2/22/2021			2/22/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			5.6			7.45			6.85			6.63		
Conductance	--			65.6			155			129.7			142.3		
TDS	--			62.7			130			109			117		
Calcium	40.1	2		6.66	0.332	46.63	13.8	0.689	37.61	9.87	0.493	32.32	9.47	0.473	27.89
Magnesium	24.3	2		2.1	0.173	24.25	9.39	0.773	42.20	9.37	0.771	50.59	11.1	0.913	53.90
Potassium	39.1	1		1.64	0.042	5.89	1.03	0.026	1.44	1.4	0.036	2.35	1.68	0.043	2.54
Sodium	23.0	1		3.8	0.165	23.19	7.89	0.343	18.74	5.16	0.224	14.73	6.1	0.265	15.66
Iron	55.8	2		0.005	0.000	0.03	0.005	0.000	0.01	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.0004	0.000	0.00	0.0001	0.000	0.00	0.00005	0.000	0.00	0.0005	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.01	0.001	0.000	0.00	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**0.71**			**1.83**			**1.52**			**1.69**	
Anion Parameters	Molecular Weight (g/mol)	n													
Alkalinity, Total	--			23.6			57.0			56.8			63.2		
Carbonate	60.0	2		0.0006	0.0000	0.0029	0.0963	0.0032	0.1831	0.0242	0.0008	0.0554	0.0162	0.0005	0.0337
Bicarbonate	61.0	1		28.8	0.4719	72.03	69.3	1.1365	64.79	69.2	1.1350	78.06	77.1	1.2632	78.88
Chloride	35.5	1		2.12	0.0598	9.13	7.14	0.2014	11.48	3.41	0.0962	6.62	2.73	0.0770	4.81
Nitrate-N	14.0	1		0.273	0.0195	2.98	1.79	0.1278	7.28	0.424	0.0303	2.08	0.238	0.0170	1.06
Sulfate	96.1	2		4.99	0.1039	15.86	13.7	0.2852	16.26	9.21	0.1918	13.19	11.7	0.2436	15.21
	Total Anions (meq/L)				**0.66**			**1.75**			**1.45**			**1.60**	
	Total Ions (meq/L)				**1.37**			**3.59**			**2.98**			**3.30**	
	Cation/Anion Ratio				**1.09**			**1.04**			**1.05**			**1.06**	
	Percent Difference				**4.21**			**2.15**			**2.35**			**2.83**	

Table I-1 *(continued)*

Channel Cc1: Ion Balance Summary for Groundwater

April 1, 2021 - June 30, 2021

			Well #	**MW-3**			**MW-4**			**MW-10**			**MW-13**		
			Sample Date	5/24/2021			5/18/2021			5/18/2021			5/17/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			5.58			6.71			7.18			6.94		
Conductance	--			54.1			256.5			136.8			136.9		
TDS	--			42.7			213			109			111		
Calcium	40.1	2		5.08	0.253	45.23	22.3	1.113	39.17	9.68	0.483	31.05	8.87	0.443	26.86
Magnesium	24.3	2		2.22	0.183	32.59	15.9	1.308	46.06	9.71	0.799	51.36	10.8	0.889	53.94
Potassium	39.1	1		1.16	0.030	5.29	1.23	0.031	1.11	1.46	0.037	2.40	1.68	0.043	2.61
Sodium	23.0	1		2.17	0.094	16.84	8.92	0.388	13.66	5.43	0.236	15.18	6.28	0.273	16.58
Iron	55.8	2		0.005	0.000	0.03	0.005	0.000	0.01	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.0004	0.000	0.00	0.0003	0.000	0.00	0.00005	0.000	0.00	0.0002	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.01	0.001	0.000	0.00	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**0.56**			**2.84**			**1.56**			**1.65**	
Anion Parameters	Molecular Weight (g/mol)	n													
Alkalinity, Total	--			18.5			79.9			57.1			59.8		
Carbonate	60.0	2		0.0004	0.0000	0.0028	0.0246	0.0008	0.0369	0.0519	0.0017	0.1180	0.0313	0.0010	0.0707
Bicarbonate	61.0	1		22.6	0.3699	72.23	97.4	1.5968	71.79	69.6	1.1400	77.77	72.9	1.1947	80.95
Chloride	35.5	1		1.47	0.0415	8.10	3.62	0.1021	4.59	3.52	0.0993	6.77	2.68	0.0756	5.12
Nitrate-N	14.0	1		0.236	0.0168	3.29	2.74	0.1956	8.79	0.461	0.0329	2.25	0.418	0.0298	2.02
Sulfate	96.1	2		4.03	0.0839	16.38	15.8	0.3290	14.79	9.22	0.1920	13.09	8.39	0.1747	11.84
	Total Anions (meq/L)				**0.51**			**2.22**			**1.47**			**1.48**	
	Total Ions (meq/L)				**1.07**			**5.07**			**3.02**			**3.12**	
	Cation/Anion Ratio				**1.09**			**1.28**			**1.06**			**1.12**	
	Percent Difference				**4.51**			**12.17**			**2.98**			**5.50**	

Table I-1 *(continued)*

Channel Cc1: Ion Balance Summary for Groundwater

July 1, 2021 - September 30, 2021

			Well #	**MW-4**			**MW-10**			**MW-13**		
			Sample Date	8/10/2021			8/10/2021			8/12/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.55			7.04			7.16		
Conductance	--			290			134.8			134.5		
TDS	--			247			131			109		
Calcium	40.1	2		25.6	1.277	40.12	9.77	0.488	32.30	9.16	0.457	27.94
Magnesium	24.3	2		18	1.481	46.52	9.35	0.769	50.98	10.6	0.872	53.32
Potassium	39.1	1		1.2	0.031	0.96	1.35	0.035	2.29	1.77	0.045	2.77
Sodium	23.0	1		9.06	0.394	12.38	5	0.218	14.41	6	0.261	15.95
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.0001	0.000	0.00	0.00005	0.000	0.00	0.0003	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**3.18**			**1.51**			**1.64**	
Anion Parameters	Molecular Weight (g/mol)	n										
Alkalinity, Total	--			80.8			56.8			60.7		
Carbonate	60.0	2		0.0172	0.0006	0.0189	0.0374	0.0012	0.0856	0.0527	0.0018	0.1157
Bicarbonate	61.0	1		98.5	1.6151	53.04	69.2	1.1345	77.87	73.9	1.2120	79.88
Chloride	35.5	1		16.6	0.4683	15.38	3.53	0.0996	6.83	2.67	0.0753	4.96
Nitrate-N	14.0	1		3.58	0.2556	8.39	0.433	0.0309	2.12	0.345	0.0246	1.62
Sulfate	96.1	2		33.9	0.7058	23.18	9.16	0.1907	13.09	9.78	0.2036	13.42
	Total Anions (meq/L)				**3.05**			**1.46**			**1.52**	
	Total Ions (meq/L)				**6.23**			**2.97**			**3.15**	
	Cation/Anion Ratio				**1.05**			**1.04**			**1.08**	
	Percent Difference				**2.22**			**1.76**			**3.76**	

Table I-1 *(continued)*

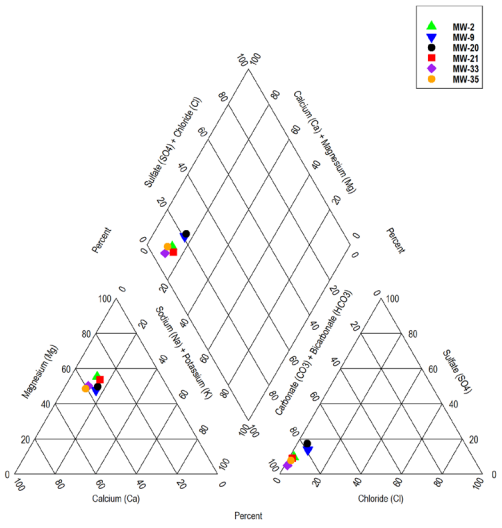
Channel Cc1: Ion Balance Summary for Groundwater

October 1, 2021 - December 31, 2021

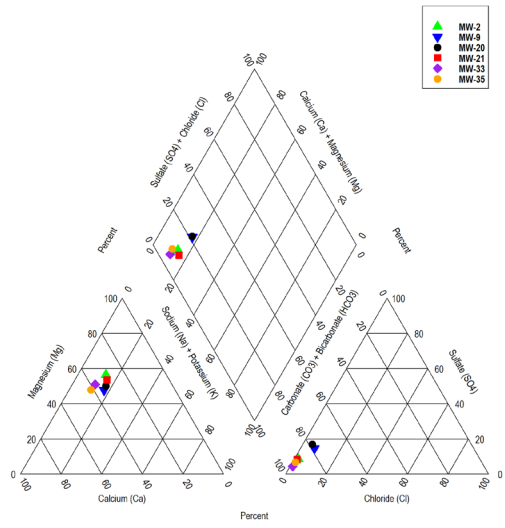
			Well #	**MW-3**			**MW-10**			**MW-13**		
			Sample Date	11/15/2021			11/16/2021			11/16/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			5.68			7			7.14		
Conductance	--			57.3			127.3			130.2		
TDS	--			40			96			101		
Calcium	40.1	2		5.72	0.285	46.74	10.3	0.514	33.51	9.34	0.466	28.62
Magnesium	24.3	2		2.31	0.190	31.13	9.59	0.789	51.46	10.6	0.872	53.56
Potassium	39.1	1		1.26	0.032	5.28	1.52	0.039	2.54	1.75	0.045	2.75
Sodium	23.0	1		2.36	0.103	16.81	4.4	0.191	12.48	5.64	0.245	15.06
Iron	55.8	2		0.005	0.000	0.03	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.0006	0.000	0.00	0.00005	0.000	0.00	0.0001	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.01	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**0.61**			**1.53**			**1.63**	
Anion Parameters	Molecular Weight (g/mol)	n										
Alkalinity, Total	--			18.8			56.6			60.9		
Carbonate	60.0	2		0.0005	0.0000	0.0032	0.0340	0.0011	0.0783	0.0505	0.0017	0.1117
Bicarbonate	61.0	1		22.9	0.3759	67.64	69.0	1.1306	78.12	74.2	1.2161	80.74
Chloride	35.5	1		1.42	0.0401	7.21	3.41	0.0962	6.65	2.58	0.0728	4.83
Nitrate-N	14.0	1		0.631	0.0450	8.11	0.412	0.0294	2.03	0.391	0.0279	1.85
Sulfate	96.1	2		4.55	0.0947	17.05	9.12	0.1899	13.12	9.02	0.1878	12.47
	Total Anions (meq/L)				**0.56**			**1.45**			**1.51**	
	Total Ions (meq/L)				**1.17**			**2.98**			**3.13**	
	Cation/Anion Ratio				**1.10**			**1.06**			**1.08**	
	Percent Difference				**4.71**			**2.90**			**3.91**	

Figure I-2. Channel Cc2 Trilinear Diagrams

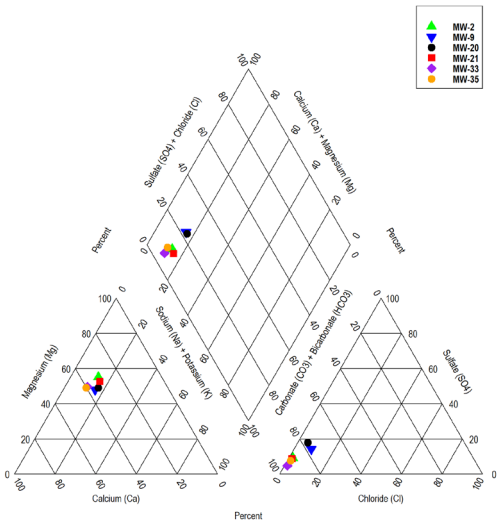
January 1, 2021 - December 31, 2021



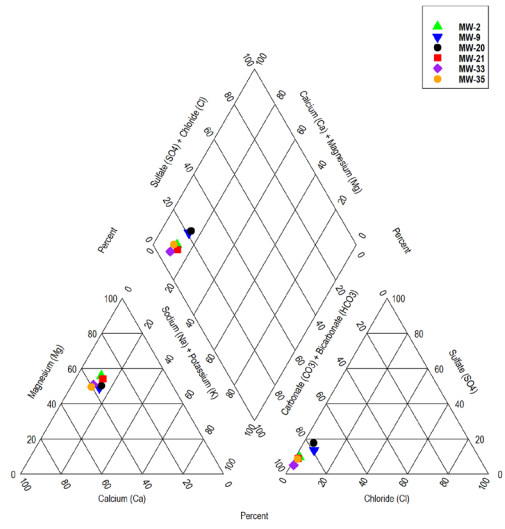
First Quarter: January 1, 2021 - March 31, 2021



Second Quarter: April 1, 2021 - June 30, 2021



Third Quarter: July 1, 2021 - September 30, 2021



Fourth Quarter: October 1, 2021 - December 31, 2021

Table I-2

Channel Cc2: Ion Balance Summary for Groundwater

January 1, 2021 - March 31, 2021

			Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**			**MW-33**			**MW-35**		
			Sample Date	2/25/2021			2/22/2021			2/25/2021			2/25/2021			2/25/2021			2/25/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.85			6.91			7.45			6.8			6.85			6.54		
Conductance	--			284.8			167.3			165.4			274			576			585		
TDS	--			195			130			142			193			375			434		
Calcium	40.1	2		21.7	1.083	31.65	14.3	0.714	36.03	13.2	0.659	33.84	21.5	1.073	30.86	56	2.794	37.37	64.4	3.214	37.73
Magnesium	24.3	2		23	1.893	55.31	11.5	0.946	47.78	11.7	0.963	49.47	22.5	1.852	53.26	44.1	3.629	48.53	46.7	3.843	45.12
Potassium	39.1	1		2.08	0.053	1.55	2.09	0.053	2.70	2	0.051	2.63	2.26	0.058	1.66	3.03	0.078	1.04	3.13	0.080	0.94
Sodium	23.0	1		9.02	0.392	11.47	6.14	0.267	13.48	5.98	0.260	13.37	10.7	0.465	13.39	16.9	0.735	9.83	17.3	0.753	8.84
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01	0.211	0.008	0.39	0.398	0.014	0.41	5.78	0.207	2.77	14.8	0.530	6.22
Manganese	54.9	2		0.0122	0.000	0.01	0.00005	0.000	0.00	0.133	0.005	0.25	0.374	0.014	0.39	0.888	0.032	0.43	2.55	0.093	1.09
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00	0.0157	0.001	0.06	0.0091	0.001	0.02	0.0313	0.002	0.03	0.0715	0.005	0.06
	Total Cations (meq/L)				**3.42**			**1.98**			**1.95**			**3.48**			**7.48**			**8.52**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			143			72.4			72.6			144			332			325		
Carbonate	60.0	2		0.0608	0.0020	0.0615	0.0354	0.0012	0.0634	0.1227	0.0041	0.2186	0.0546	0.0018	0.0560	0.1413	0.0047	0.0663	0.0678	0.0023	0.0314
Bicarbonate	61.0	1		174.3	2.8574	86.61	88.3	1.4465	77.85	88.3	1.4476	77.38	175.6	2.8776	88.49	404.8	6.6339	93.47	396.4	6.4964	90.37
Chloride	35.5	1		2.53	0.0714	2.16	4.58	0.1292	6.95	3.26	0.0920	4.92	2.09	0.0590	1.81	3.5	0.0987	1.39	4.26	0.1202	1.67
Nitrate-N	14.0	1		0.755	0.0539	1.63	0.38	0.0271	1.46	0.005	0.0004	0.02	0.278	0.0198	0.61	0.025	0.0018	0.03	0.05	0.0036	0.05
Sulfate	96.1	2		15.1	0.3144	9.53	12.2	0.2540	13.67	15.7	0.3269	17.47	14.1	0.2936	9.03	17.2	0.3581	5.05	27.2	0.5663	7.88
	Total Anions (meq/L)				**3.30**			**1.86**			**1.87**			**3.25**			**7.10**			**7.19**	
	Total Ions (meq/L)				**6.72**			**3.84**			**3.82**			**6.73**			**14.57**			**15.71**	
	Cation/Anion Ratio				**1.04**			**1.07**			**1.04**			**1.07**			**1.05**			**1.18**	
	Percent Difference				**1.83**			**3.20**			**1.98**			**3.34**			**2.61**			**8.46**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

April 1, 2021 - June 30, 2021

			Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**			**MW-33**			**MW-35**		
			Sample Date	5/24/2021			5/19/2021			5/24/2021			5/24/2021			5/24/2021			5/24/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.73			6.81			7.47			6.55			6.58			6.38		
Conductance	--			286.3			160.6			162.8			299			589.4			620		
TDS	--			182			125			129			195			391			433		
Calcium	40.1	2		20	0.998	29.76	13.3	0.664	35.05	13.1	0.654	32.80	21.7	1.083	30.43	58.6	2.924	36.62	67.4	3.363	38.43
Magnesium	24.3	2		23	1.893	56.43	11	0.905	47.81	12.1	0.996	49.96	22.9	1.884	52.96	48	3.950	49.47	47.4	3.901	44.57
Potassium	39.1	1		2.13	0.054	1.62	2.07	0.053	2.80	2.12	0.054	2.72	2.41	0.062	1.73	3.29	0.084	1.05	3.24	0.083	0.95
Sodium	23.0	1		9.35	0.407	12.13	6.24	0.271	14.34	6.42	0.279	14.01	11.4	0.496	13.94	18	0.783	9.81	18.1	0.787	9.00
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01	0.12	0.004	0.22	0.405	0.015	0.41	5.83	0.209	2.61	14.6	0.523	5.97
Manganese	54.9	2		0.0467	0.002	0.05	0.00005	0.000	0.00	0.127	0.005	0.23	0.505	0.018	0.52	0.878	0.032	0.40	2.46	0.090	1.02
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00	0.0152	0.001	0.05	0.0108	0.001	0.02	0.0292	0.002	0.03	0.0681	0.005	0.06
	Total Cations (meq/L)				**3.35**			**1.89**			**1.99**			**3.56**			**7.98**			**8.75**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			142			69.7			72.1			146			349			345		
Carbonate	60.0	2		0.0458	0.0015	0.0472	0.0270	0.0009	0.0499	0.1276	0.0043	0.2313	0.0311	0.0010	0.0319	0.0798	0.0027	0.0359	0.0498	0.0017	0.0220
Bicarbonate	61.0	1		173.1	2.8379	87.75	85.0	1.3928	77.17	87.7	1.4374	78.18	178.1	2.9183	89.67	425.6	6.9759	94.21	420.8	6.8969	91.62
Chloride	35.5	1		2.22	0.0626	1.94	4.33	0.1221	6.77	3.06	0.0863	4.70	1.85	0.0522	1.60	3.29	0.0928	1.25	4	0.1128	1.50
Nitrate-N	14.0	1		0.799	0.0570	1.76	0.403	0.0288	1.59	0.005	0.0004	0.02	0.231	0.0165	0.51	0.005	0.0004	0.00	0.025	0.0018	0.02
Sulfate	96.1	2		13.2	0.2748	8.50	12.5	0.2603	14.42	14.9	0.3102	16.87	12.8	0.2665	8.19	16	0.3331	4.50	24.7	0.5143	6.83
	Total Anions (meq/L)				**3.23**			**1.80**			**1.84**			**3.25**			**7.40**			**7.53**	
	Total Ions (meq/L)				**6.59**			**3.70**			**3.83**			**6.81**			**15.39**			**16.28**	
	Cation/Anion Ratio				**1.04**			**1.05**			**1.08**			**1.09**			**1.08**			**1.16**	
	Percent Difference				**1.82**			**2.40**			**4.03**			**4.46**			**3.76**			**7.52**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

July 1, 2021 - September 30, 2021

			Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**			**MW-33**			**MW-35**		
			Sample Date	8/18/2021			8/12/2021			8/18/2021			8/18/2021			8/18/2021			8/19/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.57			6.65			7.45			6.82			6.58			6.56		
Conductance	--			272.1			178.6			196.6			281.7			588			597		
TDS	--			187			133			128			189			383			421		
Calcium	40.1	2		21	1.048	31.18	14.6	0.729	36.34	13.3	0.664	34.04	21.1	1.053	31.30	59	2.944	38.11	61	3.044	37.33
Magnesium	24.3	2		22.5	1.852	55.09	11.7	0.963	48.03	11.6	0.955	48.96	21.3	1.753	52.10	45.2	3.720	48.15	45.2	3.720	45.62
Potassium	39.1	1		2.32	0.059	1.77	2.04	0.052	2.60	2.2	0.056	2.89	2.47	0.063	1.88	3.32	0.085	1.10	3.14	0.080	0.99
Sodium	23.0	1		9.19	0.400	11.89	6	0.261	13.02	6.1	0.265	13.61	10.5	0.457	13.58	16.9	0.735	9.52	16.9	0.735	9.02
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01	0.104	0.004	0.19	0.558	0.020	0.59	5.77	0.207	2.67	13.4	0.480	5.89
Manganese	54.9	2		0.0574	0.002	0.06	0.00005	0.000	0.00	0.135	0.005	0.25	0.494	0.018	0.53	0.887	0.032	0.42	2.46	0.090	1.10
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00	0.015	0.001	0.05	0.0108	0.001	0.02	0.0309	0.002	0.03	0.0654	0.005	0.06
	Total Cations (meq/L)				**3.36**			**2.00**			**1.95**			**3.36**			**7.72**			**8.15**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			140			75.3			71			142			342			332		
Carbonate	60.0	2		0.0313	0.0010	0.0325	0.0202	0.0007	0.0336	0.1200	0.0040	0.2174	0.0564	0.0019	0.0589	0.0782	0.0026	0.0357	0.0725	0.0024	0.0330
Bicarbonate	61.0	1		170.7	2.7984	87.31	91.8	1.5050	75.13	86.4	1.4157	76.96	173.1	2.8375	88.86	417.1	6.8360	93.71	404.9	6.6362	90.68
Chloride	35.5	1		2.26	0.0638	1.99	5.84	0.1647	8.22	3.21	0.0906	4.92	1.91	0.0539	1.69	3.55	0.1001	1.37	4.11	0.1159	1.58
Nitrate-N	14.0	1		0.734	0.0524	1.63	0.753	0.0538	2.68	0.005	0.0004	0.02	0.265	0.0189	0.59	0.005	0.0004	0.00	0.025	0.0018	0.02
Sulfate	96.1	2		13.9	0.2894	9.03	13.4	0.2790	13.93	15.8	0.3290	17.88	13.5	0.2811	8.80	17.1	0.3560	4.88	27	0.5621	7.68
	Total Anions (meq/L)				**3.20**			**2.00**			**1.84**			**3.19**			**7.30**			**7.32**	
	Total Ions (meq/L)				**6.57**			**4.01**			**3.79**			**6.56**			**15.02**			**15.47**	
	Cation/Anion Ratio				**1.05**			**1.00**			**1.06**			**1.05**			**1.06**			**1.11**	
	Percent Difference				**2.37**			**0.04**			**2.90**			**2.61**			**2.86**			**5.39**	

Table I-2 *(continued)*

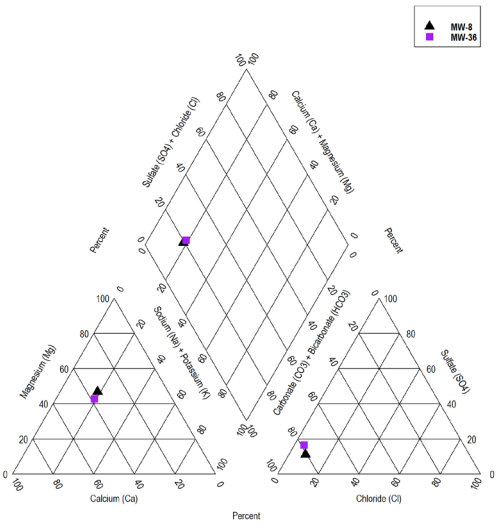
Channel Cc2: Ion Balance Summary for Groundwater

October 1, 2021 - December 31, 2021

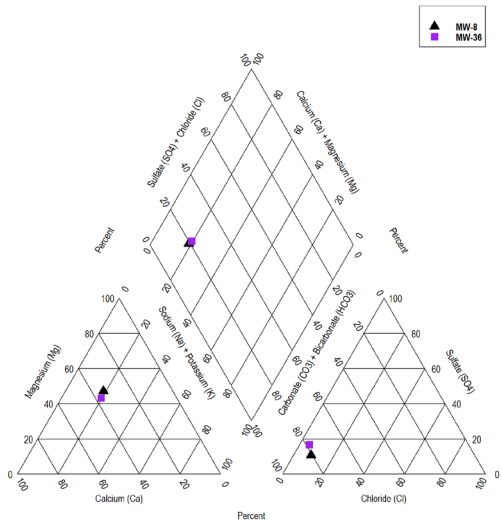
		Well #	MW-2			MW-9			MW-20			MW-21			MW-33			MW-35		
		Sample Date	11/18/2021			11/17/2021			11/18/2021			11/18/2021			11/18/2021			11/18/2021		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.98			7.27			7.89			6.66			6.61			6.39		
Conductance	--		273.1			167.4			160.3			267.6			548.3			542.1		
TDS	--		162			115			121			173			363			406		
Calcium	40.1	2	21.6	1.078	32.23	14.9	0.744	36.66	13.4	0.669	34.79	21.6	1.078	31.95	56.3	2.809	37.54	61.4	3.064	37.55
Magnesium	24.3	2	22.7	1.868	55.86	12.1	0.996	49.10	11.7	0.963	50.10	22	1.810	53.67	44.7	3.678	49.15	45.8	3.769	46.19
Potassium	39.1	1	2.26	0.058	1.73	2.28	0.058	2.88	2.18	0.056	2.90	2.4	0.061	1.82	3.3	0.084	1.13	3.37	0.086	1.06
Sodium	23.0	1	7.8	0.339	10.15	5.29	0.230	11.35	5.15	0.224	11.66	8.93	0.388	11.52	15.4	0.670	8.95	15.6	0.679	8.32
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01	0.12	0.004	0.22	0.564	0.020	0.60	5.77	0.207	2.76	13.2	0.473	5.79
Manganese	54.9	2	0.0218	0.001	0.02	0.00005	0.000	0.00	0.14	0.005	0.27	0.397	0.014	0.43	0.927	0.034	0.45	2.32	0.084	1.03
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00	0.0155	0.001	0.06	0.0091	0.001	0.02	0.031	0.002	0.03	0.0638	0.005	0.06
	Total Cations (meq/L)			**3.34**			**2.03**			**1.92**			**3.37**			**7.48**			**8.16**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		134			73.4			71			141			319			321		
Carbonate	60.0	2	0.0769	0.0026	0.0823	0.0820	0.0027	0.1444	0.3289	0.0110	0.5976	0.0387	0.0013	0.0406	0.0781	0.0026	0.0381	0.0474	0.0016	0.0221
Bicarbonate	61.0	1	163.3	2.6769	85.93	89.4	1.4650	77.37	86.0	1.4087	76.80	171.9	2.8181	88.65	389.0	6.3761	93.37	391.5	6.4171	89.73
Chloride	35.5	1	2.31	0.0652	2.09	4.8	0.1354	7.15	3.17	0.0894	4.88	1.91	0.0539	1.69	3.41	0.0962	1.41	3.89	0.1097	1.53
Nitrate-N	14.0	1	1.08	0.0771	2.47	0.508	0.0363	1.92	0.005	0.0004	0.02	0.343	0.0245	0.77	0.005	0.0004	0.01	0.005	0.0004	0.00
Sulfate	96.1	2	14.1	0.2936	9.42	12.2	0.2540	13.42	15.6	0.3248	17.71	13.5	0.2811	8.84	17	0.3539	5.18	29.9	0.6225	8.71
	Total Anions (meq/L)			**3.12**			**1.89**			**1.83**			**3.18**			**6.83**			**7.15**	
	Total Ions (meq/L)			**6.46**			**3.92**			**3.76**			**6.55**			**14.31**			**15.31**	
	Cation/Anion Ratio			**1.07**			**1.07**			**1.05**			**1.06**			**1.10**			**1.14**	
	Percent Difference			**3.54**			**3.43**			**2.33**			**2.97**			**4.58**			**6.58**	

Figure I-3. Channel Cc3 Trilinear Diagrams

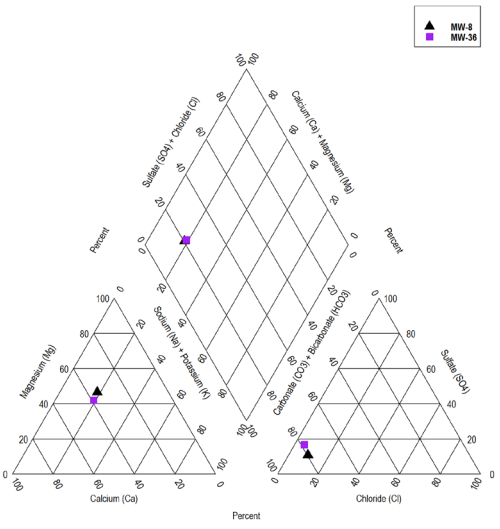
January 1, 2021 - December 31, 2021



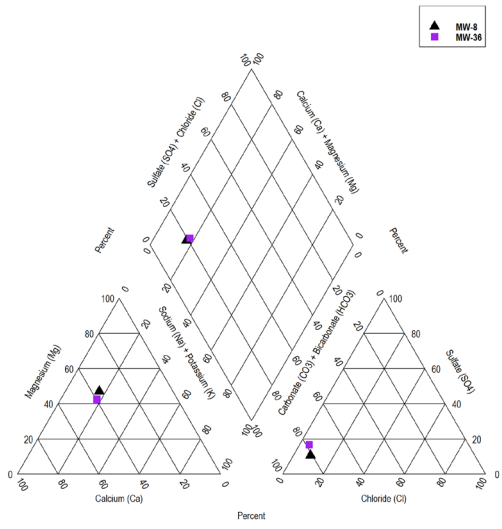
First Quarter: January 1, 2021 - March 31, 2021



Second Quarter: April 1, 2021 - June 30, 2021



Third Quarter: July 1, 2021 - September 30, 2021



Fourth Quarter: October 1, 2021 - December 31, 2021

Table I-3

Channel Cc3: Ion Balance Summary for Groundwater

January 1, 2021 - March 31, 2021

		Well #	**MW-8**			**MW-36**		
		Sample Date	2/22/2021			2/22/2021		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.37			7.59		
Conductance	--		151			156		
TDS	--		124			133		
Calcium	40.1	2	12.1	0.604	34.77	14	0.699	38.24
Magnesium	24.3	2	9.9	0.815	46.91	9.5	0.782	42.79
Potassium	39.1	1	1.12	0.029	1.65	2.64	0.068	3.70
Sodium	23.0	1	6.65	0.289	16.66	6.41	0.279	15.26
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2	0.00005	0.000	0.00	0.000685	0.000	0.00
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)			**1.74**			**1.83**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		59.1			68.8		
Carbonate	60.0	2	0.0083	0.0003	0.0167	0.1604	0.0053	0.3051
Bicarbonate	61.0	1	72.1	1.1815	71.19	83.6	1.3704	78.22
Chloride	35.5	1	4.24	0.1196	7.21	3.03	0.0855	4.88
Nitrate-N	14.0	1	2.71	0.1935	11.66	0.018	0.0013	0.07
Sulfate	96.1	2	7.91	0.1647	9.92	13.9	0.2894	16.52
	Total Anions (meq/L)			**1.66**			**1.75**	
	Total Ions (meq/L)			**3.40**			**3.58**	
	Cation/Anion Ratio			**1.05**			**1.04**	
	Percent Difference			**2.27**			**2.10**	

Table I-3 *(continued)*

Channel Cc3: Ion Balance Summary for Groundwater

April 1, 2021 - June 30, 2021

			Well #	**MW-8**			**MW-36**		
			Sample Date	5/18/2021			5/18/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.36			7.72		
Conductance	--			156.7			165.8		
TDS	--			128			133		
Calcium	40.1	2		11.7	0.584	34.06	13.8	0.689	37.16
Magnesium	24.3	2		9.83	0.809	47.19	9.73	0.801	43.21
Potassium	39.1	1		1.16	0.030	1.73	2.72	0.070	3.75
Sodium	23.0	1		6.7	0.291	17.00	6.76	0.294	15.87
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.00005	0.000	0.00	0.000638	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**1.71**			**1.85**	
Anion Parameters	Molecular Weight (g/mol)	n							
Alkalinity, Total	--			56.1			69.6		
Carbonate	60.0	2		0.0077	0.0003	0.0158	0.2185	0.0073	0.4101
Bicarbonate	61.0	1		68.4	1.1215	69.01	84.5	1.3844	77.95
Chloride	35.5	1		4.28	0.1207	7.43	3.1	0.0875	4.92
Nitrate-N	14.0	1		3.25	0.2320	14.28	0.017	0.0012	0.07
Sulfate	96.1	2		7.23	0.1505	9.26	14.2	0.2956	16.65
	Total Anions (meq/L)				**1.63**			**1.78**	
	Total Ions (meq/L)				**3.34**			**3.63**	
	Cation/Anion Ratio				**1.05**			**1.04**	
	Percent Difference				**2.67**			**2.13**	

Table I-3 *(continued)*

Channel Cc3: Ion Balance Summary for Groundwater

July 1, 2021 - September 30, 2021

			Well #	**MW-8**			**MW-36**	
			Sample Date	8/10/2021			8/11/2021	
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.29			7.66		
Conductance	--			153.4			164.3		
TDS	--			118			130		
Calcium	40.1	2		11.7	0.584	34.94	14.3	0.714	39.11
Magnesium	24.3	2		9.47	0.779	46.64	9.28	0.764	41.86
Potassium	39.1	1		1.07	0.027	1.64	2.87	0.073	4.02
Sodium	23.0	1		6.44	0.280	16.77	6.29	0.274	15.00
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.00005	0.000	0.00	0.000347	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**1.67**			**1.82**	
Anion Parameters	Molecular Weight (g/mol)	n							
Alkalinity, Total	--			54.9			69.4		
Carbonate	60.0	2		0.0064	0.0002	0.0133	0.1899	0.0063	0.3572
Bicarbonate	61.0	1		67.0	1.0976	67.89	84.3	1.3814	77.95
Chloride	35.5	1		4.69	0.1323	8.18	3.1	0.0875	4.93
Nitrate-N	14.0	1		3.32	0.2370	14.66	0.018	0.0013	0.07
Sulfate	96.1	2		7.19	0.1497	9.26	14.2	0.2956	16.68
	Total Anions (meq/L)				**1.62**			**1.77**	
	Total Ions (meq/L)				**3.29**			**3.60**	
	Cation/Anion Ratio				**1.03**			**1.03**	
	Percent Difference				**1.65**			**1.46**	

Table I-3 *(continued)*

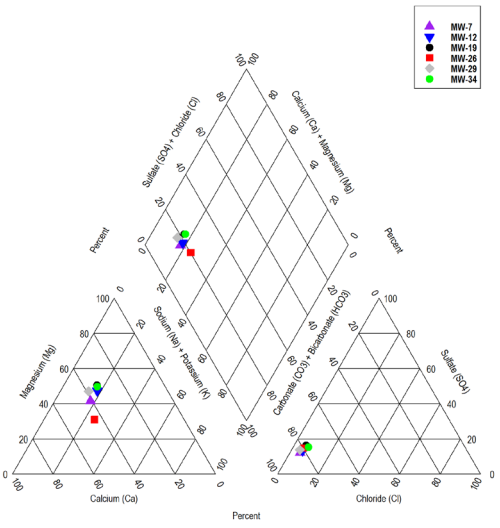
Channel Cc3: Ion Balance Summary for Groundwater

October 1, 2021 - December 31, 2021

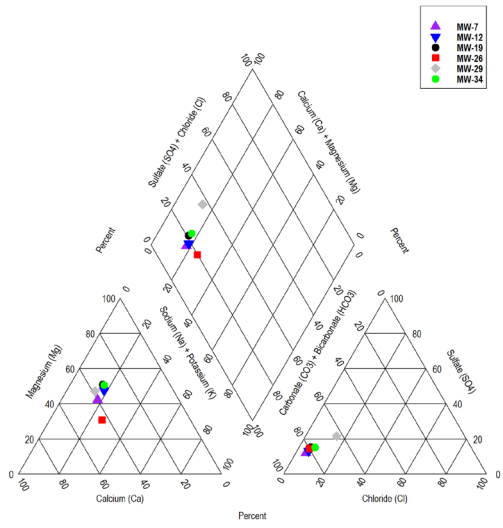
			Well #	**MW-8**			**MW-36**		
			Sample Date	11/16/2021			11/16/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.33			7.33		
Conductance	--			146.1			158.1		
TDS	--			103			119		
Calcium	40.1	2		12.1	0.604	36.17	14.7	0.734	39.63
Magnesium	24.3	2		9.56	0.787	47.13	9.56	0.787	42.51
Potassium	39.1	1		1.21	0.031	1.85	2.86	0.073	3.95
Sodium	23.0	1		5.69	0.248	14.83	5.91	0.257	13.89
Iron	55.8	2		0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2		0.00005	0.000	0.00	0.00065	0.000	0.00
Ammonia-N	14.0	1		0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)				**1.67**			**1.85**	
Anion Parameters	Molecular Weight (g/mol)	n							
Alkalinity, Total	--			55.5			68		
Carbonate	60.0	2		0.0071	0.0002	0.0147	0.0872	0.0029	0.1677
Bicarbonate	61.0	1		67.7	1.1095	68.60	82.8	1.3568	78.25
Chloride	35.5	1		4.1	0.1157	7.15	2.96	0.0835	4.82
Nitrate-N	14.0	1		3.43	0.2449	15.14	0.02	0.0014	0.08
Sulfate	96.1	2		7.06	0.1470	9.09	13.9	0.2894	16.69
	Total Anions (meq/L)				**1.62**			**1.73**	
	Total Ions (meq/L)				**3.29**			**3.58**	
	Cation/Anion Ratio				**1.03**			**1.07**	
	Percent Difference				**1.58**			**3.26**	

Figure I-4. Unit D Aquifer Trilinear Diagrams

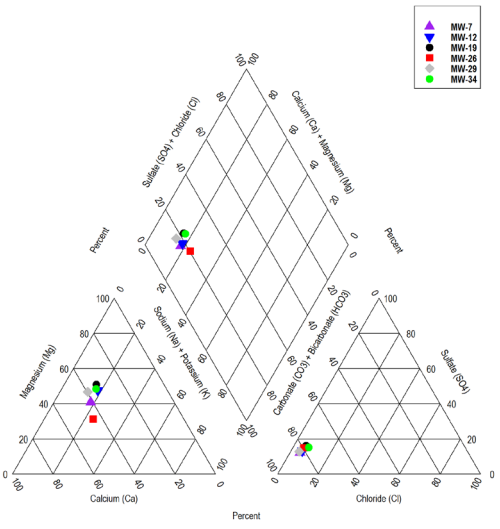
January 1, 2021 - December 31, 2021



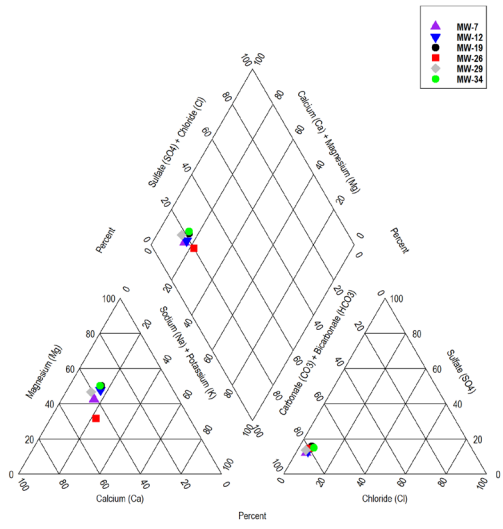
First Quarter: January 1, 2021 - March 31, 2021



Second Quarter: April 1, 2021 - June 30, 2021



Third Quarter: July 1, 2021 - September 30, 2021



Fourth Quarter: October 1, 2021 - December 31, 2021

Table I-4

Unit D Aquifer: Ion Balance Summary for Groundwater

January 1, 2021 - March 31, 2021

	Well #	MW-7			MW-12			MW-19			MW-26			MW-29			MW-34		
	Sample Date	2/23/2021			2/22/2021			2/22/2021			2/23/2021			2/23/2021			2/23/2021		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		7.82			6.95			7.4			7.77			7.11			6.65		
Conductance	--		168.9			147.4			195.4			172.6			214.7			176.6		
TDS	--		136			117			147			133			145			126		
Calcium	40.1	2	16.2	0.808	40.34	11.7	0.584	34.63	15	0.749	32.83	17.6	0.878	43.62	19.8	0.988	38.56	13.5	0.674	33.39
Magnesium	24.3	2	10	0.823	41.06	9.7	0.798	47.35	13.9	1.144	50.16	7.5	0.617	30.66	14.5	1.193	46.57	12.2	1.004	49.76
Potassium	39.1	1	2.69	0.069	3.43	1.75	0.045	2.66	2.33	0.060	2.61	2.96	0.076	3.76	2.09	0.053	2.09	1.46	0.037	1.85
Sodium	23.0	1	6.44	0.280	13.98	5.95	0.259	15.35	7.04	0.306	13.43	9.61	0.418	20.76	6.86	0.298	11.65	6.95	0.302	14.99
Iron	55.8	2	0.0142	0.001	0.03	0.005	0.000	0.01	0.0619	0.002	0.10	0.0908	0.003	0.16	0.729	0.026	1.02	0.005	0.000	0.01
Manganese	54.9	2	0.149	0.005	0.27	0.000281	0.000	0.00	0.487	0.018	0.78	0.0591	0.002	0.11	0.0867	0.003	0.12	0.00005	0.000	0.00
Ammonia-N	14.0	1	0.25	0.018	0.89	0.001	0.000	0.00	0.0286	0.002	0.09	0.261	0.019	0.93	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)			**2.00**			**1.69**			**2.28**			**2.01**			**2.56**			**2.02**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		78.7			63.4			85.1			76.3			100			70.4		
Carbonate	60.0	2	0.3107	0.0104	0.5444	0.0340	0.0011	0.0701	0.1282	0.0043	0.1954	0.2686	0.0090	0.4674	0.0774	0.0026	0.1058	0.0189	0.0006	0.0325
Bicarbonate	61.0	1	95.4	1.5633	82.19	77.2789615	1.2666	78.42	103.6	1.6974	77.58	92.5	1.5167	79.19	121.8	1.9970	81.92	85.8	1.4071	72.53
Chloride	35.5	1	3.36	0.0948	4.98	3.11	0.0877	5.43	4.53	0.1278	5.84	3.74	0.1055	5.51	3.56	0.1004	4.12	4.86	0.1371	7.07
Nitrate-N	14.0	1	0.005	0.0004	0.02	0.693	0.0495	3.06	0.005	0.0004	0.02	0.015	0.0011	0.06	0.005	0.0004	0.01	1.6	0.1142	5.89
Sulfate	96.1	2	11.2	0.2332	12.26	10.1	0.2103	13.02	17.2	0.3581	16.37	13.6	0.2832	14.78	16.2	0.3373	13.84	13.5	0.2811	14.49
	Total Anions (meq/L)			**1.90**			**1.62**			**2.19**			**1.92**			**2.44**			**1.94**	
	Total Ions (meq/L)			**3.91**			**3.30**			**4.47**			**3.93**			**5.00**			**3.96**	
	Cation/Anion Ratio			**1.05**			**1.04**			**1.04**			**1.05**			**1.05**			**1.04**	
	Percent Difference			**2.61**			**2.14**			**2.06**			**2.49**			**2.50**			**1.96**	

Table I-4 *(continued)*

Unit D Aquifer: Ion Balance Summary for Groundwater

April 1, 2021 - June 30, 2021

			Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
			Sample Date	5/19/2021			5/17/2021			5/25/2021			5/19/2021			5/19/2021			5/19/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			7.52			7.12			7.4			8.01			7.33			6.47		
Conductance	--			176.8			151.2			202.9			179.8			213.1			176.7		
TDS	--			135			109			143			143			159			138		
Calcium	40.1	2		15.8	0.788	39.59	11.5	0.574	34.14	15.1	0.753	32.92	17.5	0.873	42.94	19.8	0.988	38.39	13.5	0.674	32.45
Magnesium	24.3	2		10.1	0.831	41.73	9.7	0.798	47.49	14.1	1.160	50.69	7.51	0.618	30.39	14.6	1.201	46.68	12.8	1.053	50.73
Potassium	39.1	1		2.75	0.070	3.53	1.84	0.047	2.80	2.34	0.060	2.62	3.1	0.079	3.90	2.16	0.055	2.15	1.55	0.040	1.91
Sodium	23.0	1		6.42	0.279	14.02	6.01	0.261	15.55	6.94	0.302	13.19	10.1	0.439	21.61	6.9	0.300	11.66	7.11	0.309	14.90
Iron	55.8	2		0.0185	0.001	0.03	0.005	0.000	0.01	0.0139	0.000	0.02	0.0911	0.003	0.16	0.703	0.025	0.98	0.005	0.000	0.01
Manganese	54.9	2		0.134	0.005	0.24	0.00005	0.000	0.00	0.317	0.012	0.50	0.0577	0.002	0.10	0.101	0.004	0.14	0.00005	0.000	0.00
Ammonia-N	14.0	1		0.238	0.017	0.85	0.001	0.000	0.00	0.0176	0.001	0.05	0.256	0.018	0.90	0.002	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)				**1.99**			**1.68**			**2.29**			**2.03**			**2.57**			**2.08**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			79.6			63			86.3			77.4			101			71.1		
Carbonate	60.0	2		0.1580	0.0053	0.2744	0.0499	0.0017	0.1038	0.1300	0.0043	0.1978	0.4715	0.0157	0.8113	0.1296	0.0043	0.1349	0.0126	0.0004	0.0214
Bicarbonate	61.0	1		96.8	1.5864	82.67	76.7585722	1.2581	78.54	105.0	1.7213	78.57	93.5	1.5320	79.09	123.0	2.0153	62.94	86.7	1.4213	72.22
Chloride	35.5	1		3.4	0.0959	5.00	3.13	0.0883	5.51	4.43	0.1250	5.70	3.79	0.1069	5.52	17.4	0.4909	15.33	5.2	0.1467	7.45
Nitrate-N	14.0	1		0.005	0.0004	0.02	0.697	0.0498	3.11	0.013	0.0009	0.04	0.018	0.0013	0.07	0.005	0.0004	0.01	1.63	0.1164	5.91
Sulfate	96.1	2		11.1	0.2311	12.04	9.8	0.2040	12.74	16.3	0.3394	15.49	13.5	0.2811	14.51	33.2	0.6912	21.59	13.6	0.2832	14.39
	Total Anions (meq/L)				**1.92**			**1.60**			**2.19**			**1.94**			**3.20**			**1.97**	
	Total Ions (meq/L)				**3.91**			**3.28**			**4.48**			**3.97**			**5.78**			**4.04**	
	Cation/Anion Ratio				**1.04**			**1.05**			**1.04**			**1.05**			**0.80**			**1.06**	
	Percent Difference				**1.86**			**2.41**			**2.19**			**2.43**			**-10.88**			**2.68**	

Table I-4 *(continued)*

Unit D Aquifer: Ion Balance Summary for Groundwater

July 1, 2021 - September 30, 2021

			Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
			Sample Date	8/12/2021			8/10/2021			8/12/2021			8/11/2021			8/11/2021			8/12/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			7.74			6.98			7.13			7.71			7.08			6.64		
Conductance	--			175.5			145.3			194.8			171.9			213.9			177.3		
TDS	--			132			115			147			153			159			127		
Calcium	40.1	2		15.9	0.793	40.65	11.6	0.579	34.24	15	0.749	32.82	17.3	0.863	44.06	19.7	0.983	39.14	13.9	0.694	34.68
Magnesium	24.3	2		9.6	0.790	40.47	9.79	0.806	47.65	14	1.152	50.51	7.38	0.607	31.00	14.1	1.160	46.19	11.8	0.971	48.55
Potassium	39.1	1		2.89	0.074	3.79	1.74	0.045	2.63	2.26	0.058	2.53	2.82	0.072	3.68	2.02	0.052	2.06	1.64	0.042	2.10
Sodium	23.0	1		6.26	0.272	13.95	6.01	0.261	15.46	6.85	0.298	13.06	9.04	0.393	20.07	6.56	0.285	11.36	6.74	0.293	14.66
Iron	55.8	2		0.017	0.001	0.03	0.005	0.000	0.01	0.0766	0.003	0.12	0.101	0.004	0.18	0.774	0.028	1.10	0.005	0.000	0.01
Manganese	54.9	2		0.136	0.005	0.25	0.00005	0.000	0.00	0.533	0.019	0.85	0.0643	0.002	0.12	0.0965	0.004	0.14	0.00011	0.000	0.00
Ammonia-N	14.0	1		0.233	0.017	0.85	0.001	0.000	0.00	0.0345	0.002	0.11	0.241	0.017	0.88	0.0028	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)				**1.95**			**1.69**			**2.28**			**1.96**			**2.51**			**2.00**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			79.3			63.6			85.6			76.3			99.7			70.9		
Carbonate	60.0	2		0.2607	0.0087	0.4537	0.0365	0.0012	0.0754	0.0694	0.0023	0.1049	0.2341	0.0078	0.4067	0.0720	0.0024	0.0997	0.0186	0.0006	0.0316
Bicarbonate	61.0	1		96.2	1.5770	82.35	77.5177953	1.2705	78.71	104.3	1.7093	77.59	92.6	1.5179	79.11	121.5	1.9912	82.76	86.5	1.4171	72.27
Chloride	35.5	1		3.38	0.0953	4.98	3.09	0.0872	5.40	4.64	0.1309	5.94	3.78	0.1066	5.56	3.61	0.1018	4.23	5.01	0.1413	7.21
Nitrate-N	14.0	1		0.012	0.0009	0.04	0.677	0.0483	2.99	0.005	0.0004	0.02	0.016	0.0011	0.06	0.005	0.0004	0.01	1.69	0.1206	6.15
Sulfate	96.1	2		11.2	0.2332	12.18	9.94	0.2070	12.82	17.3	0.3602	16.35	13.7	0.2852	14.87	14.9	0.3102	12.89	13.5	0.2811	14.33
	Total Anions (meq/L)				**1.92**			**1.61**			**2.20**			**1.92**			**2.41**			**1.96**	
	Total Ions (meq/L)				**3.87**			**3.30**			**4.48**			**3.88**			**4.92**			**3.96**	
	Cation/Anion Ratio				**1.02**			**1.05**			**1.04**			**1.02**			**1.04**			**1.02**	
	Percent Difference				**0.95**			**2.31**			**1.74**			**1.04**			**2.15**			**0.99**	

Table I-4 *(continued)*

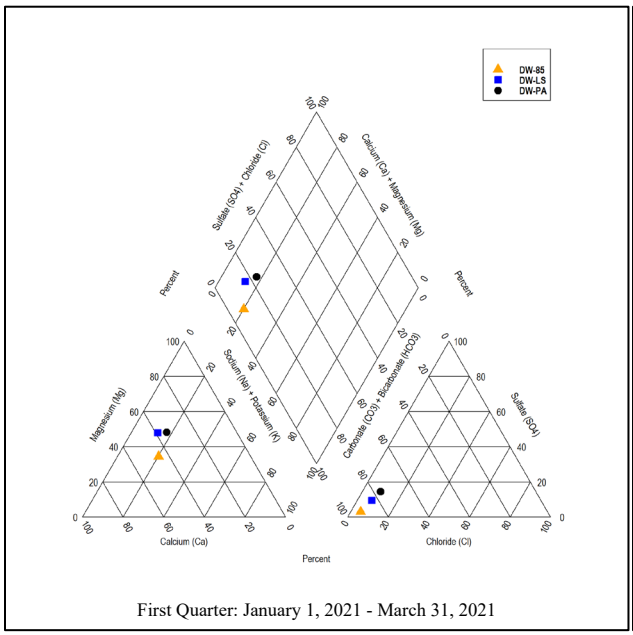
Unit D Aquifer: Ion Balance Summary for Groundwater

October 1, 2021 - December 31, 2021

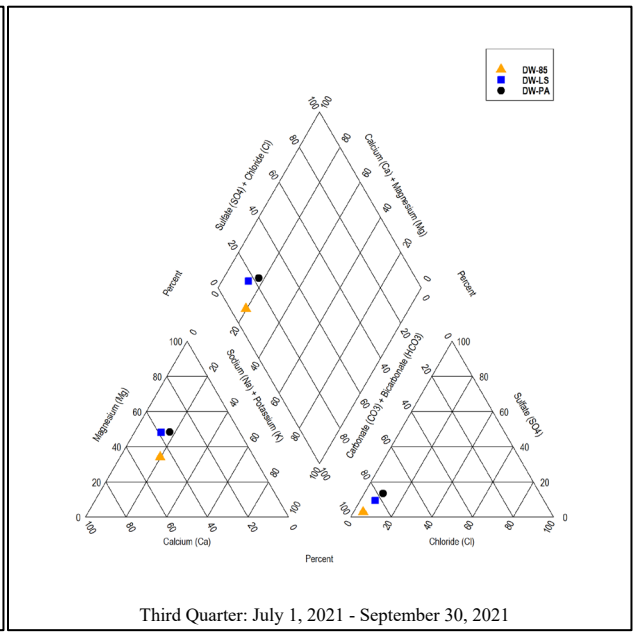
			Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
			Sample Date	11/16/2021			11/15/2021			11/16/2021			11/17/2021			11/17/2021			11/17/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			7.7			7.18			7.28			7.92			7.39			6.75		
Conductance	--			165.6			141.4			192.9			171.7			212			172.7		
TDS	--			123			99.3			135			126			135			117		
Calcium	40.1	2		16.9	0.843	41.09	12.1	0.604	35.75	15.5	0.773	33.90	18.6	0.928	45.52	21.4	1.068	40.50	14.3	0.714	34.67
Magnesium	24.3	2		10.5	0.864	42.10	9.83	0.809	47.89	13.8	1.136	49.77	7.77	0.639	31.36	14.8	1.218	46.19	12.6	1.037	50.38
Potassium	39.1	1		2.97	0.076	3.70	1.92	0.049	2.91	2.53	0.065	2.84	3.22	0.082	4.04	2.31	0.059	2.24	1.63	0.042	2.03
Sodium	23.0	1		5.68	0.247	12.04	5.22	0.227	13.44	6.57	0.286	12.53	8.42	0.366	17.96	6.02	0.262	9.93	6.11	0.266	12.91
Iron	55.8	2		0.0189	0.001	0.03	0.005	0.000	0.01	0.0501	0.002	0.08	0.0957	0.003	0.17	0.742	0.027	1.01	0.005	0.000	0.01
Manganese	54.9	2		0.144	0.005	0.26	0.00005	0.000	0.00	0.499	0.018	0.80	0.0627	0.002	0.11	0.0919	0.003	0.13	0.000151	0.000	0.00
Ammonia-N	14.0	1		0.225	0.016	0.78	0.001	0.000	0.00	0.0293	0.002	0.09	0.242	0.017	0.85	0.0026	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)				**2.05**			**1.69**			**2.28**			**2.04**			**2.64**			**2.06**	
Anion Parameters	Molecular Weight (g/mol)	n																			
Alkalinity, Total	--			77.8			62.5			84.5			75.7			98.6			69.8		
Carbonate	60.0	2		0.2333	0.0078	0.4136	0.0568	0.0019	0.1195	0.0967	0.0032	0.1489	0.3756	0.0125	0.6597	0.1452	0.0048	0.2015	0.0236	0.0008	0.0409
Bicarbonate	61.0	1		94.4	1.5479	82.31	76.1344922	1.2478	78.75	102.9	1.6864	77.97	91.6	1.5012	79.11	120.0	1.9667	81.87	85.1	1.3949	72.47
Chloride	35.5	1		3.34	0.0942	5.01	3.02	0.0852	5.38	4.57	0.1289	5.96	3.72	0.1049	5.53	3.52	0.0993	4.13	4.78	0.1348	7.01
Nitrate-N	14.0	1		0.023	0.0016	0.09	0.687	0.0490	3.10	0.01	0.0007	0.03	0.028	0.0020	0.11	0.005	0.0004	0.01	1.73	0.1235	6.42
Sulfate	96.1	2		11	0.2290	12.18	9.63	0.2005	12.65	16.5	0.3435	15.88	13.3	0.2769	14.59	15.9	0.3310	13.78	13	0.2707	14.06
	Total Anions (meq/L)				**1.88**			**1.58**			**2.16**			**1.90**			**2.40**			**1.92**	
	Total Ions (meq/L)				**3.93**			**3.27**			**4.44**			**3.94**			**5.04**			**3.98**	
	Cation/Anion Ratio				**1.09**			**1.07**			**1.05**			**1.07**			**1.10**			**1.07**	
	Percent Difference				**4.37**			**3.20**			**2.67**			**3.60**			**4.65**			**3.35**	

Figure I-5. Private Wells Trilinear Diagrams

January 1, 2021 - December 31, 2021



First Quarter: January 1, 2021 - March 31, 2021



Third Quarter: July 1, 2021 - September 30, 2021

Table I-5

Private Wells: Ion Balance Summary for Groundwater

January 1, 2021 - March 31, 2021

			Well #	**DW-85**			**DW-LS**			**DW-PA**		
			Sample Date	2/24/2021			3/24/2021			2/24/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			6.81			7.07			7.02		
Conductance	--			293.1			239.7			162.7		
TDS	--			100			182			119		
Calcium	40.1	2		14.3	0.71357	44.6888262	22.5	1.12275	38.9176178	13.3	0.66367	34.4506354
Magnesium	24.3	2		6.6	0.543114	34.0136597	16.8	1.382472	47.9203	11.3	0.929877	48.2692506
Potassium	39.1	1		2.44	0.0624152	3.90888353	1.62	0.0414396	1.43641106	1.49	0.0381142	1.97848088
Sodium	23.0	1		5.87	0.255345	15.9915191	7.77	0.337995	11.7158408	6.77	0.294495	15.287025
Iron	55.8	2		0.0684	0.0024494	0.15339909	0.005	0.00017905	0.00620637	0.005	0.00017905	0.00929436
Manganese	54.9	2		0.0533	0.00194012	0.12150411	0.000911	3.316E-05	0.00114943	0.000851	3.0976E-05	0.00160796
Ammonia-N	14.0	1		0.251	0.01791889	1.12220828	0.001	0.00007139	0.00247457	0.001	0.00007139	0.0037058
	Total Cations (meq/L)				**1.60**			**2.88**			**1.93**	
Anion Parameters	Molecular Weight (g/mol)	n										
Alkalinity, Total	--			69.9			110			68.3		
Carbonate	60.0	2		0.0271	0.0009	0.0595	0.0776	0.0026	0.0929	0.0430	0.0014	0.0778
Bicarbonate	61.0	1		85.2	1.39680243	91.92	134.0	2.19695068	78.85	83.2	1.36428117	74.08
Chloride	35.5	1		2.66	0.0750386	4.94	6.73	0.1898533	6.81	5.7	0.160797	8.73
Nitrate-N	14.0	1		0.005	0.00035695	0.02	2.03	0.1449217	5.20	0.77	0.0549703	2.98
Sulfate	96.1	2		2.23	0.0464286	3.06	12.1	0.251922	9.04	12.5	0.26025	14.13
	Total Anions (meq/L)				**1.52**			**2.79**			**1.84**	
	Total Ions (meq/L)				**3.12**			**5.67**			**3.77**	
	Cation/Anion Ratio				**1.05**			**1.04**			**1.05**	
	Percent Difference				**2.48**			**1.74**			**2.25**	

Table I-5 *(continued)*

Private Wells: Ion Balance Summary for Groundwater

July 1, 2021 - September 30, 2021

			Well #	**DW-85**			**DW-LS**			**DW-PA**		
			Sample Date	9/20/2021			8/9/2021			8/9/2021		
Cation Parameters	Molecular Weight (g/mol)	n		mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--			7.73			6.89			6.52		
Conductance	--			139			253			166.5		
TDS	--			97.3			192			131		
Calcium	40.1	2		14.5	0.72355	45.4724854	23.1	1.15269	38.6217565	13	0.6487	34.3838426
Magnesium	24.3	2		6.51	0.5357079	33.6672927	17.5	1.440075	48.2508099	11.1	0.913419	48.4150688
Potassium	39.1	1		2.42	0.0619036	3.89041607	1.6	0.040928	1.37132382	1.47	0.0376026	1.99309678
Sodium	23.0	1		5.66	0.24621	15.4734028	8.06	0.35061	11.7474551	6.59	0.286665	15.194457
Iron	55.8	2		0.0625	0.00223813	0.14065801	0.005	0.00017905	0.00599921	0.005	0.00017905	0.00949041
Manganese	54.9	2		0.0533	0.00194012	0.12192948	0.000216	7.8624E-06	0.00026344	0.000135	4.914E-06	0.00026046
Ammonia-N	14.0	1		0.275	0.01963225	1.23381549	0.001	0.00007139	0.00239198	0.001	0.00007139	0.00378397
	Total Cations (meq/L)				**1.59**			**2.98**			**1.89**	
Anion Parameters	Molecular Weight (g/mol)	n										
Alkalinity, Total	--			69.7			113			68.6		
Carbonate	60.0	2		0.2239	0.0075	0.4941	0.0527	0.0018	0.0610	0.0137	0.0005	0.0247
Bicarbonate	61.0	1		84.6	1.38624501	91.77	137.8	2.25776865	78.34	83.7	1.37125674	74.46
Chloride	35.5	1		2.57	0.0724997	4.80	7.12	0.2008552	6.97	5.81	0.1639001	8.90
Nitrate-N	14.0	1		0.005	0.00035695	0.02	2.26	0.1613414	5.60	0.931	0.06646409	3.61
Sulfate	96.1	2		2.11	0.0439302	2.91	12.5	0.26025	9.03	11.5	0.23943	13.00
	Total Anions (meq/L)				**1.51**			**2.88**			**1.84**	
	Total Ions (meq/L)				**3.10**			**5.87**			**3.73**	
	Cation/Anion Ratio				**1.05**			**1.04**			**1.02**	
	Percent Difference				**2.60**			**1.75**			**1.21**	

Appendix J

Surface Water Monitoring Data

Table J-1
Surface Water - Field Parameters

Surface Water - Field Parameters			Dissolved Oxygen (DO) (Field)	Oxidation-Reduction Potential (ORP) (Field)	pH (Field)	Specific Conductance (Field)	Temperature (Field)	Turbidity (Field)
Site ID	Sample Date	Sample ID	(mg/L)	(mV)	(µmhos/cm)	(std. Units)	(°C)	(NTU)
SW-W1	2/24/2021	SVW1210224Q	11.61	280.8	7.39	163.9	5.623	5.85
SW-W1	5/20/2021	SVW1210520Q	9.62	25.5	7.33	189.3	9.233	10.3
SW-W1	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	10.38	66.3	7.54	165.1	7.85	10.9
SW-W2	2/24/2021	SVW2210224Q	12.49	263.2	7.97	236.2	5.045	3.84
SW-W2	5/20/2021	SVW2210520Q	11.04	223.7	7.98	547	9.361	32.8
SW-W2	8/11/2021	SVW2210811Q	9.76	166.3	8.01	577	15.187	9.61
SW-W2	11/17/2021	SVW2211117Q	11.37	260.1	8.21	454	7.52	2.02
SW-W3	2/24/2021	SVW3210224Q	11.45	291.8	7.46	239.3	7.383	5.82
SW-W3	5/20/2021	SVW3210520Q	10.75	124.3	7.52	281.5	9.887	120
SW-W3	8/11/2021	SVW3210811Q	9.93	82.9	7.64	300.5	13.56	2.75
SW-W3	11/17/2021	SVW3211117Q	10.91	183.7	7.66	76.4	9.27	4.05
SW-E	2/24/2021	SVE-210224D	12.67	309.7	7.76	156.6	5.71	5.28
SW-E	2/24/2021	SVE-210224Q	12.67	309.7	7.76	156.6	5.71	5.28
SW-E	5/20/2021	SVE-210520Q	11.42	168.3	7.96	196.9	9.256	8.95
SW-E	8/11/2021	SVE-210811Q	10.36	45.5	7.95	201.6	13.276	5.65
SW-E	11/17/2021	SVE-211117Q	11.84	213.6	7.89	152.8	7.65	8.47

Note:

There was no flow at SW-W1 during third quarter 2021.

-- = parameter is not sampled

Table J-2
Surface Water - Conventionals

Surface Water - Conventionals			Alkalinity, Total (as $CaCO_3$)	Ammonia as N	Biological Oxygen Demand - 5 Day	Chemical Oxygen Demand	Chloride	Coliforms, Fecal	Coliforms, Total	Cyanide	Fluoride	Hardness	Nitrate	Nitrate + Nitrite as N	Phosphorous, Soluble Reactive	Phosphorus, Total as P	Specific Conductance	Sulfate	Total Dissolved Solids	Total Kjeldahl Nitrogen	Total Organic Carbon	Total Solids	Total Suspended Solids	Turbidity
Site ID	Sample Date	Sample ID	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(CFU/100 mL)	(CFU/100 mL)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	µmhos/cm	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(NTU)
SW-W1	2/24/2021	SVW1210224Q	65.5	0.0119	2 U	18 T	6.32	5 C	22	0.002 U	0.02 U	81.3	2.08	2.08	0.0299	0.0957	189	8.6	135	0.307	3.24	151	7.2	4.98
SW-W1	5/20/2021	SVW1210520Q	79.4	0.0184	2 U	19 T	5.94	11	50	0.002 U	0.02 U	92.8	1.38	1.38	0.0356	0.154	201	7.23	149	0.346	5.09	159	21.6	11
SW-W1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	67.4	0.0228	2 U	29.6	5.92	23 C	1500	0.002 U	0.02 U	81.9	2.32	2.34	0.0328	0.312	189	7.51	130	0.271	5.74	133	9.8	7.72
SW-W2	2/24/2021	SVW2210224Q	245	0.0075 T	2 U	15 T	15.4	89	260	0.002 U	0.02 U	258	0.212	0.212	0.011	0.0313	526	15.1	314	0.267	4.31	325	4.5	3.78
SW-W2	5/20/2021	SVW2210520Q	290	0.0073 T	2 U	22.4	16.6	14 C	80	0.002 U	0.02 U	305	0.12	0.12	0.0147	0.105	580	13.8	368	0.492	5.91	401	43.8	22.8
SW-W2	8/11/2021	SVW2210811Q	304	0.0064 T	2 U	17 T	19	8	43 C	0.002 U	0.02 U	324	0.0707	0.0708	0.0188	0.0747	620	14.5	388	0.26	5.53	433	43.1	15.4
SW-W2	11/17/2021	SVW2211117Q	251	0.0028 T	2 U	16 T	16.4	3 C	180	0.002 U	0.02 U	263	0.0871	0.0871	0.00967	0.0404	532	14.5	317	0.1 U	5.15	318	3.6	2.9
SW-W3	2/24/2021	SVW3210224Q	114	0.0078 T	2 U	18 T	7.99	6	13	0.002 U	0.02 U	127	0.457	0.457	0.056	0.139	277	11.8	184	0.263	3.48	199	12.1	5.15
SW-W3	5/20/2021	SVW3210520Q	137	0.0096 T	2 U	11 T	8.73	2	220	0.002 U	0.02 U	160	0.245	0.245	0.0583	0.325	315	12	211	0.349	4.17	511	331	92.7
SW-W3	8/11/2021	SVW3210811Q	139	0.0071 T	2 U	5.6 T	9.04	1	160	0.002 U	0.02 U	152	0.141	0.141	0.0707	0.158	323	11.8	213	0.17 T	3.83	241	15.5	4
SW-W3	11/17/2021	SVW3211117Q	120	0.008 T	2 U	17 T	8.65	23	500	0.002 U	0.02 U	131	0.269	0.269	0.061	0.151	288	11.6	181	0.201	4.83	193	5.5	3.13
SW-E	2/24/2021	SVE-210224D	--	--	--	--	--	--	--	--	--	80.7	--	--	--	--	182	--	--	--	--	--	--	4
SW-E	2/24/2021	SVE-210224Q	--	--	--	--	--	--	--	--	--	78.7	--	--	--	--	182	--	--	--	--	--	--	5.07
SW-E	5/20/2021	SVE-210520Q	--	--	--	--	--	--	--	--	--	97.7	--	--	--	--	212	--	--	--	--	--	--	7.77
SW-E	8/11/2021	SVE-210811Q	--	--	--	--	--	--	--	--	--	100	--	--	--	--	218	--	--	--	--	--	--	7.58
SW-E	11/17/2021	SVE-211117Q	--	--	--	--	--	--	--	--	--	76.4	--	--	--	--	175	--	--	--	--	--	--	8.75

Note:
There was no flow at SW-W1 during third quarter 2021.
-- = parameter is not sampled for

Table J-3
Surface Water - Metals (Dissolved & Total)

Surface Water - Metals (Dissolved & Total)			Aluminum, Dissolved	Aluminum, Total	Antimony, Dissolved	Antimony, Total	Arsenic, Dissolved	Arsenic, Total	Barium, Dissolved	Barium, Total	Beryllium, Dissolved	Beryllium, Total	Cadmium, Dissolved	Cadmium, Total	Calcium, Dissolved	Calcium, Total	Chromium, Dissolved	Chromium, Total	Cobalt, Dissolved	Cobalt, Total	Copper, Dissolved	Copper, Total	Iron, Dissolved	Iron, Total	Lead, Dissolved	Lead, Total	Magnesium, Dissolved	Magnesium, Total	Manganese, Dissolved	Manganese, Total
		CAS #	7429-90-5	7429-90-5	7440-36-0	7440-36-0	7440-38-2	7440-38-2	7440-39-3	7440-39-3	7440-41-7	7440-41-7	7440-43-9	7440-43-9	7440-70-2	7440-70-2	7440-47-3	7440-47-3	7440-48-4	7440-48-4	7440-50-8	7440-50-8	7439-89-6	7439-89-6	7439-92-1	7439-92-1	7439-95-4	7439-95-4	7439-96-5	7439-96-5
Site ID	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
SW-W1	2/24/2021	SVW1210224Q	0.005 U	0.0826	0.0003 U	0.0003 U	0.00198	0.00329	0.000632	0.00253	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.1	14	0.000432	0.000763	5.72E-05	0.000331	0.000485	0.000719	0.161	1.12	0.0001 U	0.000283	11.3	11.2	0.235	0.504
SW-W1	5/20/2021	SVW1210520Q	0.005 U	0.156	0.0003 U	0.0003 U	0.00282	0.00463	0.000815	0.00385	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.1	15.7	0.000335	0.000978	7.75E-05	0.00052	0.000275	0.000847	0.17	1.6	0.0001 U	0.000467	11.8	13	0.323	0.706
SW-W1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	0.005 U	0.177 D	0.0003 U	0.0003 U	0.00316	0.00657	0.00128	0.00467	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	14.5	14.4	0.000506	0.00148	0.000124	0.000572	0.00054	0.00127	0.306	2.11	0.0001 U	0.00054	11.2	11.1	0.591	0.954
SW-W2	2/24/2021	SVW2210224Q	0.005 U	0.0374	0.0003 U	0.0003 U	0.0012	0.00171	0.00276	0.0043	0.0001 U	0.0001 U	5E-05 U	5E-05 U	43.8	43.7	0.000258	0.000339	5E-05 U	7.97E-05	0.000255	0.00037	0.0248	0.593	0.0001 U	0.000109	36.5	36.1	0.0219	0.125
SW-W2	5/20/2021	SVW2210520Q	0.005 U	0.393	0.0003 U	0.0003 U	0.00149	0.00642	0.00337	0.0172	0.0001 U	0.0001 U	5E-05 U	5E-05 U	49.7	50.7	0.0002 U	0.00135	5E-05 U	0.00052	0.00022	0.00115	0.0166	5.25	0.0001 U	0.000633	41.7	43.4	0.0225	0.926
SW-W2	8/11/2021	SVW2210811Q	0.005 U	0.0978	0.0003 U	0.0003 U	0.00155	0.0029	0.00334	0.00829	0.0001 U	0.0001 U	5E-05 U	5E-05 U	54.6	54.7	0.000202	0.000448	5E-05 U	0.000178	0.00021	0.000474	0.0202	1.7	0.0001 U	0.000226	45.2	45.6	0.0533	0.43
SW-W2	11/17/2021	SVW2211117Q	0.00757	0.0213 D	0.0003 U	0.0003 U	0.00137	0.00158	0.00305	0.00398	0.0001 U	0.0001 U	5E-05 U	5E-05 U	46	45.2	0.000297	0.000375	5E-05 U	7.22E-05	0.000288	0.000392	0.138	0.392	0.0001 U	0.0001 U	36.1	36.5	0.058	0.107
SW-W3	2/24/2021	SVW3210224Q	0.00931	0.156	0.0003 U	0.0003 U	0.00288	0.00372	0.0046	0.00728	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21	21.2	0.000328	0.000771	0.000102	0.000257	0.000449	0.000806	0.0679	0.691	0.0001 U	0.000366	17.7	18.1	0.399	0.577
SW-W3	5/20/2021	SVW3210520Q	0.0202	4.61	0.0003 U	0.0003 U	0.00324	0.00512	0.0085	0.0358	0.0001 U	0.0001 U	5E-05 U	5E-05 U	24	25.1	0.000255	0.0109	0.000155	0.00288	0.00023	0.00752	0.0517	6.03	0.0001 U	0.00152	20.8	23.6	0.631	0.925
SW-W3	8/11/2021	SVW3210811Q	0.005 U	0.0784	0.0003 U	0.0003 U	0.00374	0.00439	0.00526	0.0073	0.0001 U	0.0001 U	5E-05 U	5E-05 U	25.7	25.4	0.00021	0.000461	0.0001	0.000208	0.0002 U	0.000588	0.0355	0.463	0.0001 U	0.000203	21.3	21.6	0.459	0.644
SW-W3	11/17/2021	SVW3211117Q	0.00747	0.0679 D	0.0003 U	0.0003 U	0.00354	0.00402	0.0051	0.00683	0.0001 U	0.0001 U	5E-05 U	5E-05 U	23	22.5	0.000444	0.00054	0.00012	0.000197	0.000388	0.000599	0.0901	0.407	0.0001 U	0.000199	18.4	18.3	0.483	0.558
SW-E	2/24/2021	SVE-210224D	0.0269	0.193	0.0003 U	0.0003 U	0.00154	0.00166	0.00521	0.00638	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.9	13.1	0.00114	0.00164	5E-05 U	0.000131	0.000713	0.000954	0.0675	0.303	0.0001 U	0.000195	11.2	11.6	0.00758	0.0237
SW-E	2/24/2021	SVE-210224Q	0.0255	0.202	0.0003 U	0.0003 U	0.00153	0.00169	0.00519	0.00625	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.9	12.8	0.00112	0.00166	5E-05 U	0.000133	0.000682	0.000945	0.0667	0.306	0.0001 U	0.000192	11.1	11.3	0.00748	0.0238
SW-E	5/20/2021	SVE-210520Q	0.00948	0.245	0.0003 U	0.0003 U	0.00191	0.00226	0.00503	0.00796	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.3	15.4	0.0011	0.00221	5E-05 U	0.000195	0.000305	0.000844	0.0381	0.496	0.0001 U	0.000367	13.6	14.4	0.0103	0.0719
SW-E	8/11/2021	SVE-210811Q	0.00812	0.285	0.0003 U	0.0003 U	0.00214	0.00243	0.00485	0.00783	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.1	16.4	0.00114	0.00215	5E-05 U	0.000223	0.000248	0.000739	0.0417	0.553	0.0001 U	0.00039	14.3	14.4	0.0102	0.0863
SW-E	11/17/2021	SVE-211117Q	0.0298	0.359 D	0.0003 U	0.0003 U	0.00171	0.00197	0.00597	0.00858	0.0001 U	0.0001 DU	5E-05 U	5E-05 U	12.8	12.8	0.00112	0.00217	5.62E-05	0.000264	0.000791	0.00141	0.0924	0.557	0.0001 U	0.000321	10.5	10.8	0.0121	0.0301

Surface Water - Metals (Dissolved & Total)			Mercury, Total	Nickel, Dissolved	Nickel, Total	Potassium, Dissolved	Potassium, Total	Selenium, Dissolved	Selenium, Total	Silver, Dissolved	Silver, Total	Sodium, Dissolved	Sodium, Total	Thallium, Dissolved	Thallium, Total	Tin, Dissolved	Tin, Total	Vanadium, Dissolved	Vanadium, Total	Zinc, Dissolved	Zinc, Total
		CAS #	7439-97-6	7440-02-0	7440-02-0	7440-09-7	7440-09-7	7782-49-2	7782-49-2	7440-22-4	7440-22-4	7440-23-5	7440-23-5	7440-28-0	7440-28-0	7440-31-5	7440-31-5	7440-62-2	7440-62-2	7440-66-6	7440-66-6
Site ID	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
SW-W1	2/24/2021	SVW1210224Q	5E-05 U	0.000689	0.00158	1.05	1.02	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.76	6.69	0.0001 U	0.0001 U	0.0005 U	0.0005 U	0.000341	0.000888	0.0005 U	0.00123
SW-W1	5/20/2021	SVW1210520Q	5E-05 U	0.000599	0.0023	1.06	1.16	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.21	7.72	0.0001 DU	0.0001 U	0.0005 U	0.0005 U	0.000363	0.00135	0.000876 D	0.00295
SW-W1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	5E-05 U	0.000991	0.00264	1.16	1.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.44	6.32	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000424	0.00149	0.00135	0.00319
SW-W2	2/24/2021	SVW2210224Q	5E-05 U	0.00166	0.00187	2.69	2.64	0.0005 U	0.0005 U	4E-05 U	4E-05 U	14.3	13.9	0.0001 U	0.0001 U	0.0005 U	0.0005 U	0.000312	0.000464	0.0005 U	0.000693
SW-W2	5/20/2021	SVW2210520Q	5E-05 U	0.00191	0.00411	2.86	3.09	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16	16.8	0.0001 DU	0.0001 U	0.0005 U	0.0005 U	0.000265	0.00172	0.000784 D	0.00222
SW-W2	8/11/2021	SVW2210811Q	5E-05 U	0.00198	0.00251	3.07	3.09	0.0005 U	0.0005 U	4E-05 U	4E-05 U	17.5	17.3	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000274	0.000671	0.000614	0.00108
SW-W2	11/17/2021	SVW2211117Q	5E-05 U	0.00197	0.00205	2.94	2.88	0.0005 U	0.0005 U	4E-05 U	4E-05 U	13.9	14.1	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000308	0.000422	0.00104	0.00124
SW-W3	2/24/2021	SVW3210224Q	5E-05 U	0.00104	0.00175	2.03	2.04	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.36	8.43	0.0001 U	0.0001 U	0.0005 U	0.0005 U	0.000676	0.00134	0.0005 U	0.00094
SW-W3	5/20/2021	SVW3210520Q	5E-05 U	0.00109	0.0144	2.24	2.66	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.42	10.4	0.0001 DU	0.0001 U	0.0005 U	0.0005 U	0.000967	0.0132	0.000793 D	0.0131
SW-W3	8/11/2021	SVW3210811Q	5E-05 U	0.000945	0.00142	2.38	2.4	0.0005 U	0.0005 U	4E-05 U	0.000141	9.88	10.1	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000544	0.000922	0.000738	0.00406
SW-W3	11/17/2021	SVW3211117Q	5E-05 U	0.00134	0.00158	2.28	2.25	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.41	8.38	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000715	0.00106	0.000893	0.00129
SW-E	2/24/2021	SVE-210224D	--	0.000809	0.00124	1.68	1.71	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.04	6.2	0.0001 U	0.0001 U	0.0005 U	0.0005 U	0.00255	0.00312	0.000874	0.00151
SW-E	2/24/2021	SVE-210224Q	--	0.000806	0.00137	1.68	1.7	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.11	6.13	0.0001 U	0.0001 U	0.0005 U	0.0005 U	0.00251	0.00306	0.00082	0.00131
SW-E	5/20/2021	SVE-210520Q	--	0.000511	0.00148	1.82	1.99	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.04	7.38	0.0001 DU	0.0001 U	0.0005 U	0.0005 U	0.00282	0.00384	0.000683 D	0.00234
SW-E	8/11/2021	SVE-210811Q	--	0.00047	0.00136	1.94	1.92	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.5	7.47	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.00315	0.00411	0.0005 U	0.00117
SW-E	11/17/2021	SVE-211117Q	--	0.000973	0.002	1.87	1.89	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.84	5.9	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.00271	0.00391	0.000652	0.00199

Note:
There was no flow at SW-W1 during third quarter 2021.
-- = parameter is not sampled for

Table J-4
Surface Water - Volatile Organic Compounds

Surface Water - Volatile Organic Compounds			1,1,1,2-Tetrachloro-ethane	1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,2,3-Trichloro-propane	1,2-Dibromo-3-Chloro-propane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane	1,4-Dichloro-benzene	2-Butanone	2-Hexanone	4-Methyl-2-Pentanone	Acetone	Acrylonitrile	Benzene	Bromo-chloro-methane	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon Disulfide	Carbon Tetra-chloride
		CAS #	630-20-6	71-55-6	79-34-5	79-00-5	75-34-3	75-35-4	96-18-4	96-12-8	106-93-4	95-50-1	107-06-2	78-87-5	106-46-7	78-93-3	591-78-6	108-10-1	67-64-1	107-13-1	71-43-2	74-97-5	75-27-4	75-25-2	74-83-9	75-15-0	56-23-5
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
SW-W1	2/24/2021	SVW1210224Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W1	5/20/2021	SVW1210520Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W2	2/24/2021	SVW2210224Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W2	5/20/2021	SVW2210520Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	3.33 JT	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W2	8/11/2021	SVW2210811Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
SW-W2	11/17/2021	SVW2211117Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W3	2/24/2021	SVW3210224Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W3	5/20/2021	SVW3210520Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W3	8/11/2021	SVW3210811Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
SW-W3	11/17/2021	SVW3211117Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-E	2/24/2021	SVE-210224D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	2/24/2021	SVE-210224Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	5/20/2021	SVE-210520Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	8/11/2021	SVE-210811Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	11/17/2021	SVE-211117Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	2/23/2021	VTRP210224Y2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	2/23/2021	VTRP210224Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/14/2021	VTRP210520X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	5/19/2021	VTRP210520Y	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	8/10/2021	VTRP210811X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 U	0.25 U
VOA TRIP BLANK	8/10/2021	VTRP210811X2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	11/16/2021	VTRP211117X2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/16/2021	VTRP211117Y2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U

Surface Water - Volatile Organic Compounds			Chloro-benzene	Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	Cis-1-2-Dichloro-ethene	Cis-1,3-Dichloro-propene	Dibromo-methane	Dichloro-difluoro-methane	Ethyl-benzene	M & P Xylene	Methyl Iodide	Methylene Chloride	O-Xylene	Styrene	Tetrachloro-ethene	Toluene	Trans-1-2-Dichloro-ethene	Trans-1-3-Dichloro-propene	Trans-1-4-Dichloro-2-Butene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Acetate	Vinyl Chloride
		CAS #	108-90-7	124-48-1	75-00-3	67-66-3	74-87-3	156-59-2	10061-01-5	74-95-3	75-71-8	100-41-4	MPX	74-88-4	75-09-2	95-47-6	100-42-5	127-18-4	108-88-3	156-60-5	10061-02-6	110-57-6	79-01-6	75-69-4	108-05-4	75-01-4
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
SW-W1	2/24/2021	SVW1210224Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W1	5/20/2021	SVW1210520Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W2	2/24/2021	SVW2210224Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0184 JT
SW-W2	5/20/2021	SVW2210520Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W2	8/11/2021	SVW2210811Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W2	11/17/2021	SVW2211117Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
SW-W3	2/24/2021	SVW3210224Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0598
SW-W3	5/20/2021	SVW3210520Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.039
SW-W3	8/11/2021	SVW3210811Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.0291
SW-W3	11/17/2021	SVW3211117Q	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.04
SW-E	2/24/2021	SVE-210224D	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	2/24/2021	SVE-210224Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	5/20/2021	SVE-210520Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	8/11/2021	SVE-210811Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	11/17/2021	SVE-211117Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
VOA TRIP BLANK	2/23/2021	VTRP210224Y2	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	2/23/2021	VTRP210224Z	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/14/2021	VTRP210520X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/19/2021	VTRP210520Y	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
VOA TRIP BLANK	8/10/2021	VTRP210811X	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/10/2021	VTRP210811X2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
VOA TRIP BLANK	11/16/2021	VTRP211117X2	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/16/2021	VTRP211117Y2	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.01 U

Note:
There was no flow at SW-W1 during third quarter 2021.
-- = parameter is not sampled for

Table J-5
Surface Water - Pesticides & Herbicides

Surface Water - Pesticides & Herbicides			2,4,5-T	2,4,5-TP Silvex	2,4-D	Dinoseb	Endrin	Lindane (Gamma	Methoxychlor	Toxaphene
		CAS #	93-76-5	93-72-1	94-75-7	88-85-7	72-20-8	58-89-9	72-43-5	8001-35-2
Site ID	Sample	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
SW-W1	2/24/2021	SVW1210224Q	0.0253 U	0.0253 U	0.0505 U	0.0253 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W1	5/20/2021	SVW1210520Q	0.0248 U	0.0248 U	0.0495 U	0.0495 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W1	--	--	--	--	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	0.025 U	0.025 U	0.05 U	0.025 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	2/24/2021	SVW2210224Q	0.0253 U	0.0253 U	0.0505 U	0.0253 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	5/20/2021	SVW2210520Q	0.0263 U	0.0263 U	0.0526 U	0.0343 J	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	8/11/2021	SVW2210811Q	0.0248 U	0.0248 U	0.0495 U	0.0495 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	11/17/2021	SVW2211117Q	0.025 U	0.025 U	0.05 U	0.0253	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	2/24/2021	SVW3210224Q	0.0272 U	0.0272 U	0.0543 U	0.0272 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	5/20/2021	SVW3210520Q	0.025 U	0.025 U	0.05 U	0.025 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	8/11/2021	SVW3210811Q	0.0248 U	0.0248 U	0.0495 U	0.0495 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	11/17/2021	SVW3211117Q	0.025 U	0.025 U	0.05 U	0.025 U	0.0125 U	0.0125 U	0.0625 U	1.25 U

Surface Water - Pesticides & Herbicides			Endrin	Lindane (Gamma	Methoxychlor	Toxaphene
Site ID	Sample	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)
SW-W1	5/20/2021	SVW1210520Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W1	--	--	--	--	--	--
SW-W1	11/17/2021	SVW1211117Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	2/24/2021	SVW2210224Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	5/20/2021	SVW2210520Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	8/11/2021	SVW2210811Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	11/17/2021	SVW2211117Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	2/24/2021	SVW3210224Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	5/20/2021	SVW3210520Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	8/11/2021	SVW3210811Q	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	11/17/2021	SVW3211117Q	0.0125 U	0.0125 U	0.0625 U	1.25 U

Note:

There was no flow at SW-W1 during third quarter 2021.

-- = parameter is not sampled for

Appendix K

Leachate Monitoring Data

Table K-1
Leachate - Field Parameters

Leachate - Field Parameters			Dissolved Sulfide	pH (Field)	Specific Conductance (Field)	Temperature (Field)
Site ID	Sample Date	Sample ID	ppm	(Std. pH Units)	(µmhos/cm)	(°C)
LS-LVT	3/15/2021	LVT-210315P	0.1 U	7.72	211.3	6.3
LS-LVT	6/15/2021	LVT-210615P	0.1 U	18.1	9.12	290.4
LS-LVT	9/14/2021	LVT-210914P	0.1 U	7.72	455.8	16.5
LS-LVT	12/13/2021	LVT-211213P	0.1 U	7.87	313.2	6.71
LS-PS1	2/24/2021	LVP-210224Q	--	8.2	171.3	6.5
LS-PS1	5/20/2021	LVP-210520Q	--	7.35	241	13.2
LS-PS1	8/10/2021	LVP-210810Q	--	7.78	362.3	21.5
LS-PS1	11/17/2021	LVP-211117D	--	7.55	363	9
LS-PS1	11/17/2021	LVP-211117Q	--	7.55	363	9
LS-B	2/24/2021	LVB-210224Q	--	6.21	1700	11
LS-B	5/20/2021	LVB-210520Q	--	6.55	3104	14.4
LS-B	8/10/2021	LVB-210810Q	--	7.11	3752	19.9
LS-B	11/17/2021	LVB-211117Q	--	6.73	1507	15.2
FIELD BLANK	9/14/2021	LVT-210914F	--	7.22	0.7	14.1
FIELD BLANK	12/13/2021	LVT-211213F	--	7.46	0.9	16.78

Note:

-- = parameter is not sampled for

Table K-2
Leachate - Conventionals

Leachate - Conventionals			Alkalinity, Total (as $CaCO_3$)	Ammonia as N	Biological Oxygen Demand - 5 Day	Chemical Oxygen Demand	Chloride	Coliforms, Fecal	Coliforms, Total	Cyanide	Fluoride	Nitrate + Nitrite as N	Phosphorous, Soluble Reactive
Site ID	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(CFU/100 mL)	(CFU/100 mL)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	3/15/2021	LVT-210315P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	6/15/2021	LVT-210615P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	9/14/2021	LVT-210914P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	12/13/2021	LVT-211213P	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	2/24/2021	LVP-210224Q	66.7	0.0029 T	2.94	19 T	16.8	96	600	0.002 U	0.028 T	0.028 T	0.00093 T
LS-PS1	5/20/2021	LVP-210520Q	89.2	0.0475	2 U	17 T	21.6	1	700	0.002 U	0.021 T	0.423	0.0206
LS-PS1	8/10/2021	LVP-210810Q	101	0.252	3.29	19 T	33.1	6	1700	0.002 U	0.054	0.408	0.0581
LS-PS1	11/17/2021	LVP-211117D	92.8	0.0051 T	3.47	28.4	33	350	28000	0.002 U	0.0889	0.011 T	0.0011 T
LS-PS1	11/17/2021	LVP-211117Q	91.6	0.0056 T	3.49	31.7	34.2	220	28000 C	0.002 U	0.0766	0.011 T	0.0011 T
LS-B	2/24/2021	LVB-210224Q	323	0.0184	2 U	55.8	260	1 U	9	0.0057 T	0.2 U	13.7	0.00228
LS-B	5/20/2021	LVB-210520Q	718	0.0077 T	2 U	116	536	1 U	1 U	0.0034 T	0.02 U	16.9	0.00301
LS-B	8/10/2021	LVB-210810Q	840	0.0199	3.06	131	595	1 U	90	0.0041 T	0.17 T	8.02	0.00345
LS-B	11/17/2021	LVB-211117Q	340	0.381	2 U	46.1	195	1 U	9 CU	0.007 T	0.27 T	0.877	0.00271
FIELD BLANK	9/14/2021	LVT-210914F	--	--	--	--	--	--	--	--	--	--	--
FIELD BLANK	12/13/2021	LVT-211213F	--	--	--	--	--	--	--	--	--	--	--

Leachate - Conventionals			Phosphorus, Total as P	Specific Conductance	Sulfate	Sulfide, Total	Total Fats, Oil, & Grease	Total Kjeldahl Nitrogen	Total Organic Carbon	Total Suspended Solids	Total Volatile Solids	Volatile Suspended Solids
Site ID	Sample Date	Sample ID	(mg/l)	(µohms/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	03/15/21	LVT-210315P	--	--	--	--	2 U	--	--	--	--	--
LS-LVT	06/15/21	LVT-210615P	--	--	--	--	1.8 U	--	--	--	--	--
LS-LVT	09/14/21	LVT-210914P	--	--	--	--	2.1 T	--	--	--	--	--
LS-LVT	12/13/21	LVT-211213P	--	--	--	--	1.9 U	--	--	--	--	--
LS-PS1	02/24/21	LVP-210224Q	0.994 U	243	21.6	0.01 U	1.6 U	0.661	3.18	7.6	42 B	4.2
LS-PS1	05/20/21	LVP-210520Q	0.991 U	315	27.7	0.011 T	1.5 U	0.535	5.2	1 U	52.7	1 U
LS-PS1	08/10/21	LVP-210810Q	1 U	390	35	0.018 T	1.5 U	1.02	7.71	4.8	72.7	2.3
LS-PS1	11/17/21	LVP-211117D	0.992 U	408	55	0.016 T	1.5 U	0.845	8.69	24.9	74.7	12
LS-PS1	11/17/21	LVP-211117Q	0.992 U	408	57	0.024 T	1.5 U	0.855	8.63	25.6	84	12.8
LS-B	02/24/21	LVB-210224Q	0.993 U	2150	403	0.01 U	1.6 U	1.24	14	4.2	336 J	0.9 T
LS-B	05/20/21	LVB-210520Q	0.986 U	3960	807	0.01 T	1.5 U	2.53	32	4.59	915 J	2.04
LS-B	08/10/21	LVB-210810Q	1 U	4320	879	0.01 U	1.5 U	2.54	39.4	2.4	817 J	2
LS-B	11/17/21	LVB-211117Q	0.991 U	1700	293	0.012 T	1.6 U	1.16	15.5	0.9 T	460	0.8 BT
FIELD BLANK	09/14/21	LVT-210914F	--	--	--	--	1.9 U	--	--	--	--	--
FIELD BLANK	12/13/21	LVT-211213F	--	--	--	--	2 U	--	--	--	--	--

Note:

-- = parameter is not sampled for

Table K-3
Leachate - Metals (Total)

Leachate - Metals			Aluminum, Total	Antimony, Total	Arsenic, Total	Barium, Total	Beryllium, Total	Cadmium, Total	Calcium, Total	Chromium, Total	Cobalt, Total	Copper, Total	Iron, Total	Lead, Total
		CAS #	7429-90-5	7440-36-0	7440-38-2	7440-39-3	7440-41-7	7440-43-9	7440-70-2	7440-47-3	7440-48-4	7440-50-8	7439-89-6	7439-92-1
Site ID	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	3/15/2021	LVT-210315P	--	--	0.00169	--	--	0.000495 U	--	0.00198 U	--	0.00596	--	0.00148
LS-LVT	6/15/2021	LVT-210615P	--	--	0.00323	--	--	0.000492 U	--	0.00221	--	0.0109	--	0.00324
LS-LVT	9/14/2021	LVT-210914P	--	--	0.00451	--	--	0.000155	--	0.00282	--	0.0142	--	0.00479
LS-LVT	12/13/2021	LVT-211213P	--	--	0.00179	--	--	0.000498 U	--	0.002	--	0.00998	--	0.00236
LS-PS1	2/24/2021	LVP-210224Q	0.212	0.00298 U	0.000853	0.0209	0.000994 U	0.000497 U	19.8	0.00199 U	0.000497 U	0.00425	0.253	0.000994 U
LS-PS1	5/20/2021	LVP-210520Q	0.0495 U	0.00297 U	0.00128	0.0362	0.000991 U	0.000495 U	31.4	0.00198 U	0.000495 U	0.00198 U	0.0991 U	0.000991 U
LS-PS1	8/10/2021	LVP-210810Q	0.0584	0.003 U	0.00214	0.0441	0.001 U	0.000501 U	33.7	0.002 U	0.000501 U	0.002 U	0.367	0.001 U
LS-PS1	11/17/2021	LVP-211117D	0.261	0.00298 U	0.00147	0.0363	0.000992 U	0.000496 U	38.1	0.00198 U	0.000677	0.00537	0.775	0.00106
LS-PS1	11/17/2021	LVP-211117Q	0.27	0.00298 U	0.00134	0.0367	0.000992 U	0.000496 U	37.7	0.00198 U	0.00065	0.00544	0.774	0.00106
LS-B	2/24/2021	LVB-210224Q	0.0497 U	0.00298 U	0.00123	0.0431	0.000993 U	0.000637	154	0.00199 U	0.00333	0.00611	0.0993 U	0.000993 U
LS-B	5/20/2021	LVB-210520Q	0.0493 U	0.00296 U	0.00259	0.0913	0.000986 U	0.00137	326	0.00197 U	0.0105	0.00912	0.293	0.000986 U
LS-B	8/10/2021	LVB-210810Q	0.0501 U	0.003 U	0.00259	0.0912	0.001 U	0.00137	352	0.002 U	0.0185	0.00874	0.1 U	0.001 U
LS-B	11/17/2021	LVB-211117Q	0.0496 U	0.00297 U	0.00167	0.0698	0.000991 U	0.000567	129	0.00198 U	0.0361	0.00612	0.169	0.000991 U
FIELD BLANK	9/14/2021	LVT-210914F	--	--	5E-05 U	--	--	5E-05 U	--	0.0002 U	--	0.0002 U	--	0.0001 U
FIELD BLANK	12/13/2021	LVT-211213F	--	--	6.26E-05	--	--	5E-05 U	--	0.0002 U	--	0.0134	--	0.000173

Leachate - Metals			Magnesium, Total	Manganese, Total	Mercury, Total	Nickel, Total	Potassium, Total	Selenium, Total	Silver, Total	Sodium, Total	Thallium, Total	Tin, Total	Vanadium, Total	Zinc, Total
			7439-95-4	7439-96-5	7439-97-6	7440-02-0	7440-09-7	7782-49-2	7440-22-4	7440-23-5	7440-28-0	7440-31-5	7440-62-2	7440-66-6
Site ID	Sample Date	Sample ID	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	3/15/2021	LVT-210315P	--	--	--	0.00627	--	--	0.000396 U	--	--	--	--	0.0244
LS-LVT	6/15/2021	LVT-210615P	--	--	--	0.00792	--	--	0.000393 U	--	--	--	--	0.0553
LS-LVT	9/14/2021	LVT-210914P	--	--	--	0.0135	--	--	0.0000782	--	--	--	--	0.0642
LS-LVT	12/13/2021	LVT-211213P	--	--	--	0.0086	--	--	0.000398 U	--	--	--	--	0.0326
LS-PS1	2/24/2021	LVP-210224Q	6.09	0.0271	0.0001 U	0.0036	2.3	0.00497 U	0.000398 U	10.5	0.000994 U	0.00497 U	0.000823	0.0122
LS-PS1	5/20/2021	LVP-210520Q	10.1	0.0176	0.0001 U	0.00444	3.91	0.00495 U	0.000396 U	16.9	0.000991 U	0.00495 U	0.00107	0.00495 U
LS-PS1	8/10/2021	LVP-210810Q	14.7	0.431	0.0001 U	0.00696	5.26	0.00501 U	0.000401 U	24.3	0.000751 U	0.00501 U	0.000921	0.00792
LS-PS1	11/17/2021	LVP-211117D	13.5	0.269	0.0001 U	0.00801 D	4.53	0.00496 U	0.000397 U	22.2	0.000744 U	0.00496 U	0.00106	0.018
LS-PS1	11/17/2021	LVP-211117Q	13.5	0.273	0.0001 U	0.00848 D	4.55	0.00496 U	0.000397 U	22.3	0.000744 U	0.00496 U	0.00123	0.0183
LS-B	2/24/2021	LVB-210224Q	91.8	1.24	0.0001 U	0.0964	21.3	0.00497 U	0.000397 U	177	0.000993 U	0.00497 U	0.000745 U	0.119
LS-B	5/20/2021	LVB-210520Q	189	6.58	0.0001 U	0.241	45.1	0.00493 U	0.000394 U	356	0.000986 U	0.00493 U	0.00111	0.208
LS-B	8/10/2021	LVB-210810Q	213	11.1	0.0001 U	0.262	49.1	0.00501 U	0.000401 U	391	0.000751 U	0.00501 U	0.000751 U	0.167
LS-B	11/17/2021	LVB-211117Q	74.8	10	0.0001 U	0.129 D	16.2	0.00496 U	0.000397 U	127	0.000743 U	0.00496 U	0.000743 U	0.127
FIELD BLANK	9/14/2021	LVT-210914F	--	--	--	0.0001 U	--	--	4E-05 U	--	--	--	--	0.0005 U
FIELD BLANK	12/13/2021	LVT-211213F	--	--	--	0.000166	--	--	4E-05 U	--	--	--	--	0.00304

Note:

-- = parameter is not sampled for

Table K-4
Leachate - Volatile Organic Compounds

Leachate - Volatile Organic Compounds			1,1,1,2-Tetrachloro-ethane	1,1,1-Trichloro-ethane	1,1,2,2-Tetrachloro-ethane	1,1,2-Trichloro-ethane	1,1-Dichloro-ethane	1,1-Dichloro-ethene	1,1-Dichloro-propene	1,2,3-Trichloro-propane	1,2-Dibromo-3-Chloro-propane	1,2-Dibromo-ethane	1,2-Dichloro-benzene	1,2-Dichloro-ethane	1,2-Dichloro-propane	1,3-Dichloro-benzene	1,3-Dichloro-propane	1,4-Dichloro-benzene	2,2-Dichloro-propane	2-Butanone	2-Hexanone	2-Methyl-1-Propanol	3-Chloro-propene	4-Methyl-2-Pentanone	Acetone	Acetonitrile	Acrolein
		CAS #	630-20-6	71-55-6	79-34-5	79-00-5	75-34-3	75-35-4	563-58-6	96-18-4	96-12-8	106-93-4	95-50-1	107-06-2	78-87-5	541-73-1	142-28-9	106-46-7	594-20-7	78-93-3	591-78-6	78-83-1	107-05-1	108-10-1	67-64-1	75-05-8	107-02-8
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
LS-PS1	2/24/2021	LVP-210224Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-PS1	5/20/2021	LVP-210520Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-PS1	8/10/2021	LVP-210810Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-PS1	11/17/2021	LVP-211117D	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-PS1	11/17/2021	LVP-211117Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-B	2/24/2021	LVB-210224Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	3.66 JT	5 U	2.5 U
LS-B	5/20/2021	LVB-210520Q	0.25 U	0.1 U	0.1 U	0.1 U	0.248	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	4.95 JT	5 U	2.5 U
LS-B	8/10/2021	LVB-210810Q	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.61 JT	5 U	2.5 U
LS-B	11/17/2021	LVB-211117Q	0.25 U	0.1 U	0.1 U	0.1 U	0.164 JT	0.119 JT	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	4.4 JT	5 U	2.5 U
VOA TRIP BLANK	2/23/2021	VTRP210224Z2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
VOA TRIP BLANK	5/19/2021	VTRP210520Y2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
VOA TRIP BLANK	5/19/2021	VTRP210520Z	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
VOA TRIP BLANK	8/9/2021	VTRP210810X	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U
VOA TRIP BLANK	11/16/2021	VTRP211117Z2	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	2.5 U	5 U	2.5 U

Leachate - Volatile Organic Compounds			Acrylonitrile	Benzene	Bromo-chloro-methane	Bromo-dichloro-methane	Bromoform	Bromo-methane	Carbon Disulfide	Carbon Tetra-chloride	Chloro-benzene	Chloro-dibromo-methane	Chloro-ethane	Chloroform	Chloro-methane	Chloroprene	Cis-1-2-Dichloro-ethene	Cis-1,3-Dichloro-propene	Dibromo-methane	Dichloro-difluoro-methane	Ethyl-benzene	M & P Xylene	Methyl Iodide	Methyl Methacrylate	Methyl-acrylonitrile	Methylene Chloride	O-Xylene
		CAS #	107-13-1	71-43-2	74-97-5	75-27-4	75-25-2	74-83-9	75-15-0	56-23-5	108-90-7	124-48-1	75-00-3	67-66-3	74-87-3	126-99-8	156-59-2	10061-01-5	74-95-3	75-71-8	100-41-4	MPX	74-88-4	80-62-6	126-98-7	75-09-2	95-47-6
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
LS-PS1	2/24/2021	LVP-210224Q	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	0.25 U	0.1 U	2.5 U	0.1 U
LS-PS1	5/20/2021	LVP-210520Q	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	2.5 U	0.1 U
LS-PS1	8/10/2021	LVP-210810Q	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.125 JT	0.1 U	0.25 U	0.1 U	0.176 JT
LS-PS1	11/17/2021	LVP-211117D	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U
LS-PS1	11/17/2021	LVP-211117Q	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U
LS-B	2/24/2021	LVB-210224Q	0.035 U	0.167 JT	0.1 U	0.25 U	0.5 U	0.1 GU	0.1 GU	0.25 U	0.1 U	0.5 U	0.1 GU	0.1 U	0.25 GU	0.1 U	0.1 U	0.25 U	0.1 U	0.1 GU	0.1 U	0.1 U	0.1 GU	0.25 U	0.1 U	2.5 U	0.1 U
LS-B	5/20/2021	LVB-210520Q	0.035 U	0.343	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.206	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U
LS-B	8/10/2021	LVB-210810Q	0.035 U	0.325	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U
LS-B	11/17/2021	LVB-211117Q	0.035 U	0.16 JT	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.263	0.1 U	0.115 JT	0.1 U	0.25 U	0.1 U	2.5 U	0.1 U
VOA TRIP BLANK	2/23/2021	VTRP210224Z2	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 GU	0.25 U	0.1 U	2.5 U	0.1 U
VOA TRIP BLANK	5/19/2021	VTRP210520Y2	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	4.23 JT	0.1 U
VOA TRIP BLANK	5/19/2021	VTRP210520Z	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	4.09 JT	0.1 U
VOA TRIP BLANK	8/9/2021	VTRP210810X	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U
VOA TRIP BLANK	11/16/2021	VTRP211117Z2	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	2.5 U	0.1 U

Leachate - Volatile Organic Compounds			Propionitrile	Styrene	Tetrachloro-ethene	Toluene	Trans-1-2-Dichloro-ethene	Trans-1-3-Dichloropropene	Trans-1-4-Dichloro-2-Butene	Trichloro-ethene	Trichloro-fluoro-methane	Vinyl Acetate	Vinyl Chloride
		CAS #	107-12-0	100-42-5	127-18-4	108-88-3	156-60-5	10061-02-6	110-57-6	79-01-6	75-69-4	108-05-4	75-01-4
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
LS-PS1	2/24/2021	LVP-210224Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-PS1	5/20/2021	LVP-210520Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-PS1	8/10/2021	LVP-210810Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-PS1	11/17/2021	LVP-211117D	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-PS1	11/17/2021	LVP-211117Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-B	2/24/2021	LVB-210224Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 GU
LS-B	5/20/2021	LVB-210520Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-B	8/10/2021	LVB-210810Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
LS-B	11/17/2021	LVB-211117Q	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.012 JT
VOA TRIP BLANK	2/23/2021	VTRP210224Z2	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/19/2021	VTRP210520Y2	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	5/19/2021	VTRP210520Z	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	8/9/2021	VTRP210810X	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U
VOA TRIP BLANK	11/16/2021	VTRP211117Z2	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.01 U

Note:
-- = parameter is not sampled for

Table K-5
Leachate - Pesticides, Herbicides, & Polychlorinated Biphenyls (PCBs)

Leachate - Pesticides, Herbicides, & Polychlorinated Biphenyls (PCBs)			2,4,5-T	2,4,5-TP Silvex	2,4-D	4,4'DDD	4,4'DDE	4,4'DDT	Aldrin	Alpha BHC	Alpha Chlordane	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Beta BHC
		CAS #	93-76-5	93-72-1	94-75-7	72-54-8	72-55-9	50-29-3	309-00-2	319-84-6	5103-71-9	12674-11-2	11104-28-2	11141-16-5	53469-21-9	12672-29-6	11097-69-1	11096-82-5	319-85-7
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
LS-PS1	2/24/2021	LVP-210224Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-PS1	5/20/2021	LVP-210520Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-PS1	8/10/2021	LVP-210810Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-PS1	11/17/2021	LVP-211117D	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-PS1	11/17/2021	LVP-211117Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.104	0.05 U	0.025 U	0.01 U
LS-B	2/24/2021	LVB-210224Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-B	5/20/2021	LVB-210520Q	0.25 U	0.25 U	0.5 U	0.01 U	0.0134 J	0.03 U	0.01 U	0.03 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-B	8/10/2021	LVB-210810Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U
LS-B	11/17/2021	LVB-211117Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.01 U

Leachate - Pesticides, Herbicides, & Polychlorinated Biphenyls (PCBs)			Delta BHC	Dieldrin	Dinoseb	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Endrin	Endrin Aldehyde	Heptachlor	Heptachlor Epoxide	Isodrin	Lindane (Gamma BHC)	Methoxychlor	Total Aroclors	Toxaphene	trans-Chlordane
		CAS #	319-86-8	60-57-1	88-85-7	959-98-8	33213-65-9	1031-07-8	72-20-8	7421-93-4	76-44-8	1024-57-3	465-73-6	58-89-9	72-43-5	T_AROCLOR	8001-35-2	5103-74-2
Site ID	Sample Date	Sample ID	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
LS-PS1	02/24/21	LVP-210224Q	0.01 U	0.01 U	0.25 U	0.04 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U
LS-PS1	05/20/21	LVP-210520Q	0.01 U	0.01 U	0.25 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.0609	0.05 U	0.025 U	1 U	0.01 U
LS-PS1	08/10/21	LVP-210810Q	0.01 U	0.01 U	0.25 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 GU	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U
LS-PS1	11/17/21	LVP-211117D	0.01 U	0.01 U	0.25 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U
LS-PS1	11/17/21	LVP-211117Q	0.01 U	0.01 U	0.25 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.104	1 U	0.01 U
LS-B	02/24/21	LVB-210224Q	0.01 U	0.01 U	0.364 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U
LS-B	05/20/21	LVB-210520Q	0.01 U	0.01 U	0.289 J	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U	0.05 U	0.05 U	0.05 U	0.025 U	1 U	0.01 U
LS-B	08/10/21	LVB-210810Q	0.01 U	0.01 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U
LS-B	11/17/21	LVB-211117Q	0.01 U	0.01 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.025 U	1 U	0.01 U

Note:
-- = parameter is not sampled for

Appendix L

Landfill Gas Monitoring Data

Table L-1

Landfill Gas Monitoring Data

January 1, 2021 - March 31, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-001	1/7/2021	0	0.2	21	0	-0.67	
GP-001	2/5/2021	0	0.2	20.8	0	-0.79	GP-1
GP-001	3/30/2021	0	0.2	20.5	0	-1.5	
GP-002	1/7/2021	0	2.1	18.4	0	0.27	
GP-002	2/5/2021	0	0.2	20.8	0	0.02	GP-2
GP-002	3/30/2021	0	2.2	17.1	0	0.57	
GP-01D	1/7/2021	0	0.2	21	0	-3.11	
GP-01D	2/5/2021	0	0.1	20.5	0	0	
GP-01D	3/30/2021	0	0.2	20.9	0	-2.78	
GP-01I	1/7/2021	0	0.2	21	0	-2.63	
GP-01I	2/5/2021	0	0.1	20.5	0	-1.36	NP-1
GP-01I	3/30/2021	0	0.2	20.8	0	-1.27	
GP-01S	1/7/2021	0	1.2	19.4	0	0.13	
GP-01S	2/5/2021	0	0.3	20.3	0	-4.26	
GP-01S	3/30/2021	0	0.3	20.7	0	-0.53	
GP-02D	1/7/2021	0	0.2	20.7	0	-2.76	
GP-02D	2/5/2021	0	0.1	20.6	0	-1.68	
GP-02D	3/30/2021	0	0.2	20.9	0	-1.83	
GP-02I	1/7/2021	0	0.2	20.7	0	-2.66	
GP-02I	2/5/2021	0	0.1	20.6	0	-1.73	NP-2
GP-02I	3/30/2021	0	0.2	20.9	0	-2.02	
GP-02S	1/7/2021	0	1.4	19.3	0	0.07	
GP-02S	2/5/2021	0	0.3	20.5	0	0.02	
GP-02S	3/30/2021	0	0.2	20.8	0	0.59	
GP-03D	1/7/2021	0	2	18.1	0	-2.12	
GP-03D	2/5/2021	0	1.6	17.8	0	-1.42	
GP-03D	3/30/2021	0	1.6	18.2	0	-1.1	
GP-03I	1/7/2021	0	1.6	18.6	0	-2.04	
GP-03I	2/5/2021	0	1.4	18.7	0	-1.42	NP-3
GP-03I	3/30/2021	0	1.6	18.8	0	-1.48	
GP-03S	1/7/2021	0	0.7	20.2	0	0.11	
GP-03S	2/5/2021	0	1.2	19.2	0	-0.02	
GP-03S	3/30/2021	0	1.2	18.8	0	-0.02	
GP-04D	1/7/2021	0	1.2	19.3	0	-1.86	
GP-04D	2/5/2021	0	0.4	20.3	0	-1	
GP-04D	3/30/2021	0	1.2	18.8	0	-1.05	
GP-04I	1/7/2021	0	0.9	20.2	0	-0.89	
GP-04I	2/5/2021	0	0.4	20.5	0	-0.94	NP-4
GP-04I	3/30/2021	0	0.5	20.2	0	-0.94	
GP-04S	1/7/2021	0	3.1	18.2	0	10.05	
GP-04S	2/5/2021	0	2.8	18.6	0	6.01	
GP-04S	3/30/2021	0	1.9	18.5	0	-0.83	

Table L-1 *(continued)*

Landfill Gas Monitoring Data

January 1, 2021 - March 31, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-05D	1/7/2021	0	2.5	18.1	0	0.32	
GP-05D	2/5/2021	0	2.4	17.9	0	-0.97	
GP-05D	3/30/2021	0	0.5	20.2	0	0.28	
GP-05I	1/7/2021	0	1.7	19.2	0	0.24	
GP-05I	2/5/2021	0	1.5	19.4	0	-0.51	NP-5
GP-05I	3/30/2021	0	1.7	19	0	0.33	
GP-05S	1/7/2021	0	1	19.9	0	0.32	
GP-05S	2/5/2021	0	0.4	20.4	0	-0.22	
GP-05S	3/30/2021	0	0.2	20.5	0	0.61	
GP-06D	1/7/2021	0	0.5	20.5	0	-0.19	
GP-06D	2/5/2021	0	0.3	20.6	0	-1.24	
GP-06D	3/30/2021	0	0.4	19.6	0	0.15	
GP-06I	1/7/2021	0	0.4	20.6	0	-0.03	
GP-06I	2/5/2021	0	0.2	20.7	0	-0.39	NP-6
GP-06I	3/30/2021	0	0.3	19.6	0	0.53	
GP-06S	1/7/2021	0	3.4	17.2	0	0.12	
GP-06S	2/5/2021	0	3.2	16.9	0	0.06	
GP-06S	3/30/2021	0	3.2	15.4	0	0.83	
GP-07D	1/7/2021	0	3.3	13.4	0	1.91	
GP-07D	2/5/2021	0	2.6	17.2	0	0.86	
GP-07D	3/30/2021	0	0.9	17.1	0	0.6	
GP-07I	1/7/2021	0	0.2	20.8	0	-1.02	
GP-07I	2/5/2021	0	0.1	20.8	0	-1.42	NP-7
GP-07I	3/30/2021	0	0.2	19.9	0	-0.56	
GP-07S	1/7/2021	0	0.2	20.8	0	-1.21	
GP-07S	2/5/2021	0	0.2	20.7	0	-1.73	
GP-07S	3/30/2021	0	0.2	19.9	0	-1.12	
GP-08D	1/7/2021	0	0.2	21	0	-2.97	
GP-08D	2/5/2021	0	0.4	19.9	0	-2.19	
GP-08D	3/30/2021	0	0.3	20.5	0	-2.72	
GP-08I	1/7/2021	0	3.1	15.5	0	-2.87	
GP-08I	2/5/2021	0	5.9	3.9	0	0.02	NP-8
GP-08I	3/30/2021	0	4.2	14.6	0	-2.61	
GP-08S	1/7/2021	0	4.1	11.1	0	-5.45	
GP-08S	2/5/2021	0	3.2	17.1	0	-1.27	
GP-08S	3/30/2021	0	6.5	1.8	0	-1.3	

Table L-2

Landfill Gas Monitoring Data

April 1, 2021 - June 30, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-001	4/22/2021	0	2.7	17.8	0	0.15	
GP-001	5/3/2021	0	0.2	21	0	0	GP-1
GP-001	6/11/2021	0	0.3	21	0	0.51	
GP-002	4/22/2021	0	2	17.5	0	0.11	
GP-002	5/3/2021	0	2.1	17.9	0	0	GP-2
GP-002	6/11/2021	0	2	18.9	0	-0.05	
GP-01D	4/22/2021	0	0.4	16.8	0	1.41	
GP-01D	5/3/2021	0	0.1	21	0	0	
GP-01D	6/11/2021	0	0.1	21	0	1.52	
GP-01I	4/22/2021	0	0.5	16.8	0	0.59	
GP-01I	5/3/2021	0	0.1	20.9	0	0	NP-1
GP-01I	6/11/2021	0	0.2	21	0	0.6	
GP-01S	4/22/2021	0	0.7	19.2	0	0.09	
GP-01S	5/3/2021	0	0.6	19.6	0	1.46	
GP-01S	6/11/2021	0	0.3	21	0	-0.08	
GP-02D	4/22/2021	0	0.5	18.3	0	1.15	
GP-02D	5/3/2021	0	0.1	21	0	0.05	
GP-02D	6/11/2021	0	0.2	21	0	1.31	
GP-02I	4/22/2021	0	0.4	17.7	0	0.98	
GP-02I	5/3/2021	0	0.1	21	0	0.07	NP-2
GP-02I	6/11/2021	0	0.2	21	0	1.36	
GP-02S	4/22/2021	0	0.1	20.5	0	0.06	
GP-02S	5/3/2021	0	0.2	21	0	-0.06	
GP-02S	6/11/2021	0	0.2	21	0	-0.12	
GP-03D	4/22/2021	0	1.3	18	0	0.56	
GP-03D	5/3/2021	0	1.4	18.9	0	0	
GP-03D	6/11/2021	0	1.5	19.4	0	1.25	
GP-03I	4/22/2021	0	1.5	18.5	0	0.55	
GP-03I	5/3/2021	0	1.7	19	0	-0.02	NP-3
GP-03I	6/11/2021	0	1.5	19.3	0	1.17	
GP-03S	4/22/2021	0	0.9	19	0	0.04	
GP-03S	5/3/2021	0	1	19.7	0	0	
GP-03S	6/11/2021	0	0.9	20.5	0	-0.99	
GP-04D	4/22/2021	0	1.1	18.7	0	0.52	
GP-04D	5/3/2021	0	0.6	20.4	0	0.14	
GP-04D	6/11/2021	0	0.8	20.5	0	1.27	
GP-04I	4/22/2021	0	0.7	20	0	0.1	
GP-04I	5/3/2021	0	0.7	20.5	0	0	NP-4
GP-04I	6/11/2021	0	0.7	20.9	0	0.61	
GP-04S	4/22/2021	0	2.2	18.2	0	0.28	
GP-04S	5/3/2021	0	1.9	18.3	0	0	
GP-04S	6/11/2021	0	1.9	19.6	0	0.27	

Table L-2 *(continued)*

Landfill Gas Monitoring Data

April 1, 2021 - June 30, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-05D	4/22/2021	0	1.5	19	0	-0.13	
GP-05D	5/3/2021	0	1.7	19.1	0	0.16	
GP-05D	6/11/2021	0	2	19.4	0	0.11	
GP-05I	4/22/2021	0	1.8	18.9	0	-0.07	
GP-05I	5/3/2021	0	2	19.2	0	0	NP-5
GP-05I	6/11/2021	0	1.9	19.7	0	-0.02	
GP-05S	4/22/2021	0	0.8	19.7	0	-0.01	
GP-05S	5/3/2021	0	1	19.5	0	0	
GP-05S	6/11/2021	0	3.8	16.4	0	-0.03	
GP-06D	4/22/2021	0	0.6	19.6	0	0.1	
GP-06D	5/3/2021	0	0.5	20.2	0	0.06	
GP-06D	6/11/2021	0	0.5	20.9	0	0.55	
GP-06I	4/22/2021	0	2	16.7	0	0.13	
GP-06I	5/3/2021	0	0.3	20.5	0	-0.03	NP-6
GP-06I	6/11/2021	0	0.6	20.4	0	0.35	
GP-06S	4/22/2021	0	3.2	15	0	0.1	
GP-06S	5/3/2021	0	3.1	15.9	0	-0.09	
GP-06S	6/11/2021	0	3.4	16.4	0	-0.09	
GP-07D	4/22/2021	0	1.2	15	0	0.07	
GP-07D	5/3/2021	0	1.4	14.5	0	-0.06	
GP-07D	6/11/2021	0	1.6	13.9	0	0.31	
GP-07I	4/22/2021	0	1.2	15.3	0	0.56	
GP-07I	5/3/2021	0	0.1	20.6	0	-0.15	NP-7
GP-07I	6/11/2021	0	0.3	21	0	0.71	
GP-07S	4/22/2021	0	0.9	18.1	0	0.62	
GP-07S	5/3/2021	0	0.1	20.6	0	0.02	
GP-07S	6/11/2021	0	1	18.8	0	0.93	
GP-08D	4/22/2021	0	0.7	14.6	0	1.3	
GP-08D	5/3/2021	0	0.1	21	0	-0.04	
GP-08D	6/11/2021	0	0.7	15.8	0	1.4	
GP-08I	4/22/2021	0	4	14.7	0	1.16	
GP-08I	5/3/2021	0	0.1	20.9	0	-0.07	NP-8
GP-08I	6/11/2021	0	2.4	16.9	0	1.29	
GP-08S	4/22/2021	0	6.6	1	0	0.01	
GP-08S	5/3/2021	0	6.7	0.5	0	0	
GP-08S	6/11/2021	0	6.3	3.8	0	0.27	

Table L-3

Landfill Gas Monitoring Data

July 1, 2021 - September 30, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-001	7/12/2021	0	0.2	20.3	0.0	0.01	
GP-001	8/5/2021	0	1	18.9	0.0	0.21	GP-1
GP-001	7/12/2021	0	1.9	17.7	0.0	0.04	
GP-002	8/5/2021	0	1.8	17.7	0.0	0.15	
GP-002	9/22/2021	0	0.2	20.0	2.0	-0.32	GP-2
GP-002	9/22/2021	0	1.4	18.9	4.0	-0.32	
GP-01D	7/12/2021	0	0.2	20.1	0.0	0.01	
GP-01D	8/5/2021	0	0.3	17.8	0.0	0.42	
GP-01D	9/22/2021	0	0.1	19.9	4.0	-0.49	
GP-01I	7/12/2021	0	0.2	20.1	0.0	-0.03	
GP-01I	8/5/2021	0	0.5	16.6	0.0	0.35	NP-1
GP-01I	9/22/2021	0	0.3	18.8	4.0	-0.52	
GP-01S	7/12/2021	0	1	17.6	0.0	0.06	
GP-01S	8/5/2021	0	1.2	16.5	0.0	-0.07	
GP-01S	9/22/2021	0	1.2	16.5	4.0	0.08	
GP-02D	7/12/2021	0	0.2	20.1	0.0	-0.02	
GP-02D	8/5/2021	0	0.6	17.4	0.0	0.28	
GP-02D	9/22/2021	0	0.1	20.0	4.0	-0.67	
GP-02I	7/12/2021	0	0.2	20.1	0.0	0.01	
GP-02I	8/5/2021	0	0.5	16.1	0.0	0.27	NP-2
GP-02I	9/22/2021	0	0.2	19.8	4.0	-0.59	
GP-02S	7/12/2021	0	0.9	18.9	0.0	-0.03	
GP-02S	8/5/2021	0	1	18.1	0.0	0.06	
GP-02S	9/22/2021	0	0.6	19.7	4.0	0.02	
GP-03D	7/12/2021	0	1.8	17.4	0.0	-0.04	
GP-03D	8/5/2021	0	1.4	16.8	0.0	0.12	
GP-03D	9/22/2021	0	1.5	18.1	4.0	-0.70	
GP-03I	7/12/2021	0	1.9	17.5	0.0	-0.01	
GP-03I	8/5/2021	0	2	16.7	0.0	0.09	NP-3
GP-03I	9/22/2021	0	1.6	18.3	4.0	-0.76	
GP-03S	7/12/2021	0	1.4	18.2	0.0	0.03	
GP-03S	8/5/2021	0	1.3	17.5	0.0	0.11	
GP-03S	9/22/2021	0	1	19.1	4.0	0.06	
GP-04D	7/12/2021	0	1.1	18.4	0.0	-0.06	
GP-04D	8/5/2021	0	1.2	17.6	0.0	0.11	
GP-04D	9/22/2021	0	1.1	18.5	4.0	-0.60	
GP-04I	7/12/2021	0	1	19.1	0.0	-0.01	
GP-04I	8/5/2021	0	1.2	18.2	0.0	0.03	NP-4
GP-04I	9/22/2021	0	0.5	19.6	4.0	-0.38	
GP-04S	7/12/2021	0	2.3	17.8	0.0	0.15	
GP-04S	8/5/2021	0	2.4	17.1	0.0	0.01	
GP-04S	9/22/2021	0	2	18.8	4.0	-0.13	

Table L-3 *(continued)*

Landfill Gas Monitoring Data

July 1, 2021 - September 30, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-05D	7/12/2021	0	2.3	18.2	0.0	-0.12	
GP-05D	8/5/2021	0	2.4	17.3	0.0	0.03	
GP-05D	9/22/2021	0	2	18.3	4.0	-0.50	
GP-05I	7/12/2021	0	2.1	18.9	0.0	-0.02	
GP-05I	8/5/2021	0	2.3	17.8	0.0	0.06	NP-5
GP-05I	9/22/2021	0	1.8	18.9	4.0	-0.13	
GP-05S	7/12/2021	0	1.5	18.9	0.0	-0.02	
GP-05S	8/5/2021	0	2.6	16.9	0.0	0.04	
GP-05S	9/22/2021	0	0.6	19.9	4.0	0.10	
GP-06D	7/12/2021	0	0.6	20.1	0.0	0.05	
GP-06D	8/5/2021	0	0.7	19.6	0.0	0.19	
GP-06D	9/22/2021	0	0.4	20.1	4.0	-1.06	
GP-06I	7/12/2021	0	0.3	20.2	0.0	-0.02	
GP-06I	8/5/2021	0	1	18.3	0.0	0.17	NP-6
GP-06I	9/22/2021	0	0.2	20.0	4.0	-0.05	
GP-06S	7/12/2021	0	3.8	15.9	0.0	0.00	
GP-06S	8/5/2021	0	4	15.9	0.0	0.13	
GP-06S	9/22/2021	0	4.1	17.2	4.0	0.05	
GP-07D	7/12/2021	0	2	14.8	0.0	-0.08	
GP-07D	8/5/2021	0	2.2	12.2	0.0	0.10	
GP-07D	9/22/2021	0	1.8	16.7	4.0	0.06	
GP-07I	7/12/2021	0	0.2	20.7	0.0	0.06	
GP-07I	8/5/2021	0	0.6	18.1	0.0	0.28	NP-7
GP-07I	9/22/2021	0	0.1	20.5	4.0	-0.80	
GP-07S	7/12/2021	0	0.2	20.6	0.0	-0.01	
GP-07S	8/5/2021	0	0.9	18.2	0.0	0.37	
GP-07S	9/22/2021	0	0.1	20.4	4.0	-1.08	
GP-08D	7/12/2021	0	0.4	18.6	0.0	-0.07	
GP-08D	8/5/2021	0	0.7	13.2	0.0	0.63	
GP-08D	9/22/2021	0	0.5	19.9	4.0	-0.90	
GP-08I	7/12/2021	0	0.3	19.6	0.0	-0.04	
GP-08I	8/5/2021	0	7.7	1.5	0.0	0.13	NP-8
GP-08I	9/22/2021	0	0.4	19.8	4.0	-1.06	
GP-08S	7/12/2021	0	3.3	15.8	0.0	0.03	
GP-08S	8/5/2021	0	3.1	14.5	0.0	0.57	
GP-08S	9/22/2021	0	0.5	19.6	4.0	-0.08	

Table L-4

Landfill Gas Monitoring Data

October 1, 2021 - December 31, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-001	10/7/2021	0	0.1	21.0	0.0	-0.01	
GP-001	11/9/2021	0	0.2	20.9	0.0	-1.07	GP-1
GP-001	12/31/2021	0	0.3	21.0	0.0	-2.08	
GP-002	10/7/2021	0	1.8	15.7	0.0	0.05	
GP-002	11/9/2021	0	1.8	19.4	0.0	-0.20	GP-2
GP-002	12/31/2021	0	2.1	18.9	0.0	-0.50	
GP-01D	10/7/2021	0	0.1	21.0	0.0	-1.09	
GP-01D	11/9/2021	0	0.5	17.7	0.0	-0.69	
GP-01D	12/31/2021	0	0.1	21.0	0.0	-4.22	
GP-01I	10/7/2021	0	0.1	21.0	0.0	-1.07	
GP-01I	11/9/2021	0	0.5	19.2	0.0	-0.24	NP-1
GP-01I	12/31/2021	0	0.1	21.0	0.0	-3.27	
GP-01S	10/7/2021	0	1.1	18.9	0.0	0.10	
GP-01S	11/9/2021	0	1.4	18.7	0.0	-0.04	
GP-01S	12/31/2021	0	0.8	20.3	0.0	-0.09	
GP-02D	10/7/2021	0	0.1	21.0	0.0	-0.80	
GP-02D	11/9/2021	0	0.2	21.0	0.0	-1.15	
GP-02D	12/31/2021	0	0.1	21.0	0.0	-3.91	
GP-02I	10/7/2021	0	0.2	20.9	0.0	-0.56	
GP-02I	11/9/2021	0	0.2	21.0	0.0	-1.25	NP-2
GP-02I	12/31/2021	0	0.1	21.0	0.0	-3.84	
GP-02S	10/7/2021	0	0.6	20.4	0.0	0.07	
GP-02S	11/9/2021	0	0.2	21.0	0.0	0.04	
GP-02S	12/31/2021	0	0.5	20.8	0.0	0.00	
GP-03D	10/7/2021	0	1.5	18.9	0.0	-0.37	
GP-03D	11/9/2021	0	1.8	19.1	0.0	-1.72	
GP-03D	12/31/2021	0	1.8	18.1	0.0	-3.46	
GP-03I	10/7/2021	0	1.7	18.6	0.0	-0.39	
GP-03I	11/9/2021	0	1.8	19.0	0.0	-1.68	NP-3
GP-03I	12/31/2021	0	1.6	18.9	0.0	-3.39	
GP-03S	10/7/2021	0	0.9	19.8	0.0	-0.02	
GP-03S	11/9/2021	0	1.6	19.4	0.0	-0.29	
GP-03S	12/31/2021	0	0.4	21.0	0.0	0.00	
GP-04D	10/7/2021	0	1	19.5	0.0	-0.69	
GP-04D	11/9/2021	0	0.8	19.9	0.0	-1.69	
GP-04D	12/31/2021	0	0.4	21.0	0.0	-3.66	
GP-04I	10/7/2021	0	0.8	20.2	0.0	0.02	
GP-04I	11/9/2021	0	0.9	20.2	0.0	-1.25	NP-4
GP-04I	12/31/2021	0	0.4	21.0	0.0	-2.35	
GP-04S	10/7/2021	0	1.7	19.8	0.0	-0.01	
GP-04S	11/9/2021	0	2	19.4	0.0	-0.62	
GP-04S	12/31/2021	0	3.2	18.9	0.0	0.00	

Table L-4 *(continued)*

Landfill Gas Monitoring Data

October 1, 2021 - December 31, 2021

Sample ID	Date/Time	CH4		CO2	O2	Static Pressure	Map Location (see Fig. 6)
		(% Vol)	(% LEL)	(% Vol)	(% Vol)	(in H2O)	
GP-05D	10/7/2021	0	2.2	19.1	0.0	0.33	
GP-05D	11/9/2021	0	2.7	18.2	0.0	-1.22	
GP-05D	12/14/2021	0	2.9	16.7	0.0	-0.20	
GP-05I	10/7/2021	0	1.9	19.7	0.0	0.16	
GP-05I	11/9/2021	0	2	19.3	0.0	-0.50	NP-5
GP-05I	12/14/2021	0	2.3	17.6	0.0	0.00	
GP-05S	10/7/2021	0	0.2	21.0	0.0	0.10	
GP-05S	11/9/2021	0	0.2	21.0	0.0	-0.01	
GP-05S	12/14/2021	0	0.2	19.5	0.0	0.00	
GP-06D	10/7/2021	0	0.4	20.4	0.0	0.21	
GP-06D	11/9/2021	0	0.5	21.0	0.0	-1.65	
GP-06D	12/31/2021	0	0.4	21.0	0.0	-1.92	
GP-06I	10/7/2021	0	4.6	17.1	0.0	-0.02	
GP-06I	11/9/2021	0	0.4	20.9	0.0	-0.40	NP-6
GP-06I	12/31/2021	0	0.2	21.0	0.0	-0.89	
GP-06S	10/7/2021	0	4	17.8	0.0	-0.02	
GP-06S	11/9/2021	0	4.4	17.3	0.0	0.52	
GP-06S	12/31/2021	0	2.7	18.3	0.0	0.01	
GP-07D	10/7/2021	0	2.8	13.4	0.0	-0.02	
GP-07D	11/9/2021	0	4	11.4	0.0	-0.12	
GP-07D	12/31/2021	0	2	18.6	0.0	-0.53	
GP-07I	10/7/2021	0	0.1	21.0	0.0	-0.04	
GP-07I	11/9/2021	0	0.7	19.3	0.0	-1.06	NP-7
GP-07I	12/31/2021	0	0.1	21.0	0.0	-2.60	
GP-07S	10/7/2021	0	0.1	21.0	0.0	-0.17	
GP-07S	11/9/2021	0	0.2	21.0	0.0	-1.46	
GP-07S	12/31/2021	0	0.2	21.0	0.0	-3.01	
GP-08D	10/7/2021	0	0.1	21.0	0.0	-1.03	
GP-08D	11/9/2021	0	1	18.0	0.0	-0.74	
GP-08D	12/31/2021	0	0.8	16.2	0.0	-4.15	
GP-08I	10/7/2021	0	0.1	21.0	0.0	-0.84	
GP-08I	11/9/2021	0	0.5	20.7	0.0	-0.76	NP-8
GP-08I	12/31/2021	0	1.8	17.2	0.0	-4.02	
GP-08S	10/7/2021	0	0.1	21.0	0.0	0.01	
GP-08S	11/9/2021	0	8.1	10.1	0.0	-0.02	
GP-08S	12/31/2021	0	6.3	0.6	0.0	-5.69	

Appendix M

Inspection Survey Reports

SOLID WASTE INSPECTION REPORT

Public Health
Seattle & King County

PUBLIC HEALTH - SEATTLE & KING COUNTY Downtown Office 401 - 5th Ave., Ste 1100 Seattle, WA 98104 206-263-9566	**PURPOSE OF VISIT:** Routine Inspection/Field Review of a Closed Landfill - Permitted establishment (PE=1002)
ESTABLISHMENT INFORMATION: **VASHON LANDFILL** VASHON LANDFILL 18900 SW WESTSIDE HWY SW VASHON ISLAND, WA 98070 206-296-4385 **Program Record:** PR0015723	**INSPECTION INFORMATION:** **Date of Inspection:** Monday, May 3, 2021 **Time In:** 12:45 pm **Time Out:** 1:30 pm **Inspector:** Darshan Dhillon **Result: COMPLETE**

VIOLATIONS OBSERVED (if any)

OVERALL INSPECTION COMMENTS:

Weather: Partially cloudy and sunny

1. ACTIONS AND RECOMMENDATIONS:

1.1 New blowers onsite needs to be connected to the landfill gas extraction system by May 31, 2021

1.2 Landfill cover need landscaping by 5/31/2021

1.3 Ensure that aerators are operating in the leachate pond. I did not observe any foam on the leachate pond indicates that aerator may not be operating as required.

2.0 OBSERVATIONS:

2.1 Access is controlled by a locking gate.

2.2 Storm water pond has little amount of storm water.

2.3 Landfill gas extraction system is down waiting for blowers connections.

2.4 Landfill gas is monitored on a monthly basis and no exceedances were noticed.

2.5 Access roads are clear of debris.

2.6 Groundwater monitoring wells and gas probes are secured by pad locks.

2.7 Groundwater is being monitored on a quarterly basis.

2.8 Weekly inspections carried out by the landfill staff and records are maintained.

NEW ENVIRONMENTAL HEALTH SERVICES OFFICE HOURS effective February 3, 2020:

- **Monday, Wednesday and Friday, 8:00 am to 3:00 pm**
- **Tuesdays and Thursdays, 10:30 am to 3:00 pm**

Darshan Dhillon
HEI III

Marisa Baptiste
Engineer

PIC Phone #: 206-477-0458 **Email:** Marisa.Baptiste@kingcounty.gov

INSPECTION CHECKLIST

The following items are evaluated during inspections.
Violations cited as out of compliance during this inspection are highlighted below.
Out=out of compliance

OUT

Abandoned Landfill Sites BOH 10.09.040

- ☐ 0888-Abandoned landfills maintained so as to not create a risk to the public health.

Closer Landfill Leachate Managment for surface impoundment WAC-173-350-330

- ☐ 0754-Records kept of weekly inspections and liner inspections at least every 5 years
- ☐ 0763-Liners, embankments, tank piping and secondary containment maintained and logs kept
- ☐ 0766-Surface impoundments not equipped with a leak detection layer must meet WAC 173-350-500
- ☐ 0767-Surface impoundments w/a leak detection layer are subject to WAC 173-350-040 (5),173-350-330(b)

Closure Performance Standard WAC-173-304-407 (3)

- ☐ 0870-Closure must be performed in a manner to minimize maintenance
- ☐ 0871-Closure must be performed to control and prevent threats to human health and the environment
- ☐ 0872-Facility must be prepared for post-closure period

Closure Plan and Amendments WAC-173-304-407 (4)

- ☐ 0873-Facility must provide a closure plan amendments as directed by JHD
- ☐ 0874-Facility must be closed in accordance with the approved closure plan amendments

Closure Procedure WAC 173-304-407 (4)

- ☐ 0875-Closure plan sheets signed by WS PE showing as-built changes in final constn per closure plan

Closure Requirements WAC-173-351-500

- ☐ 0856-Final cover installed to minimize, infiltration and erosion per design
- ☐ 0857-Closure plan followed for areas of the MSWLF unit within 30 days of final receipt of wa-stes
- ☐ 0858-For closed areas, closure activities must be completed within 180 days

Financial Assurance Criteria WAC-173-351-600

- ☐ 0864-Financial assurance for post closure care per WAC 173-351-600 (3)

Landfill requirements for landfill closed under WAC 173-304-460

- ☐ 0882-Must prevent groundwater contamination per WAC 173-304-100
- ☐ 0883-Operation shall not result in explosive gas generation in facility structures
- ☐ 0884-Operation shall not result in explosive gas generated by the landfill at property boundary
- ☐ 0885-Landfill shall not cause violation of ambient air quality standard at property boundary
- ☐ 0886-Landfill shall not cause water quality violations

Methane Monitoring BOH 10.09.050

- ☐ 0889-Methane monitoring must be conducted per BOH 10.09.050
- ☐ 0890-Structures within 1,000 ft of landfill must be protected from potential methane migration

Performance Standards

- ☐ 0290-Must not pose a threat to human health or environment
- ☐ 0291-Protects from ground water contamination
- ☐ 0292-The facility must conform to the approved local comprehensive solid waste management plan
- ☐ 0293-Complies with RCW 70.94 Emission or ambient air quality standards
- ☐ 0294-Complies with all other local/state/federal laws and regulations

Permit Requirements

- ☐ 0891-Permit Required for Landfills operating under WAC 173-351

Post Closure care WAC-173-351-500

OUT

- ☐ 0859-For closed areas post closure care must be conducted per post-closure plan and WAC
- ☐ 0860-Final cover for closed areas must be maintained (vegetation, settlement, erosion,# run on/off)
- ☐ 0861-Leachate collection systems maintained and operated per post-closure plan and WAC 173-351-300
- ☐ 0862-Gas monitoring systems maintained and operated per post-closure plan and WAC 173-351-200

Post Closure Performance Standards WAC 173-304-407 (6)

- ☐ 0876-Post-closure activities must provide maintenance & monitoring of air/land/ water for stability

Post Closure Plan WAC 173-304-407 (7)

- ☐ 0877-Facility must keep and abide by approved plan of post closure
- ☐ 0878-Facility must provide an approved financial assurance instrument for all post closure costs
- ☐ 0879-Post-closure activities must be completed per the closure plan and schedule
- ☐ 0880-Owner/operator must implement post closure activities w/ a valid post closure plan and any requ

Post Closure Procedure WAC 173-304-407 (8)

- ☐ 0881-WA PE certification must be to the JHD of why post-closure activities are no longer necessary

Requirements sf Landfills BOH 10.09: for landfills closed under WAC 173-351/304&pre WAC173-.04

- ☐ 0887-Necessary maintenance, site inspections, and reporting provided for closed landfills

SOLID WASTE INSPECTION REPORT

Public Health
Seattle & King County

PUBLIC HEALTH - SEATTLE & KING COUNTY Downtown Office 401 - 5th Ave., Ste 1100 Seattle, WA 98104 206-263-9566	**PURPOSE OF VISIT:** Routine Inspection/Field Review of a Closed Landfill - Permitted establishment (PE=1002)
ESTABLISHMENT INFORMATION: **VASHON LANDFILL** VASHON LANDFILL 18900 SW WESTSIDE HWY SW VASHON ISLAND, WA 98070 206-296-4385 **Program Record:** PR0015723	**INSPECTION INFORMATION:** **Date of Inspection:** Wednesday, September 1, 2021 **Time In:** 1:05 pm **Time Out:** 1:45 pm **Inspector:** Darshan Dhillon **Result: COMPLETE**

VIOLATIONS OBSERVED (if any)

OVERALL INSPECTION COMMENTS:

1.0 ACTIONS AND RECOMMENDATIONS:

1.1 Landfill gas (LFG) extraction blowers need to be connected to extraction pipes (work plan has been developed).

1.2 Ensure that aerator located in the leachate pond is operating on a regular schedule. It was not operating at the time of inspection and no foam on the surface of leachate was observed.

2.0 OBSERVATIONS:

2.1 Final cover has been maintained and grass has been mowed. Did not notice any settlement on the Landfill cover.

2.2 Storm water system is maintained and no water was found in the storm water pond.

2.3 Landfill gas extraction blowers being replace with new blowers.

2.4 Landfill gas is monitored on a monthly basis.

2.5 Access to the facility has been controlled by a locking gate.

2.6 Groundwater monitoring wells and gas probes are secured by pad locks.

2.7 Groundwater is being monitored on a continuous basis to ensure that unlined landfill does not contaminate waters of the State of Washington.

2.8 The landfill us under volunteer clean-up action. Remediation investigation and feasibility studies have been developed and approved by Ecology.

2.9 The landfill gas generated by the landfill is below LEL (5% by volume)

2.10 No odors were detected at the time of inspection.

NEW ENVIRONMENTAL HEALTH SERVICES OFFICE HOURS effective February 3, 2020:

- **Monday, Wednesday and Friday, 8:00 am to 3:00 pm**
- **Tuesdays and Thursdays, 10:30 am to 3:00 pm**

Chinook (Seattle) 206-263-9566
Eastgate (Bellevue) 206-477-8050

Darshan Dhillon
HEI III

Marisa Baptiste
Engineer

PIC Phone #: 206-477-0458 **Email:** Marisa.Baptiste@kingcounty.gov

INSPECTION CHECKLIST

The following items are evaluated during inspections.
Violations cited as out of compliance during this inspection are highlighted below.
Out=out of compliance

OUT

Abandoned Landfill Sites BOH 10.09.040

- ☐ 0888-Abandoned landfills maintained so as to not create a risk to the public health.

Closer Landfill Leachate Managment for surface impoundment WAC-173-350-330

- ☐ 0754-Records kept of weekly inspections and liner inspections at least every 5 years
- ☐ 0763-Liners, embankments, tank piping and secondary containment maintained and logs kept
- ☐ 0766-Surface impoundments not equipped with a leak detection layer must meet WAC 173-350-500
- ☐ 0767-Surface impoundments w/a leak detection layer are subject to WAC 173-350-040 (5),173-350-330(b)

Closure Performance Standard WAC-173-304-407 (3)

- ☐ 0870-Closure must be performed in a manner to minimize maintenance
- ☐ 0871-Closure must be performed to control and prevent threats to human health and the environment
- ☐ 0872-Facility must be prepared for post-closure period

Closure Plan and Amendments WAC-173-304-407 (4)

- ☐ 0873-Facility must provide a closure plan amendments as directed by JHD
- ☐ 0874-Facility must be closed in accordance with the approved closure plan amendments

Closure Procedure WAC 173-304-407 (4)

- ☐ 0875-Closure plan sheets signed by WS PE showing as-built changes in final constn per closure plan

Closure Requirements WAC-173-351-500

- ☐ 0856-Final cover installed to minimize, infiltration and erosion per design
- ☐ 0857-Closure plan followed for areas of the MSWLF unit within 30 days of final receipt of wa-stes
- ☐ 0858-For closed areas, closure activities must be completed within 180 days

Financial Assurance Criteria WAC-173-351-600

- ☐ 0864-Financial assurance for post closure care per WAC 173-351-600 (3)

Landfill requirements for landfill closed under WAC 173-304-460

- ☐ 0882-Must prevent groundwater contamination per WAC 173-304-100
- ☐ 0883-Operation shall not result in explosive gas generation in facility structures
- ☐ 0884-Operation shall not result in explosive gas generated by the landfill at property boundary
- ☐ 0885-Landfill shall not cause violation of ambient air quality standard at property boundary
- ☐ 0886-Landfill shall not cause water quality violations

Methane Monitoring BOH 10.09.050

- ☐ 0889-Methane monitoring must be conducted per BOH 10.09.050
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Requirements sf Landfills BOH 10.09: for landfills closed under WAC 173-351/304&pre WAC173-.04

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Appendix N

Financial Summary

King County Solid Waste Division
Vashon Island Closed Landfill
2021 Financial Summary

King County Vashon Closed Landfill – Closed 2001 WAC 173-351

The minimum 30-year post closure required funding period is currently planned through 2031. Financial Assurance is derived from three sources: the established post-closure fund [WAC 173-351-600 (5) (a) (i), the recurring two-year operational and capital improvement program funds WAC 173-351-600 (5) (a) (ii)and the high security bonding options [WAC 173-351-600 (5) (a) (iii)] described in the April 18, 2014 letter from V. Okereke KCSWD to B. Lasby SKCDPH.

Landfill Systems being maintained during post-closure:

- Geomembrane cover
- Landfill gas collection with carbon treatment
- Leachate/Wastewater control and management
- Groundwater, surface water, leachate, and landfill gas monitoring

Completion of the following projects will provide necessary information to reevaluate the current post-closure assumptions and financial assurance plans:

- Enhancements to landfill gas control and treatment
- Modifications to leachate and wastewater management
- Groundwater monitoring of natural attenuation and landfill gas control improvements
- Determination of remaining post-closure period

Vashon Island Closed Landfill Financial Assurance
December 2021-2022

Account	2021	2022
Post Closure Maintenance Fund		
LOAN IN LABOR MANUAL	$146,760	$151,089
MISC OPERATING SUPPLIES	$177	$177
SMALL TOOLS NON CAP NON CONTR	$11,675	$11,675
UTILITIES SURFACE WATER UTILITY	$12	$12
DISPOSAL	$16,524	$16,524
LABORATORY ANALYSIS	$87,224	$87,224
Post Closure Maintenance Fund Subtotal =	**$262,372**	**$266,701**
Capital Improvement Project		
Solid Waste Vashon Feasibilty Study	$523,651	$3,625,000
Vashon Closed Landfill Financial Assurance Total =	**$786,023**	**$3,891,701**