King County
Solid Waste Division
Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 5701
Seattle, WA 98104-3855
206-477-4466
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March 30, 2023

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

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

FM: Adrienne M. Scott, Engineer III - Geologist AMS

RE: King County Vashon Island Closed Landfill 2022 Annual Groundwater Data Evaluation Report

The purpose of this letter is to transmit the *King County Vashon Island Closed Landfill 2022 Annual Groundwater Data Evaluation Report*. The potentiometric maps and groundwater velocity calculations that have been included in the report were sealed 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 2022 Annual Report has been updated to include environmental data collected through December 2022.

If you have questions or need additional information, please contact me at 206-263-0518, or via email at adscott@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

Marisa Baptiste, Engineer III, SWD, DNRP
Eric W. Ferguson, L.H.G., L.G., Water Quality Planner III, Science and Technical Support Section, Water and Land Resources Division
Jennifer Keune, Interim Supervisor Environmental/Permit Compliance, SWD, DNRP
Naima Rushiddin, Records Management Specialist, SWD, DNRP

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March 30, 2023

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 2022 Annual Groundwater Data Evaluation Report

Dear Mr. O'Connor:

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Sincerely,

DocuSigned by:
14908FAE672E464...

Adrienne M. Scott
Engineer III - Geologist

Enclosures

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KING COUNTY
VASHON ISLAND CLOSED LANDFILL

2022 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

March 2023

CERTIFICATION

KING COUNTY VASHON ISLAND CLOSED LANDFILL
2022 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:** March 30, 2023
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: Jamey Barker 3/30/2023		

JAMEY LYNN BARKER
STATE OF WASHINGTON
REGISTERED PROFESSIONAL ENGINEER

Jamey Barker
3/30/2023

CERTIFICATION

KING COUNTY VASHON ISLAND CLOSED LANDFILL
2022 ANNUAL GROUNDWATER DATA EVALUATION REPORT CERTIFICATION

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<table>
<tr><td>Name:
Eric W. Ferguson, LHG, LG</td><td>Title:
Water Quality Planner – Hydrogeologist; Science and Technical Support Section</td><td>Date:
March 30, 2023</td></tr>
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<tr><td colspan="3">Signature:
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State of Washington
Hydrogeologist
2564
Licensed Geologist
Eric W Ferguson

03/30/2023

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:** 2022	**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:** 2022			
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:
[signature]
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Signature of Report Author

March 30, 2022
Date

King County Vashon Island Closed Landfill
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

2022 ANNUAL GROUNDWATER DATA EVALUATION REPORT

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

March 2023

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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 2022 per Washington Administrative Code (WAC) 173-351 and King County Solid Waste Code, Chapter 10.04. The fourth quarter 2022 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 M) presents the authorized 2023-2024 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 exhibit 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 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 the Unit D Aquifer show as being stable and 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 groundwater 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 2022 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 2022. 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 during 2022 (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. 2022 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. Since finalization of the Feasibility Study Outline, the a draft scope of work has been written and is currently being refined.

For the 2022 site improvements see Table 2-1.

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. GROUNDWATER ELEVATIONS and FLOW DIRECTION

Groundwater levels in individual wells have been plotted as a function of time (Figures 7-11). Prior to May 2019, all vertical well data surveyed at Vashon Island Landfill used the National Geodetic Vertical Datum of 1929 (NGVD29). NGVD29 was superseded by the North American Vertical Datum of 1988 (NAVD88). During May 2019, groundwater monitoring wells were resurveyed using NAVD88 and beginning in July of 2019, water level elevations were calculated from the updated reference elevations. To correct groundwater elevations prior to July 2019, survey benchmark monuments were referenced via the National Geodetic Survey Data Explorer. Five benchmark monuments were listed within a 16,000 foot radius of Vashon Island Landfill (stations SY0637, and SY0640-SY0643); the stations show a mean and median 3.44 foot correction between NGVD29 and NAVD88 control survey markers (US Department of Commerce, 2023). Therefore, all groundwater elevations reported prior to July 2019 were corrected by increasing the historic elevations by 3.44 feet. Well completion details are listed in Table 2-3, and all screen intervals are in reference to the NAVD88, unless otherwise indicated.

Groundwater static water levels are reviewed each quarter. Inconsistencies with historical data are carefully reviewed and evaluated for accuracy. Since water levels are taken prior to sampling, this provides a second data point for quality control. Static groundwater elevation, also called hydraulic head, is calculated by subtracting static water level measurements from the reference point elevation (surveyed in NAVD88). The updated conceptual hydrogeologic model delineated groundwater monitoring wells into their respective water-bearing units (Aspect, 2020). Upgradient and downgradient wells were determined by the hydraulic head at each well relative to the waste unit and other wells in the same water-bearing unit; upgradient wells have higher hydraulic head measurements relative to downgradient wells.

Quarterly groundwater potentiometric surface maps are generated using Surfer, a gridding, contouring, and 3D surface mapping program. Surfer was used to interpolate and smooth the irregularly spaced three-dimensional groundwater elevation data into grid values that represent modeled hydraulic head values across each aquifer. Next, the grid values are used to generate equipotential contours that represent the groundwater potentiometric surface for each aquifer. The hydraulic gradient is the change in hydraulic head over a distance, and the maximum hydraulic gradient will be perpendicular to the potentiometric contours; therefore, the maximum gradient determines the direction of groundwater flow, with groundwater moving from high hydraulic head values to low hydraulic head values. Potentiometric surface maps and groundwater velocity calculations are included in 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. Leachate from station LS-B is included on the trilinear diagram for comparison. 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). Analytical results, not mean or median values, are compared to their respective standards. 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 as 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 2022 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, excluding 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, bis (2-ehtylhexyl) phthalate, toluene, and methylene chloride. Although improvements have reduced 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. These 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 the MW-3 and MW-4 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.

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 or 8 µg/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 due to 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 Unit B 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 2022. The trilinear diagrams for monitoring wells MW-3, MW-10, and MW-13 show the samples are within the same calcium-magnesium-bicarbonate hydrochemical facies as previous years. The cation-anion sums for monitoring wells MW-3, MW-4, MW-10 and MW-13 are less than 5 meq/L, and are below the ten percent difference threshold limit (Appendix I).

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 2022 (Appendix B). There were no new or statistically significant increases in groundwater criteria exceedances for Channel Cc1 in 2022. 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. During 2022, there were two detections: cis-1,2-dichloroethene in monitoring well MW-4, and trichlorofluoromethane (qualified as ‘JT’) 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.

All short-term trends for monitoring wells MW-10 and MW-13 are 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 pH, nitrate, total sodium, 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.

During 2022, the 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 past ion balance and trilinear diagram changes, monitoring well MW-4 will only be sampled if the depth to water is less than 105.3 ft. (above the silt contact).

4.4. GROUNDWATER in CHANNEL Cc2

Monitoring wells MW-2, MW-9, MW-20, MW-21, MW-33, MW-35, and MW-37 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. Monitoring well MW-37 was installed on May 18, 2022 to monitor the southern boundary of the site.

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 Cc2 can found in Figure 9 and Appendix H. Quarterly velocity calculations and potentiometric maps are attached in Appendix G.

In 2022, water level fluctuations in monitoring wells MW-2, MW-9, MW-20, MW-21, MW-33, MW-35, and MW-37 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. The Cc2 channel deposit is a perched water-bearing zone that is not laterally extensive across the site and the water levels generally indicate unconfined groundwater conditions (Aspect, 2020).

4.4.2. Trilinear Diagrams and Ion Balance

The Channel Cc2 trilinear diagrams and ion balances are located in Appendix I for 2022. The trilinear diagram shows all the samples to be within the same calcium-magnesium-bicarbonate hydro-chemical facies, 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. Well MW-37 has exhibited dominant bicarbonate-carbonate characteristics since installation in May 2022. The cation-anion sums for wells MW-2, MW-21, MW-33, and MW-37 meet the percent difference threshold limits for all of 2022 (Appendix I).

Groundwater Monitoring well MW-35 has a total cation-anion sum greater than 5 meq/L and exceeds the five percent difference threshold during the first, second, and fourth quarter of 2022. Although well MW-35 exceeds the percent difference threshold, it is likely that the laboratory results are valid given the consistency of the results. Well MW-35 exhibits elevated trace metals and metalloids such as arsenic, iron, and manganese. It is likely that the presence of the trace metals and metalloids has affected the ion balance calculation (discussed further in Sections 4.4.3 - 4.4.8).

4.4.3. Groundwater Exceedances

Exceedances of the SGWC and MCL are summarized in tables in Appendix B. There were no statistically significant increases in groundwater criteria exceedances for Channel Cc2 in 2022.

Monitoring wells MW-2 and MW-20 exhibited new bis(2-ethylhexyl)phthalate exceedances during the fourth quarter of 2022. All fourth quarter 2022 bis(2-ethylhexyl)phthalate results were flagged by the laboratory as estimates with high bias; additionally, the constituent is a common laboratory contaminant. 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.

During 2022, newly installed monitoring well MW-37 exhibited prediction limit exceedances for nitrate, total suspended solids, total calcium, and total sodium. Excluding well MW-37, there were no new prediction limit exceedances for Channel Cc2 in 2022 and there were no prediction limit exceedances for total cobalt, which was exceeded during 2021. 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 2022 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 cis-1,2-dichloroethene in monitoring well MW-2 during 2022 (Tables 3-2 and 3-3). The short term mean value is lower than the long term mean value (Table 3-1), and the increasing trend is not believed to represent a new landfill impact.

There was a statistically significant short-term increasing trend for nitrate and total magnesium in monitoring well MW-9 (Tables 3-2 and 3-3). These increasing trends are not believed to represent changing conditions in monitoring well MW-9. Nitrate concentrations are more than an order of magnitude lower than the SGWC of 10 mg/L (Table 3-1), and there is no SGWC for magnesium. The increasing trends do not coincide with any increases in chloride concentrations, which would be indicative of a leachate impact.

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 and 2022 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 2022 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.

The redox condition of groundwater controls the mobility, persistence, and fate of anthropogenic and natural groundwater contaminants. Water with more dissolved oxygen is considered aerobic (or oxic), and water with less dissolved oxygen is considered anaerobic (or reduced). Redox state is generally inferred from groundwater quality data in an effort to characterize the predominant redox processes occurring in situ. Under aerobic aquifer conditions, constituents such like uranium, selenium, and nitrate are expected to have elevated concentrations. In strongly reducing or anaerobic environments, elevated dissolved methane concentrations can reduce carbon dioxide which may enhance dissolution of redox-sensitive constituents like sulfur, iron, manganese, and arsenic. In western Washington, where Vashon Island Landfill is located, the host aquifer rocks naturally contain higher concentrations of arsenic and manganese; reduced groundwater conditions react with the aquifer materials and arsenic and manganese is released from the aquifer.

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 conditions 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 2022. The trilinear diagram shows all the samples to be within the same calcium-magnesium-bicarbonate hydro-chemical facies, 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 2022. 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 2022 (Appendix

B). There were no new or statistically significant increases in groundwater criteria exceedances for Channel Cc3 during 2022. 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 were statistically significant short-term increasing trends for nitrate and arsenic in monitoring well MW-8 during 2022. These increasing trends are 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 is significantly lower than the primary SGWC of 10 mg/L.

There was a statistically significant short-term increasing trend for nitrate in monitoring well MW-36. This increasing trend is not believed to represent changing conditions in monitoring well MW-36. Nitrate values at well MW-36 are more than two orders of magnitude below the 10 mg/L SGWC. Additionally, this increasing trend does not coincide with any increases in chloride concentrations, which would be more indicative of leachate impacts.

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 2022 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 was decommissioned on May 6, 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 2022, 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 facies. During 2022, the cation/anion for the wells in this zone are within ten percent (Appendix I), which is sufficient for characterization.

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 2022 and one sample 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 2022. 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.

Monitoring well MW-7 exhibited intrawell prediction limit exceedances of total solids, total dissolved solids, total arsenic, and total barium during 2022; of these constituents, total barium,

and total solids are not new exceedances and have sporadically exceeded their respective intrawell prediction limits over the past five years. Well MW-7 has entered retesting protocol, all other wells have been removed from retesting protocol.

During third quarter 2022, well MW-12 exceeded the intrawell prediction limits for dissolved iron and dissolved manganese, and well MW-26 exceeded the intrawell prediction limit for ammonia.

Excluding the aforementioned prediction limit exceedances, there were no other prediction limit exceedances for the Unit D aquifer during 2022.

4.6.5. Volatile Organic Compounds Detections

There were no VOCs detected this year in Unit D samples.

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 were statistically significant short-term increasing trends for nitrate, total arsenic, and total iron at monitoring well MW-7. Since arsenic and iron are naturally occurring in the environment, the increasing trends for total arsenic and total iron may reflect the elevated total solids in the well (denoted in Section 4.6.4 of this report). The nitrate short-term median value is less than the long-term value, and nitrate results at MW-7 are approximately three orders of magnitude smaller than the 10 mg/L SGWC. These increasing trends are not believed to represent a new landfill impact, as arsenic and iron are both naturally occurring in the environment.

There was a statistically significant short-term increasing trend for pH in monitoring well MW-12. The pH short-term median value is less than the long-term median value (see Table 3-1), and the increasing trend is not believed to be indicative of changing groundwater conditions since there are no other increasing trends at well MW-12.

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 mean value is less than the long-term mean value (see Table 3-1) and both are less than the secondary SGWC of 0.3 mg/L.

There was a statistically significant short-term increasing trend for nitrate and total arsenic in monitoring well MW-34. The nitrate short-term median value is less than the long-term value, and nitrate results at MW-34 are approximately lower than the 10 mg/L SGWC. The increasing trend of arsenic is not believed to represent a new landfill impact, since arsenic occurs naturally in the environment.

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). Identified seeps (SW-S1, SW-S2, SW-S3, SW-S4, and SW-S5) are monitored by downstream weir sampling locations SW-W1, SW-W2 and SW-W3. Surface water sampling location SW-E was installed further downstream of the landfill to verify that there are no impacts to Robinwood Creek (see location in Figure 4). 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. Weirs SW-W1, SW-W2, SW-W3, and Station SW-E had total iron exceedances of the federal chronic surface water criteria. Exceedances of total metal criteria is consistent with previous years.

4.7.2. Volatile Organic Compound Detections

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

The VOC detections during 2022 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 SW-W2, however, all SW-W2 detections were flagged as ‘JT’ by the laboratory. 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, King County 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 2022 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 2022. The trilinear diagram shows all samples are within the same calcium-magnesium-bicarbonate hydrochemical facies. During 2022, the cation/anion for the wells in this zone are within ten percent (Appendix I).

5. LEACHATE

The 2022 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 methane detections in 2022 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. Groundwater movement in the middle channel of the lacustrine silt, Channel Cc2, within Unit C generally travels along west-northwest and south-southeast flow paths. A better understanding of the flow path distribution in Channel Cc2 occurred subsequent to the installation of monitoring well MW-37 along the southern property boundary.
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 described in the *Vashon Island Closed Landfill Remedial Investigation Report* (RI; Aspect et. al., 2020) and monitoring well MW-37 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 2023 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, and refinement of the scope of work continues as of March 2023.
5. In 2023, KCSWD will continue trying to coordinate the addition of the offsite spring, DW-GW, to the offsite monitoring network.
6. 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.
7. In accordance with WAC 173-350-340, the leachate lagoon at VLF is to be tested in 2025 for leaks.
8. 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. Work for this project is ongoing.
9. 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 continue to closely monitor the methane concentration in the landfill gas stack emissions and the groundwater response.

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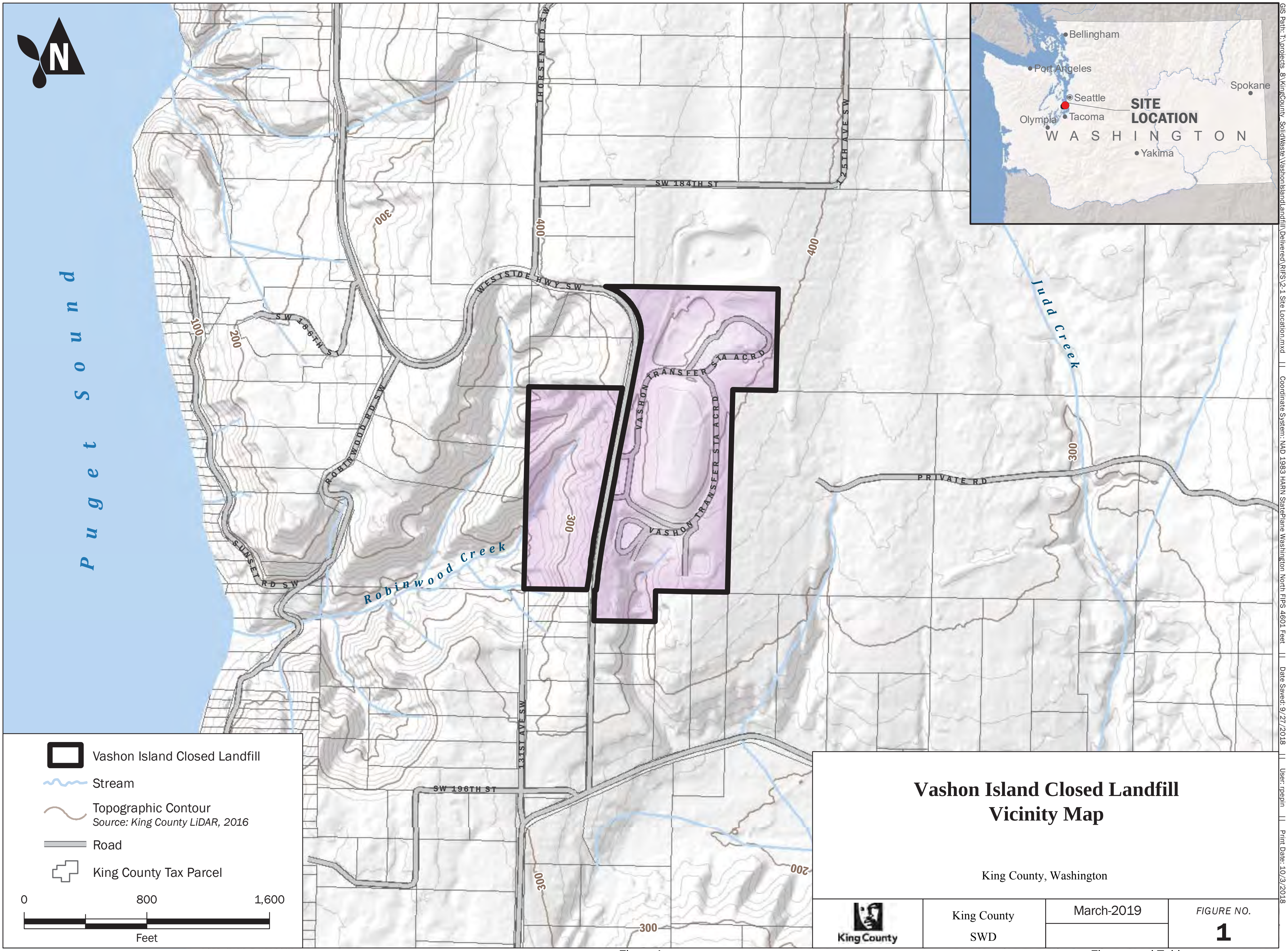
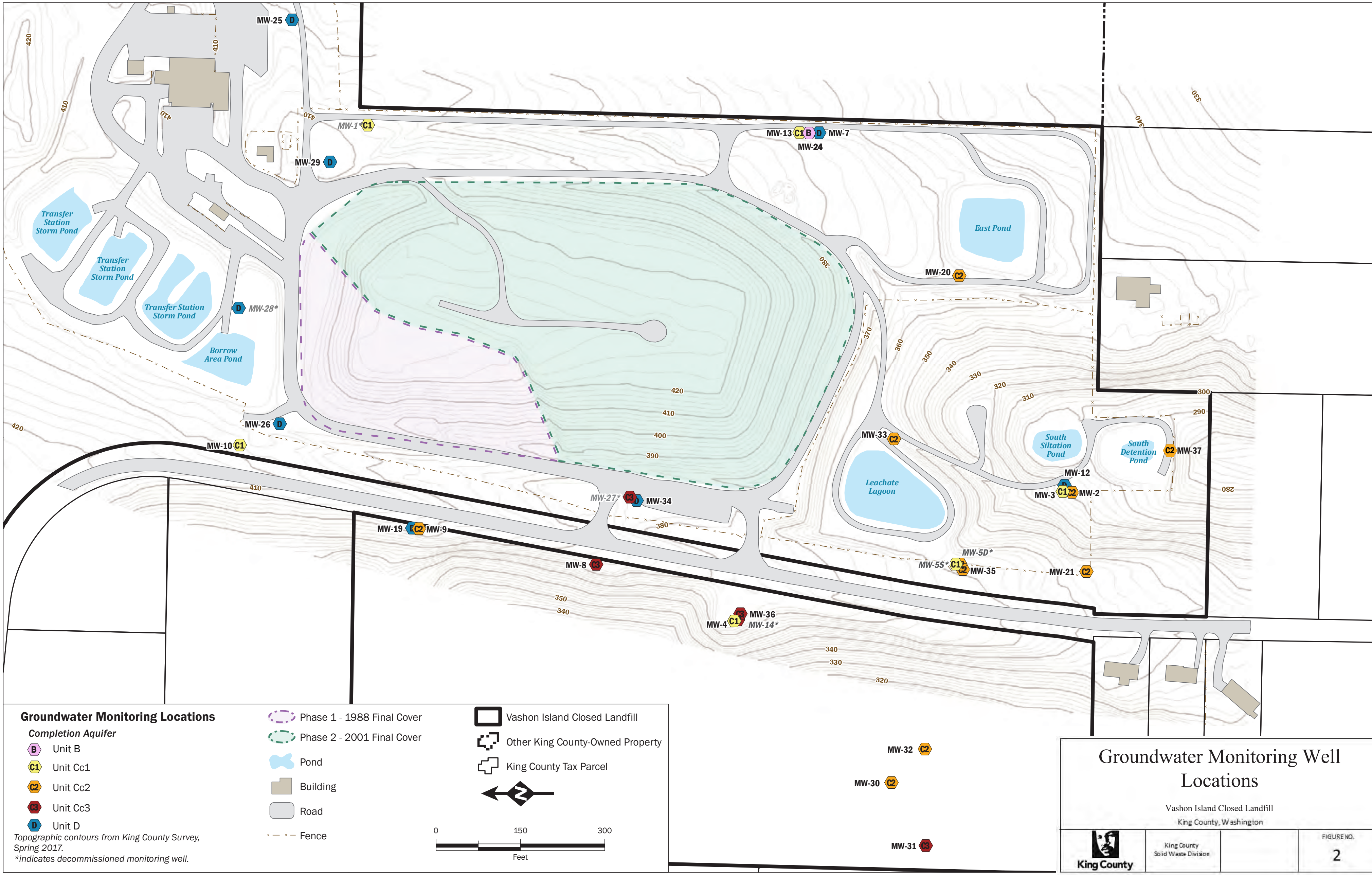
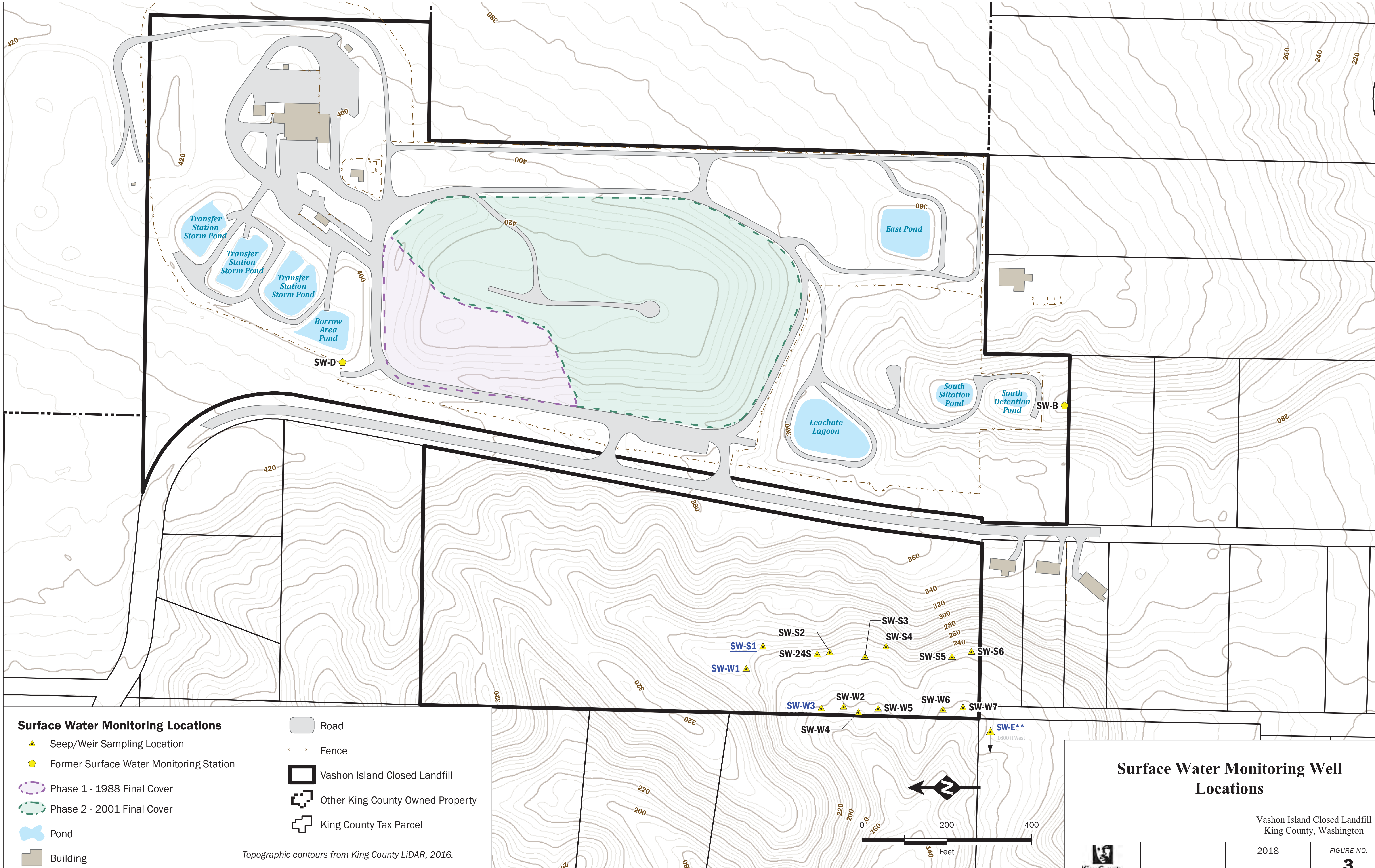
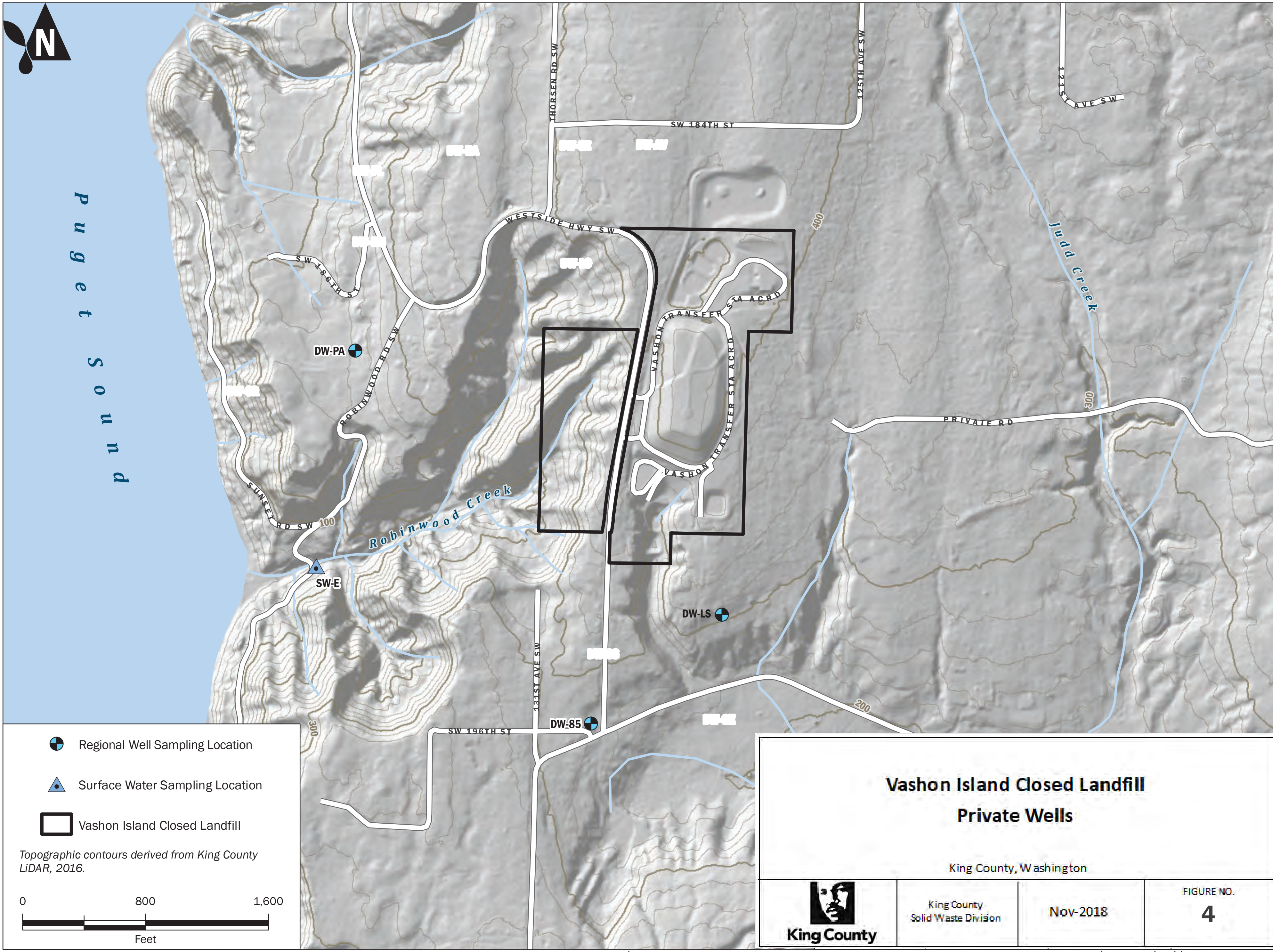
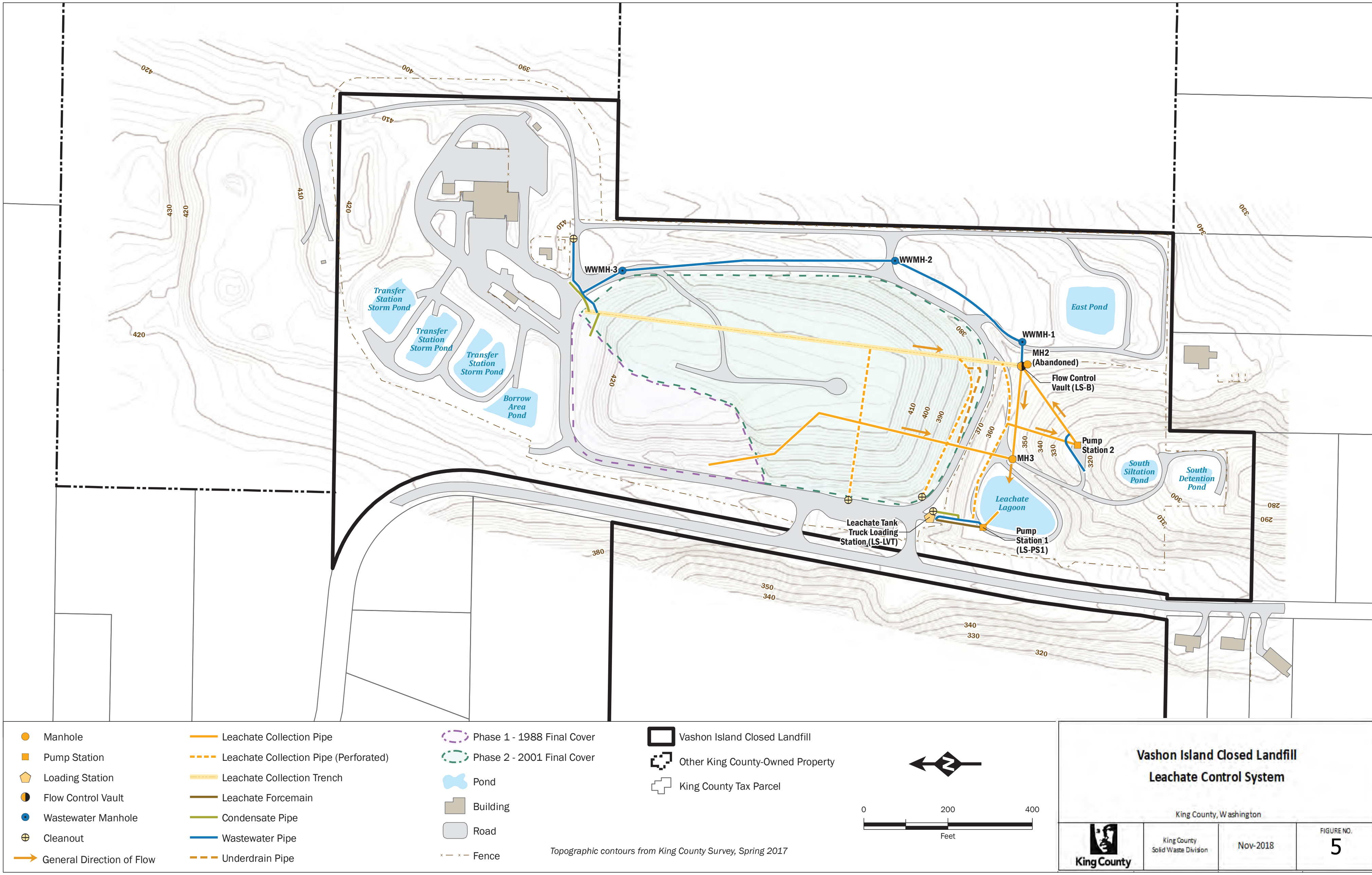
FIGURES and TABLES


N
Puget Sound
Robinwood Creek
Judd Creek
WESTSIDE HWY SW
THORSEN RD SW
SW 184TH ST
125TH AVE SW
SW 186TH ST
ROBINWOOD RD SW
SUNSET RD SW
VASHON TRANSFER STA ACRD
PRIVATE RD
131ST AVE SW
SW 196TH ST
100
200
300
400
Bellingham
Port Angeles
Seattle
Spokane
Olympia
Tacoma
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\RIFS\2-1 Site Location.mxd || Coordinate System: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet || Date Saved: 9/27/2018 || User: rpepin || Print Date: 10/3/2018

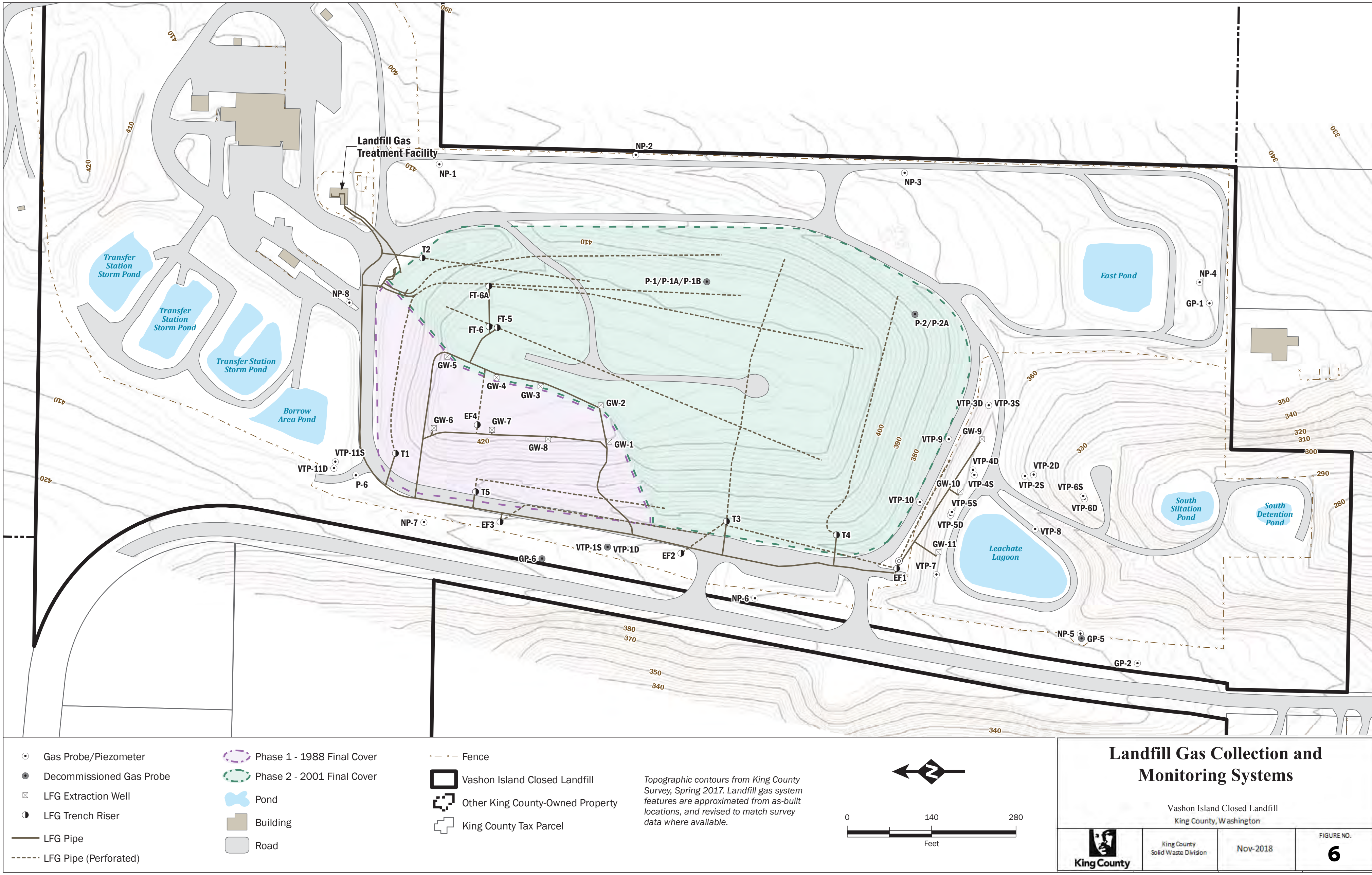

Groundwater Monitoring Well Locations
Vashon Island Closed Landfill
King County, Washington
King County Solid Waste Division
FIGURE NO. 2
Groundwater Monitoring Locations
Completion Aquifer
Unit B
Unit Cc1
Unit Cc2
Unit Cc3
Unit D
Topographic contours from King County Survey, Spring 2017.
*indicates 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
Transfer Station Storm Pond
Transfer Station Storm Pond
Transfer Station Storm Pond
Borrow Area Pond
East Pond
South Siltation Pond
South Detention Pond
Leachate Lagoon
MW-25
MW-1*
MW-29
MW-13
MW-7
MW-24
MW-20
MW-28*
MW-26
MW-10
MW-33
MW-37
MW-12
MW-3
MW-2
MW-27*
MW-34
MW-19
MW-9
MW-8
MW-5D*
MW-5S*
MW-35
MW-21
MW-36
MW-4
MW-14*
MW-32
MW-30
MW-31


Surface Water Monitoring Well Locations
Vashon Island Closed Landfill
King County, Washington
2018
FIGURE NO.
3
King County
Surface Water Monitoring Locations
Seep/Weir Sampling Location
Former Surface Water Monitoring Station
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 LiDAR, 2016.
Transfer Station Storm Pond
Transfer Station Storm Pond
Transfer Station Storm Pond
Borrow Area Pond
East Pond
South Siltation Pond
South Detention Pond
Leachate Lagoon
SW-D
SW-B
SW-S1
SW-S2
SW-S3
SW-S4
SW-24S
SW-S5
SW-S6
SW-W1
SW-W2
SW-W3
SW-W4
SW-W5
SW-W6
SW-W7
SW-E**
1600 ft West
0
200
400
Feet
N


N
Puget Sound
THORSEN RD SW
125TH AVE SW
121ST AVE SW
SW 184TH ST
WESTSIDE HWY SW
SW 186TH ST
ROBINWOOD RD SW
SUNSET RD SW
Robinwood Creek
Judd Creek
PRIVATE RD
TRANSFER STA AC RD
VASHON TRANSFER STA AC RD
131ST AVE SW
SW 196TH ST
DW-PA
DW-LS
DW-85
SW-E
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



Vashon Island Closed Landfill
Leachate Control System
King County, Washington
King County Solid Waste Division
Nov-2018
FIGURE NO. 5
WWMH-3
WWMH-2
WWMH-1
MH2 (Abandoned)
Flow Control Vault (LS-B)
Pump Station 2
MH3
Leachate Lagoon
Pump Station 1 (LS-PS1)
Leachate Tank Truck Loading Station (LS-LVT)
Transfer Station Storm Pond
Borrow Area Pond
East Pond
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



Landfill Gas Treatment Facility
Transfer Station Storm Pond
Transfer Station Storm Pond
Transfer Station Storm Pond
Borrow Area Pond
East Pond
South Siltation Pond
South Detention Pond
Leachate Lagoon
NP-1
NP-2
NP-3
NP-4
NP-5
NP-6
NP-7
NP-8
GP-1
GP-2
GP-5
GP-6
P-1/P-1A/P-1B
P-2/P-2A
P-6
T1
T2
T3
T4
T5
EF1
EF2
EF3
EF4
FT-5
FT-6
FT-6A
GW-1
GW-2
GW-3
GW-4
GW-5
GW-6
GW-7
GW-8
GW-9
GW-10
GW-11
VTP-1S
VTP-1D
VTP-2S
VTP-2D
VTP-3D
VTP-3S
VTP-4D
VTP-4S
VTP-5S
VTP-5D
VTP-6S
VTP-6D
VTP-7
VTP-8
VTP-9
VTP-10
VTP-11S
VTP-11D
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

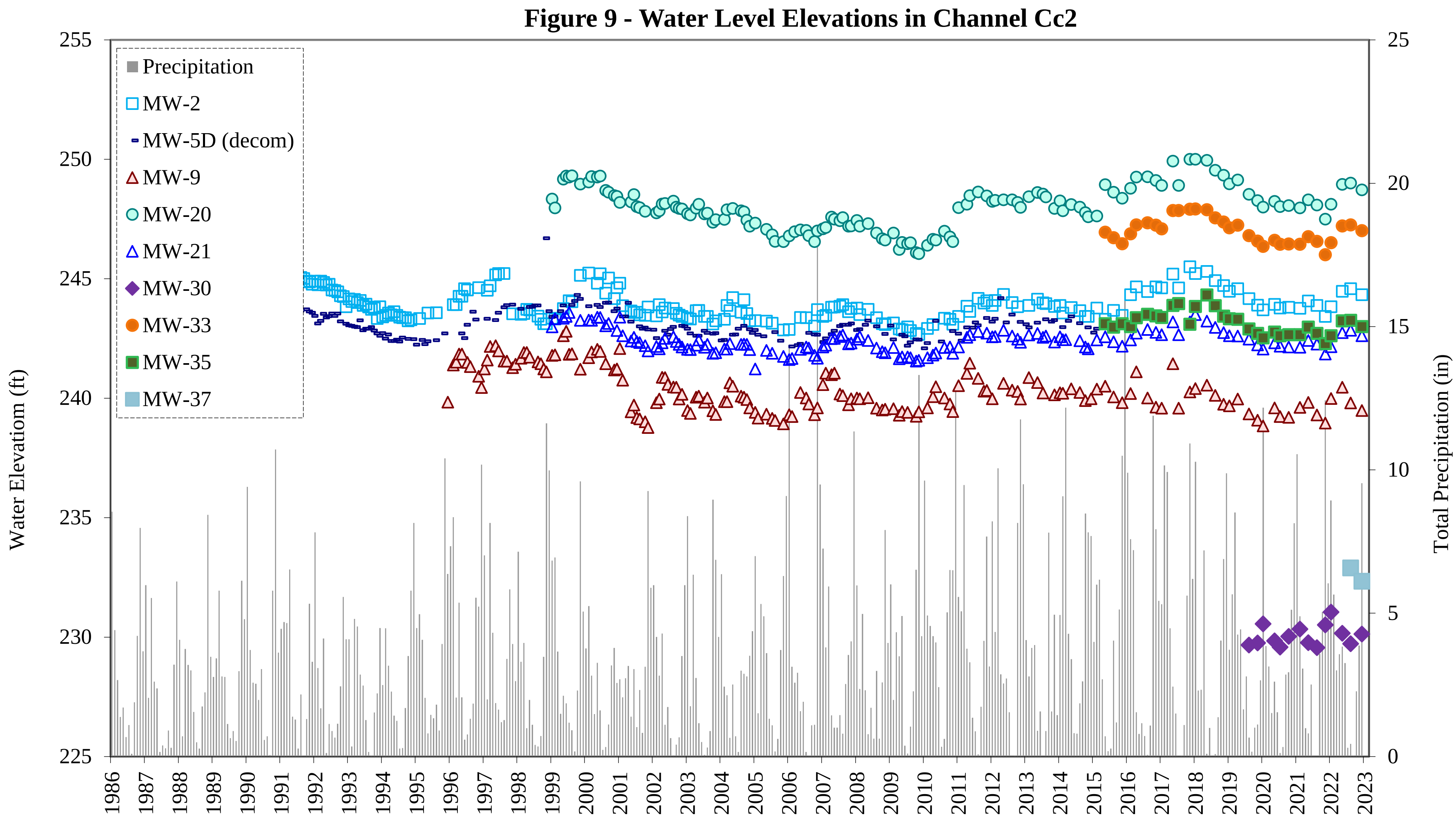


Figure 9 - Water Level Elevations in Channel Cc2
Precipitation
MW-2
MW-5D (decom)
MW-9
MW-20
MW-21
MW-30
MW-33
MW-35
MW-37
Water Elevatiom (ft)
Total Precipitation (in)
255
250
245
240
235
230
225
25
20
15
10
5
0
1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023

Figure 7 - Water Level Elevations in Unit B Aquifer

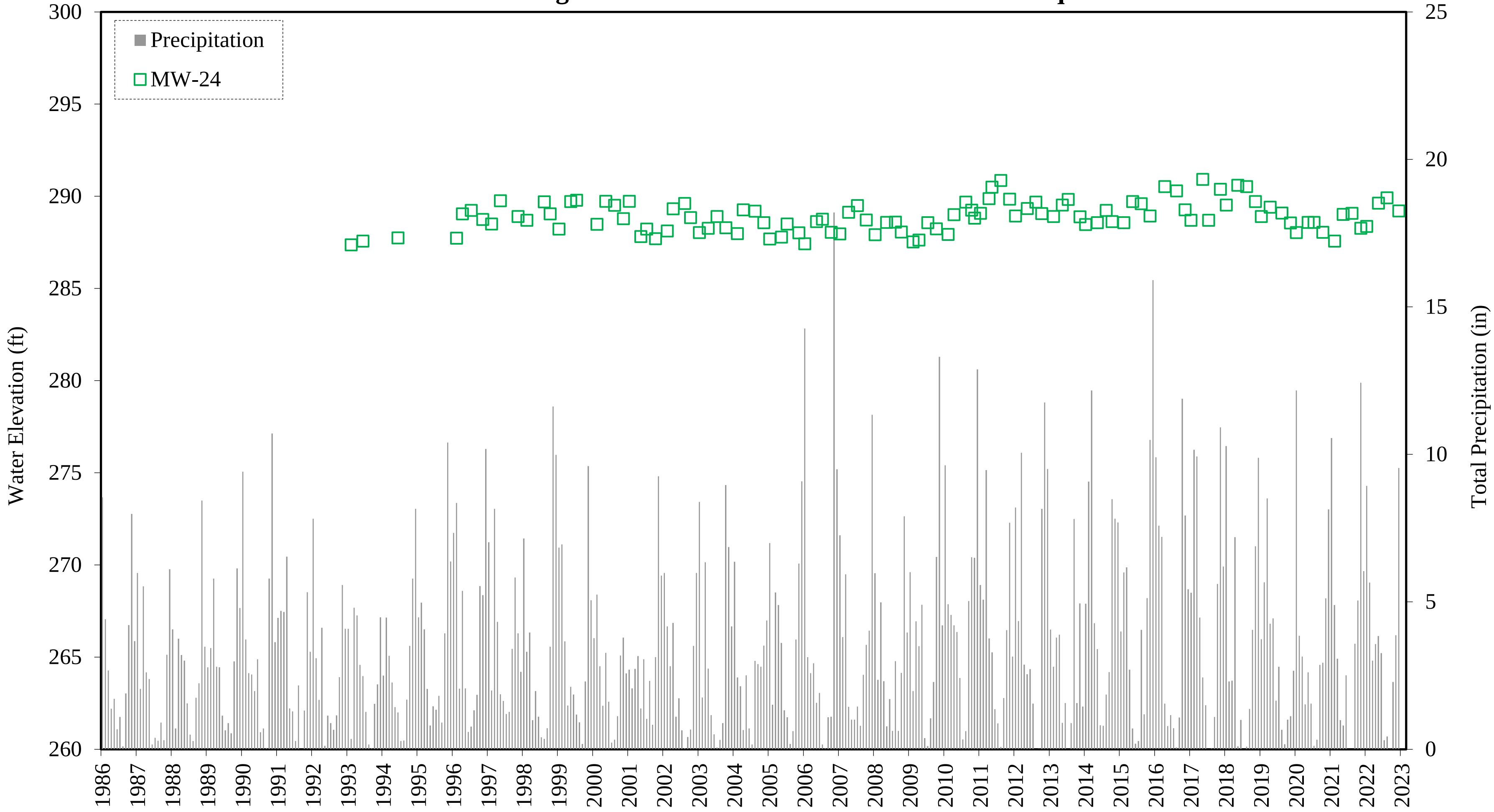


Figure 8 - Water Level Elevations in Channel Cc1

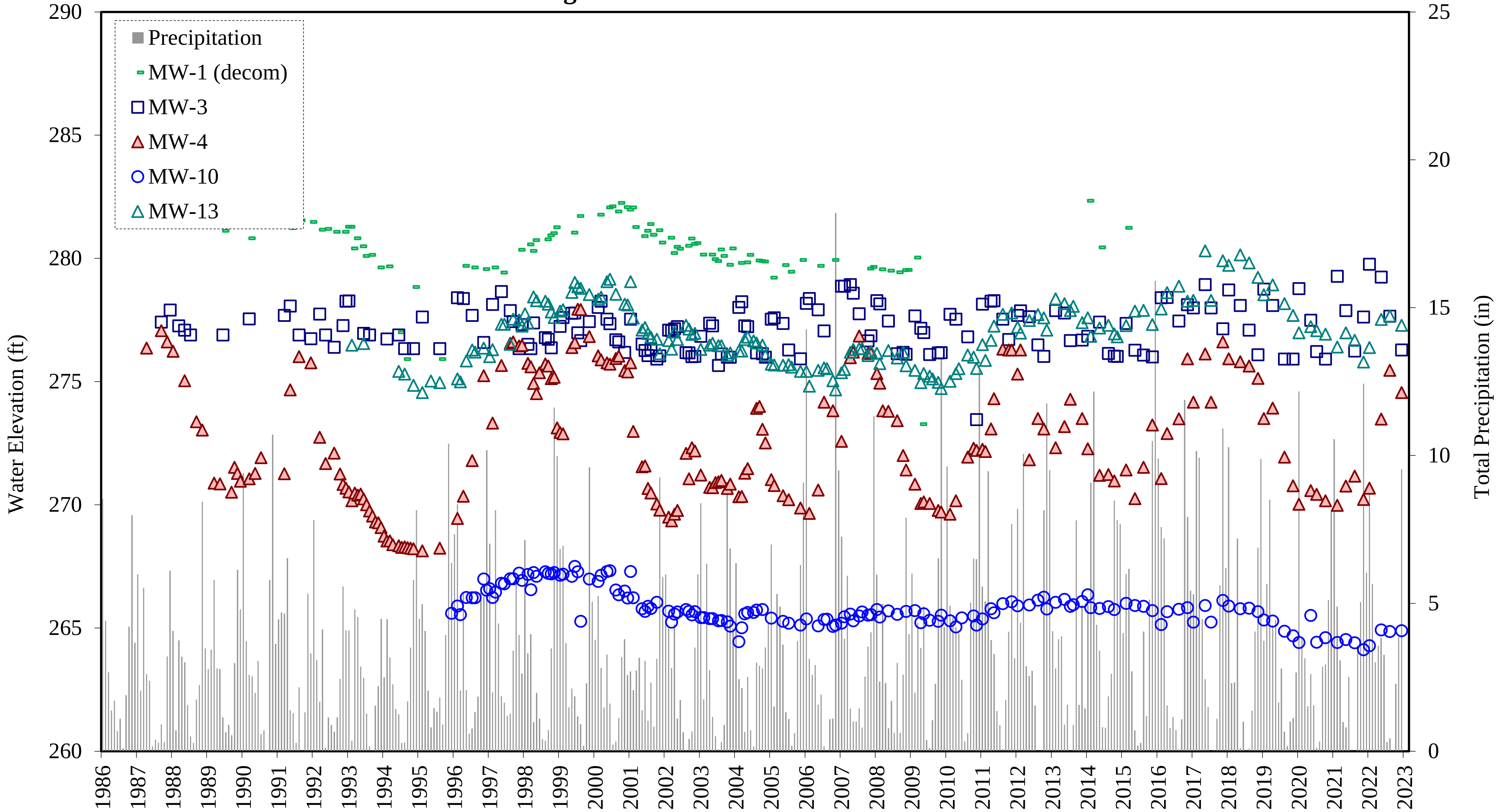


Figure 10 - Water Level Elevations in Channel Cc3

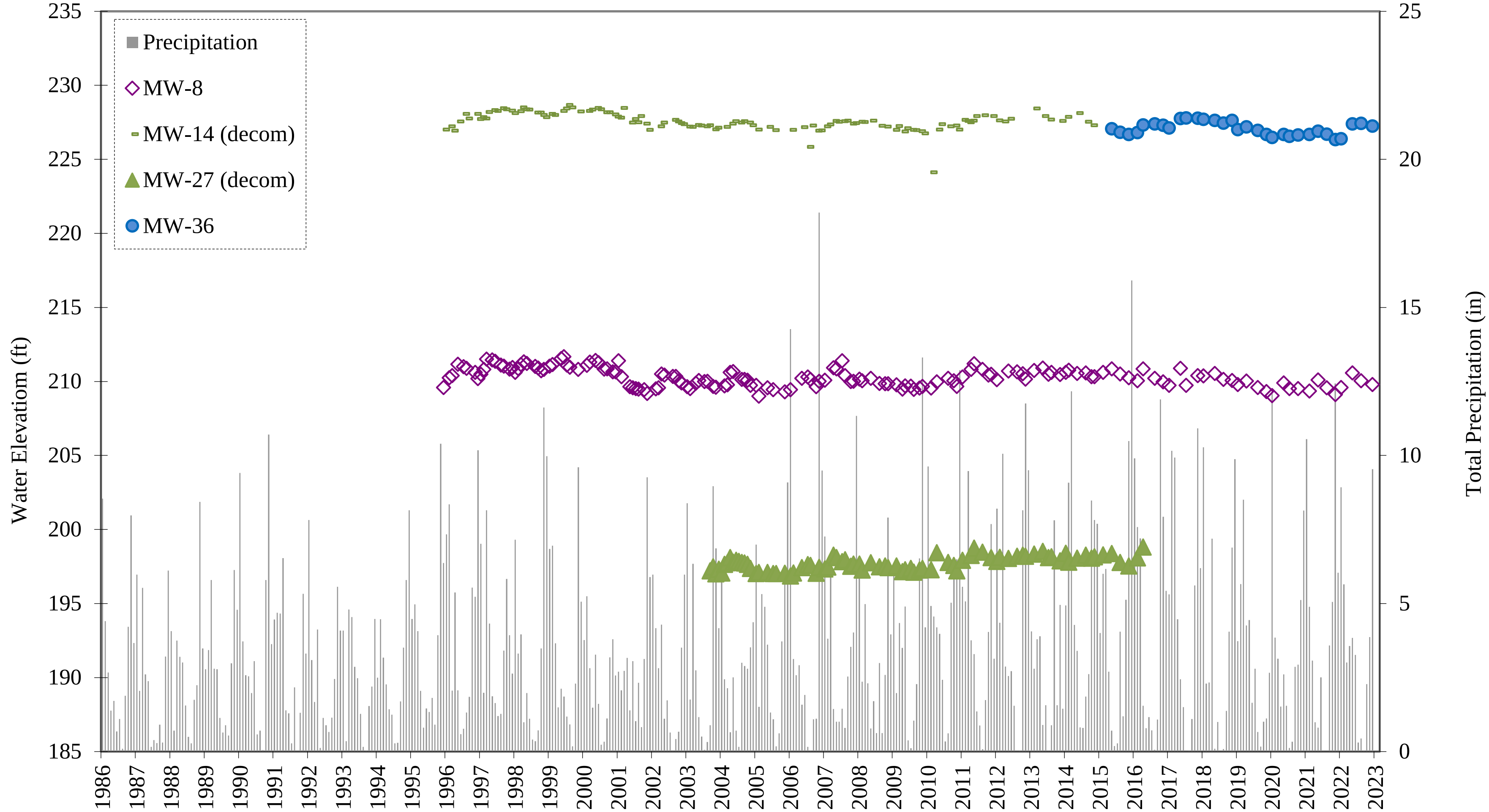


Figure 11 - Water Level Elevations in Unit D Aquifer

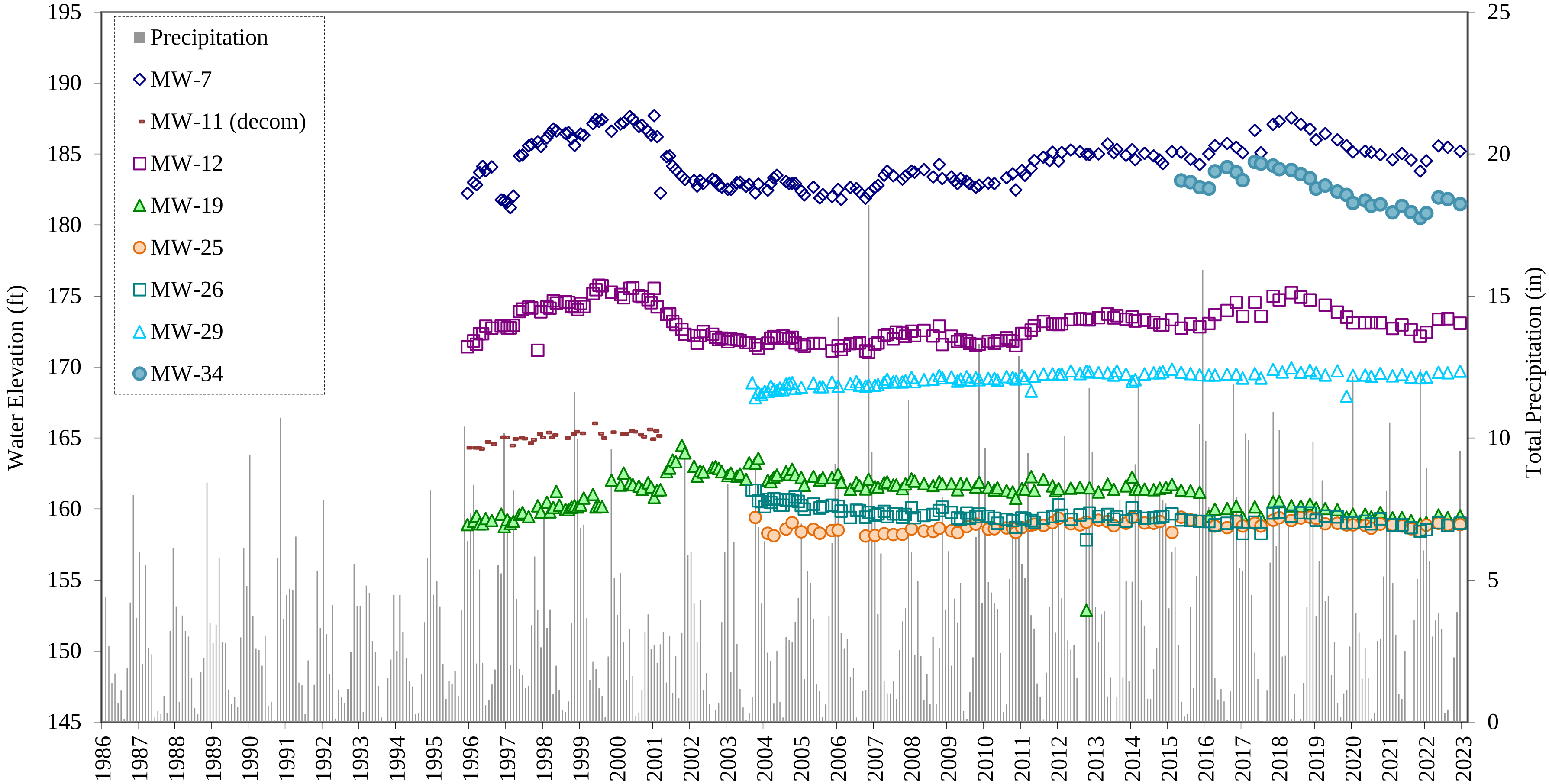


Table 2-1
Significant Maintenance Activities Summary 2022

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, 2022
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. Maintenance work is ongoing.

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 Report	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[d]	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
MW-37	5/18/2022	Jacobs	294.70	Sch 40 PVC	4	0.020	222.10	212.10	291.10	224.10	Bentonite	224.10	212.10	12/20 Washed Silica	K
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, K = Jacobs, 2022.

[d] Well has been decommissioned.

Table 3-1
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	38	55	101	8	106	8
No. of Detections	38	55	101	8	106	8
Minimum	5.44	5.94	6.75	6.85	6.70	6.63
Maximum	6.82	7.97	8.42	7.18	7.99	7.18
Mean	6.02	6.57	7.35	7.05	7.20	6.97
Standard Deviation	0.35	0.35	0.29	0.11	0.25	0.22
Median	5.985	6.46	7.35	7.045	7.205	7.02
Specific Conductance, Field [umhos/cm]						
No. of Analyses	38	55	101	8	105	8
No. of Detections	38	55	101	8	105	8
Minimum	46.3	149.5	100.0	127.3	130.0	101.0
Maximum	200.0	860.0	158.8	136.8	195.0	142.3
Mean	99.8	440.4	132.3	131.0	160.2	132.2
Standard Deviation	33.4	219.9	12.1	3.5	14.6	13.2
Median	99.5	460	130	130.1	160	135.75
Alkalinity [mg/L]						
No. of Analyses	31	34	101	8	103	8
No. of Detections	31	34	101	8	103	8
Minimum	15.6	37.8	52	56.5	30	59.8
Maximum	41	320	70	59.4	80	63.2
Mean	25.98	129.77	56.69	57.53	63.68	61.96
Standard Deviation	6.23	102.22	2.71	1.12	7.29	1.31
Median	24.7	67.05	56.3	56.95	64	62.5
Ammonia-N [mg/L]						
No. of Analyses	37	67	101	8	108	8
No. of Detections	11	25	15	0	12	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	0.65	0.332	0.06	ND	0.07	ND
Mean	0.086	0.042	0.009	ID	0.009	ID
Standard Deviation	0.183	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	38	67	101	8	108	8
No. of Detections	38	65	100	8	108	8
Minimum	0.941	ND	ND	3.16	2.5	2.58
Maximum	11	19	30.9	3.53	10.6	2.89
Mean	2.48	8.91	3.38	3.40	3.46	2.71
Standard Deviation	2.07	4.03	2.79	0.12	1.00	0.11
Median	1.895	7.84	3	3.415	3.025	2.69
Nitrate-N [mg/L]						
No. of Analyses	38	67	101	8	108	8
No. of Detections	38	42	101	8	107	8
Minimum	0.2	ND	0.21	0.409	ND	0.238
Maximum	5.53	6.3	0.84	0.461	0.407	0.418
Mean	1.620	1.450	0.425	0.428	0.118	0.330
Standard Deviation	1.344	1.713	0.127	0.016	0.072	0.062
Median	1.245	0.3	0.4	0.4245	0.0898	0.33
Sulfate [mg/L]						
No. of Analyses	38	67	101	8	107	8
No. of Detections	38	67	101	8	107	8
Minimum	3.96	3.7	2.6	9.04	8.39	8.39
Maximum	19	46	11	10.2	26.81	11.7
Mean	9.0	17.1	9.4	9.4	18.0	10.0
Standard Deviation	4.2	8.7	0.9	0.4	3.2	1.2
Median	8	15	9.5	9.215	18.9	9.72
Total Dissolved Solids [mg/L]						
No. of Analyses	33	52	100	8	107	8
No. of Detections	33	52	100	8	107	8
Minimum	8	29	46	90	68	101
Maximum	90	500	130	131	150	117
Mean	62	284	98	106	116	108
Standard Deviation	17	130	13	12	14	5
Median	64	300	100	105.5	118	109

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Arsenic, Dissolved [ug/L]						
No. of Analyses	38	67	101	8	108	8
No. of Detections	5	24	100	8	107	8
Minimum	ND	ND	ND	1.67	ND	1.89
Maximum	7.00	6.00	2.00	1.78	3.00	2.3
Mean	0.722	1.062	1.610	1.711	1.819	2.079
Standard Deviation	1.265	1.079	0.331	0.043	0.296	0.156
Median	0.500	0.500	1.640	1.700	1.875	2.055
Arsenic, Total [ug/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	11	18	29	8	32	8
Minimum	ND	ND	1.47	1.66	1.55	1.94
Maximum	0.5	0.623	1.75	1.72	2.22	2.33
Mean	0.171	0.384	1.587	1.699	1.887	2.125
Standard Deviation	0.171	0.070	0.074	0.023	0.197	0.160
Median	0.104	0.366	1.580	1.705	1.930	2.160
Calcium, Dissolved [mg/L]						
No. of Analyses	32	44	101	8	108	8
No. of Detections	32	44	101	8	108	8
Minimum	4.55	11.1	4.3	9.68	6.5	8.87
Maximum	11	73.6	13	10.3	11.5	9.47
Mean	8.2	36.6	9.0	10.0	9.4	9.2
Standard Deviation	1.7	23.3	1.0	0.2	0.9	0.2
Median	8.43	33.5	9.05	9.875	9.5	9.215
Calcium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Minimum	4.47	11.2	8.23	9.72	8.21	8.45
Maximum	9.67	26	11.2	10.4	11.5	9.6
Mean	7.20	14.67	9.58	9.99	9.67	9.14
Standard Deviation	1.61	4.12	0.69	0.23	0.81	0.37
Median	7.235	12.9	9.6	9.935	9.63	9.095
Iron, Dissolved [mg/L]						
No. of Analyses	38	67	101	8	108	8
No. of Detections	21	40	55	0	65	1
Minimum	ND	ND	ND	ND	ND	ND
Maximum	8.6	0.5	0.3	ND	0.49	0.0302
Mean	0.75	0.07	0.03	ID	0.03	ID
Standard Deviation	2.08	0.10	0.05	ID	0.06	ID
Median	0.0215	0.025	0.0097	ID	0.016	ID
Iron, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	14	18	2	29	2
Minimum	0.0192	ND	ND	ND	ND	ND
Maximum	0.353	0.335	0.041	0.062	2.18	0.0137
Mean	0.128	0.041	0.012	ID	0.134	ID
Standard Deviation	0.103	0.075	0.008	ID	0.383	ID
Median	0.11095	0.016	0.012	ID	0.0359	ID
Magnesium, Dissolved [mg/L]						
No. of Analyses	32	44	101	8	108	8
No. of Detections	32	44	101	8	108	8
Minimum	1.8	8.03	4.2	9.35	7.7	10.6
Maximum	3.1	56.8	12	10.1	14	11.5
Mean	2.35	27.55	8.41	9.59	10.70	10.91
Standard Deviation	0.29	18.08	0.98	0.24	1.20	0.31
Median	2.335	24	8.3	9.585	10.5	10.85
Magnesium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Minimum	1.89	7.75	8.04	8.95	9.63	9.95
Maximum	2.94	17.7	10.9	9.78	13.6	11
Mean	2.38	10.40	9.35	9.39	11.44	10.68
Standard Deviation	0.30	2.58	0.70	0.25	1.12	0.40
Median	2.41	9.34	9.41	9.335	11.25	10.85

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Manganese, Dissolved [ug/L]						
No. of Analyses	38	67	101	8	108	8
No. of Detections	31	60	11	2	67	7
Minimum	ND	ND	ND	ND	ND	ND
Maximum	2700	970	3	0.55	27	8
Mean	257	132	0.54	ID	2.6	1.7
Standard Deviation	746	205	0.43	ID	4.1	2.7
Median	1.04	28	0.50	ID	1.0	0.41
Manganese, Total [ug/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	20	6	29	8
Minimum	0.81	1.1	ND	ND	ND	0.20
Maximum	36	169	1.9	4.3	65	3.9
Mean	8.4	22	0.57	0.69	6.6	0.94
Standard Deviation	9.7	40	0.48	1.4	12	1.2
Median	4.4	7.7	0.50	0.16	3.2	0.54
Potassium, Dissolved [mg/L]						
No. of Analyses	32	44	101	8	108	8
No. of Detections	32	44	101	8	108	8
Minimum	1.06	0.88	0.65	1.35	1.1	1.59
Maximum	4.1	2.7	2	1.55	2.24	1.89
Mean	2.59	1.54	1.37	1.44	1.71	1.71
Standard Deviation	0.93	0.54	0.15	0.07	0.16	0.09
Median	2.555	1.45	1.38	1.415	1.7	1.69
Potassium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Minimum	1.04	0.901	1.28	1.39	1.48	1.59
Maximum	2.8	1.24	1.65	1.47	2.5	1.84
Mean	1.86	1.07	1.49	1.43	1.81	1.69
Standard Deviation	0.61	0.10	0.08	0.03	0.17	0.08
Median	1.665	1.04	1.49	1.425	1.79	1.66
Sodium, Dissolved [mg/L]						
No. of Analyses	32	44	101	8	108	8
No. of Detections	32	44	101	8	108	8
Minimum	1.81	5.4	2.3	4.4	4.9	5.31
Maximum	7.1	24.8	6.4	5.43	14.4	6.28
Mean	4.3	11.8	4.6	4.9	6.0	5.9
Standard Deviation	1.3	6.0	0.5	0.3	0.9	0.3
Median	4.2	10.2	4.6	4.885	5.9	5.855
Sodium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Minimum	1.82	5.84	4.41	4.62	5.4	5.41
Maximum	7.73	9.18	5.72	5.24	15.8	6.23
Mean	3.78	7.11	5.05	4.93	6.46	5.85
Standard Deviation	1.70	0.91	0.31	0.20	1.75	0.24
Median	3.465	7.05	5.07	4.93	6.21	5.845

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	38	67	101	8	108	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	0.40	ID	ID	ID	ID
Standard Deviation	ID	0.63	ID	ID	ID	ID
Median	ID	0.35	ID	ID	ID	ID
1,2-Dichloropropane [ug/L]						
No. of Analyses	38	67	101	8	108	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	38	67	101	8	108	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	38	67	101	8	108	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	0.816	ID	ID	ID	ID
Standard Deviation	ID	1.029	ID	ID	ID	ID
Median	ID	0.1	ID	ID	ID	ID
Tetrachloroethene [ug/L]						
No. of Analyses	38	67	101	8	108	8
No. of Detections	7	0	0	0	0	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	2.50	ND	ND	ND	ND	ND
Mean	0.22	ID	ID	ID	ID	ID
Standard Deviation	0.41	ID	ID	ID	ID	ID
Median	0.10	ID	ID	ID	ID	ID
cis **-1,2-Dichloroethene [ug/L]**						
No. of Analyses	35	54	101	8	108	8
No. of Detections	0	27	0	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	ND	16	ND	ND	0.79	ND
Mean	ID	1.051	ID	ID	ID	ID
Standard Deviation	ID	2.283	ID	ID	ID	ID
Median	ID	0.5	ID	ID	ID	ID
Dichlorodifluoromethane [ug/L]						
No. of Analyses	31	35	101	8	103	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	0.847	ID	ID	ID	ID
Standard Deviation	ID	1.297	ID	ID	ID	ID
Median	ID	0.05	ID	ID	ID	ID

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	38	67	101	8	108	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	37	59	101	8	108	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	38	67	101	8	108	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	32	45	101	8	108	8
No. of Detections	16	27	1	0	1	0
Minimum	ND	ND	ND	ND	ND	ND
Maximum	0.67	5	0.2	ND	1	ND
Mean	0.195	0.746	ID	ID	ID	ID
Standard Deviation	0.158	0.922	ID	ID	ID	ID
Median	0.1295	0.24	ID	ID	ID	ID
Vinyl Chloride [ug/L]						
No. of Analyses	38	67	101	8	108	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	2.684	ID	ID	ID	ID
Standard Deviation	ID	4.720	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 2022

	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	156	8	104	8	89	8	90	8	23	8	23	8
No. of Detections	156	8	104	8	89	8	90	8	23	8	23	8
Minimum	6.06	6.57	6.55	6.65	6.57	7.45	6.41	6.53	6.32	6.58	6.37	6.38
Maximum	7.75	7.07	7.98	7.27	8.56	7.89	8.24	6.91	6.89	6.85	6.91	6.70
Mean	6.87	6.80	7.31	6.93	7.76	7.63	6.87	6.75	6.70	6.69	6.67	6.50
Standard Deviation	0.24	0.16	0.25	0.23	0.44	0.19	0.24	0.15	0.13	0.12	0.15	0.11
Median	6.9	6.77	7.34	6.9	7.84	7.59	6.87	6.805	6.72	6.645	6.68	6.495
Specific Conductance, Field [umhos/cm]												
No. of Analyses	156	8	104	8	90	8	90	8	23	8	23	8
No. of Detections	156	8	104	8	90	8	90	8	23	8	23	8
Minimum	230.0	260.5	110.0	160.6	140.0	159.5	200.0	243.6	608.4	539.9	569.0	488.8
Maximum	1024.0	286.3	209.9	185.5	242.1	196.6	480.0	299.0	921.6	589.4	884.9	620.0
Mean	432.9	271.8	158.8	171.8	178.3	166.5	333.1	266.5	793.9	568.0	726.8	557.9
Standard Deviation	122.2	9.7	20.8	9.2	23.1	12.3	68.4	19.3	76.4	17.8	84.5	44.1
Median	412.5	271.65	155	169.45	171	162.9	317.5	269.2	810.5	570.5	705.1	559.25
Alkalinity [mg/L]												
No. of Analyses	104	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	104	8	103	8	89	8	89	8	23	8	23	8
Minimum	110	134	56	67.5	58.5	68.5	116	127	342	316	309	297
Maximum	500	143	100	79.8	94.9	72.6	290	146	496	349	460	345
Mean	208.57	138.38	67.43	73.45	73.96	71.08	185.19	137.75	417.61	332.88	368.78	320.88
Standard Deviation	57.39	3.50	6.22	4.14	6.22	1.23	49.57	7.05	40.37	11.64	40.10	15.74
Median	197.5	138	67.8	72.9	72	71	180	140.5	421	333	353	323
Ammonia-N [mg/L]												
No. of Analyses	161	8	103	8	89	8	88	8	23	8	23	8
No. of Detections	26	0	12	0	57	8	51	8	23	8	23	8
Minimum	ND	ND	ND	ND	ND	0.015	ND	0.0077	0.0152	0.0292	0.0319	0.0635
Maximum	0.04	ND	0.06	ND	0.1	0.0187	0.13	0.0108	0.0651	0.0323	0.0954	0.0715
Mean	0.011	ID	0.009	ID	0.018	0.016	0.017	0.009	0.034	0.031	0.068	0.066
Standard Deviation	0.009	ID	0.010	ID	0.012	0.001	0.018	0.001	0.008	0.001	0.011	0.003
Median	0.005	ID	0.005	ID	0.0151	0.0157	0.01425	0.0091	0.0321	0.03075	0.0676	0.06515
Chloride [mg/L]												
No. of Analyses	162	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	159	8	103	8	89	8	89	8	23	8	23	8
Minimum	ND	2.06	3	4.33	2.99	3.06	2.01	1.76	3.46	3.29	3.83	3.32
Maximum	10.6	2.53	23	5.84	4.3	3.36	15.2	2.09	5.78	4.07	5.97	4.26
Mean	4.23	2.25	4.45	4.92	3.56	3.19	3.80	1.91	4.54	3.57	4.55	3.87
Standard Deviation	1.55	0.14	1.93	0.49	0.36	0.09	1.87	0.10	0.74	0.24	0.69	0.29
Median	4	2.24	4.14	4.87	3.47	3.17	3.48	1.91	4.49	3.51	4.21	3.875
Nitrate-N [mg/L]												
No. of Analyses	162	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	78	8	103	8	15	0	56	8	2	0	1	0
Minimum	ND	0.154	ND	0.38	ND	ND	ND	0.0987	ND	ND	ND	ND
Maximum	1.25	1.23	1.6	0.951	0.11	ND	0.555	0.343	0.0426	ND	0.025	ND
Mean	0.129	0.736	0.269	0.643	0.014	ID	0.101	0.232	ID	ID	ID	ID
Standard Deviation	0.233	0.364	0.247	0.216	0.014	ID	0.106	0.090	ID	ID	ID	ID
Median	0.05	0.777	0.1935	0.638	0.005	ID	0.076	0.248	ID	ID	ID	ID
Sulfate [mg/L]												
No. of Analyses	162	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	162	8	103	8	89	8	89	8	23	8	23	8
Minimum	1.54	11.9	9	12	14	14.9	10	12	13.9	15.9	13.8	24.7
Maximum	18.8	15.1	18	13.7	18	16	19	14.1	17.9	18.6	26.4	31.9
Mean	12.6	13.3	12.8	12.7	16.1	15.5	14.0	13.0	15.9	16.9	20.6	28.1
Standard Deviation	2.7	1.0	1.3	0.6	1.1	0.4	2.6	0.7	1.3	0.8	3.0	2.3
Median	12	13.2	13	12.4	16	15.55	13.6	12.9	16.2	17.05	21	28.15
Total Dissolved Solids [mg/L]												
No. of Analyses	151	8	103	8	88	8	89	8	23	8	23	8
No. of Detections	151	8	103	8	88	8	89	8	23	8	23	8
Minimum	34	162	58	108	50	113	157	166	402	325	404	371
Maximum	480	195	160	139	160	142	307	195	519	394	539	434
Mean	265	178	114	126	125	126	222	179	470	372	451	409
Standard Deviation	66	10	18	10	18	8	37	11	36	22	33	21
Median	259	178.5	114	128.5	128	128	220	174	485	374	445	405.5

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	162	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	101	8	102	8	88	8	82	8	23	8	23	8
Minimum	ND	0.83	ND	2.27	ND	1.92	ND	0.871	32.7	36.1	22.9	23.7
Maximum	4.00	0.982	3.00	2.44	5.00	2.08	23	1.15	57.2	41.7	38.4	29.3
Mean	1.038	0.917	2.388	2.343	1.771	2.005	4.536	0.990	41.5	38.0	30.4	26.6
Standard Deviation	0.610	0.051	0.393	0.059	0.479	0.060	5.674	0.107	5.806	1.719	4.150	1.660
Median	1.000	0.914	2.340	2.345	1.700	1.995	1.680	0.949	39.8	37.7	29.4	26.9
Arsenic, Total [ug/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	16	8	31	8	31	8	28	8	23	8	23	8
Minimum	ND	0.836	2.17	2.21	1.3	2.03	ND	1.2	32.3	36.1	20.4	28.4
Maximum	2.5	1.02	2.5	2.4	4.4	2.22	8.73	2.72	47.1	43.1	55.3	51.8
Mean	0.751	0.917	2.310	2.323	2.202	2.153	3.155	1.641	40.0	38.6	31.0	36.8
Standard Deviation	0.376	0.054	0.086	0.058	0.762	0.067	1.979	0.472	3.523	2.000	7.254	7.640
Median	0.740	0.913	2.320	2.335	2.210	2.175	3.060	1.550	39.5	38.4	29.8	34.9
Calcium, Dissolved [mg/L]												
No. of Analyses	137	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	137	8	103	8	89	8	89	8	23	8	23	8
Minimum	4.3	19.9	7.8	13.3	9.1	12.9	16.3	19.8	57.8	55.2	52.1	54.2
Maximum	47.9	21.7	15.8	15.6	18	13.4	40	21.7	77.1	59	77.4	67.4
Mean	30.9	20.6	12.0	14.4	12.4	13.1	25.0	20.9	67.8	57.2	63.4	60.3
Standard Deviation	9.6	0.7	1.5	0.8	1.5	0.2	6.1	0.8	4.9	1.3	5.7	4.5
Median	30	20.35	12	14.45	12.5	13.1	23	21.05	68.8	57.25	63.1	61.15
Calcium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Minimum	18.4	19.8	8.51	13	11.5	13.1	16.1	20	60.2	55.3	52.8	54.2
Maximum	27.1	21.8	16.7	16	14.6	13.3	24.9	22.2	78.7	59.2	73.2	67.2
Mean	22.24	20.56	13.29	14.49	13.33	13.19	20.35	20.88	69.77	57.29	65.52	60.86
Standard Deviation	2.31	0.57	1.65	0.94	0.81	0.08	2.01	0.73	4.84	1.34	4.53	4.56
Median	22.1	20.4	13.3	14.65	13.4	13.2	20.2	20.8	70	57.45	64.6	60.4
Iron, Dissolved [mg/L]												
No. of Analyses	162	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	104	1	50	0	68	8	89	8	23	8	23	8
Minimum	ND	ND	ND	ND	ND	0.0992	0.146	0.102	5.77	5.36	10.8	10.4
Maximum	0.89	0.01	0.29	ND	0.51	0.211	5.2	0.564	8.19	5.83	16.4	14.8
Mean	0.06	ID	0.03	ID	0.10	0.13	1.35	0.35	7.21	5.63	13.88	12.75
Standard Deviation	0.11	ID	0.05	ID	0.11	0.04	1.25	0.18	0.59	0.19	1.83	1.63
Median	0.025	ID	0.005	ID	0.063	0.112	0.9	0.4015	7.28	5.69	13.7	13
Iron, Total [mg/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	18	1	22	1	30	8	31	8	23	8	23	8
Minimum	ND	ND	ND	ND	ND	0.137	0.231	0.299	5.87	5.36	11	11.7
Maximum	0.15	0.02	0.346	0.0346	5.12	0.354	3.28	1.39	9.1	5.91	23.8	17.9
Mean	0.018	ID	0.045	ID	0.680	0.225	1.225	0.707	7.355	5.684	15.183	15.263
Standard Deviation	0.027	ID	0.068	ID	0.956	0.065	0.744	0.376	0.715	0.201	2.899	2.564
Median	0.011	ID	0.019	ID	0.521	0.2075	1.08	0.774	7.44	5.7	15.1	15.85
Magnesium, Dissolved [mg/L]												
No. of Analyses	137	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	137	8	103	8	89	8	89	8	23	8	23	8
Minimum	3.9	20.6	6.6	10.2	7.7	10.9	15.2	19.2	45.1	41.4	37.8	41.2
Maximum	53.9	23	13	12.6	15.1	12.1	43.2	22.9	65.1	48	51.4	47.4
Mean	34.63	22.10	9.56	11.69	10.66	11.63	25.07	20.90	55.67	44.85	43.86	44.54
Standard Deviation	10.85	0.94	1.34	0.78	1.84	0.34	7.63	1.47	4.48	1.83	3.51	2.30
Median	33	22.5	9.3	11.9	10	11.7	23	20.8	55.9	44.95	43.4	45.25
Magnesium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Minimum	19.4	19.7	8.54	11	8.69	10.1	14.3	17.8	46.2	40.1	36.5	41.2
Maximum	31.8	23.2	14	13.2	15.7	11.9	25.7	22.2	61.1	46.1	59.6	47.5
Mean	24.76	21.83	11.07	11.65	12.61	11.41	19.75	20.61	54.91	44.04	44.43	44.19
Standard Deviation	3.60	1.12	1.13	0.75	1.80	0.58	3.07	1.68	3.76	2.08	4.59	2.52
Median	23.1	21.85	11	11.5	12.8	11.6	19.7	21.55	55.6	44.7	43.9	43.75

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	162	8	103	8	89	8	88	8	23	8	23	8
No. of Detections	161	8	10	0	89	8	88	8	23	8	23	8
Minimum	ND	12	ND	ND	53	126	165	158	877	877	1630	2140
Maximum	590	57	540	ND	548	146	1600	505	1130	927	2560	2550
Mean	127	41	6.1	ID	209	134	550.5	330	1014	887	2297	2345
Standard Deviation	76	17	53	ID	90	6.7	309.0	142	78	17	236	141
Median	110	45	0.50	ID	210	133	478.5	368	1010	882	2370	2335
Manganese, Total [ug/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	32	8	24	6	31	8	31	8	23	8	23	8
Minimum	18	27	ND	ND	140	129	168	175	897	863	1940	2180
Maximum	306	68	15	1.6	2920	152	1050	536	1290	921	2790	2570
Mean	135	50	1.9	0.35	376	136	524	370	1043	892	2439	2374
Standard Deviation	65	15	3.0	0.51	486	7.1	243	158	108	21	215	136
Median	117	51	0.50	0.17	298	135	496	417	1030	895	2440	2400
Potassium, Dissolved [mg/L]												
No. of Analyses	137	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	137	8	103	8	89	8	89	8	23	8	23	8
Minimum	0.59	2.01	1.2	2.01	1.5	1.99	1.8	2.1	3.03	3.02	3.03	3.13
Maximum	3.7	2.32	2.41	2.28	2.9	2.2	3.3	2.47	3.79	3.32	3.72	3.37
Mean	2.49	2.14	1.95	2.12	2.07	2.08	2.36	2.27	3.45	3.17	3.32	3.21
Standard Deviation	0.40	0.11	0.21	0.10	0.21	0.08	0.34	0.14	0.18	0.13	0.18	0.09
Median	2.4	2.105	1.95	2.105	2.09	2.075	2.27	2.235	3.47	3.15	3.29	3.19
Potassium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Minimum	2.07	2.06	1.92	2.05	1.91	2	2.02	2.15	3.27	3	3.07	3.14
Maximum	2.58	2.2	2.67	2.28	2.48	2.21	2.74	2.47	3.89	3.38	3.88	3.56
Mean	2.31	2.11	2.18	2.13	2.20	2.07	2.27	2.26	3.56	3.15	3.50	3.29
Standard Deviation	0.14	0.05	0.17	0.07	0.13	0.08	0.19	0.10	0.15	0.14	0.19	0.15
Median	2.33	2.095	2.17	2.11	2.2	2.04	2.21	2.245	3.57	3.125	3.46	3.285
Sodium, Dissolved [mg/L]												
No. of Analyses	137	8	103	8	89	8	89	8	23	8	23	8
No. of Detections	137	8	103	8	89	8	89	8	23	8	23	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	9.35	6.59	6.24	8	6.42	13	11.4	21.4	18	17.7	18.1
Mean	10.3	8.7	5.4	5.8	6.2	5.9	10.4	10.3	18.9	16.5	16.1	16.6
Standard Deviation	1.7	0.5	0.5	0.4	0.7	0.4	0.9	0.8	1.0	0.8	1.2	0.8
Median	9.9	8.88	5.3	5.985	6.16	5.98	10.2	10.6	18.9	16.5	16.3	16.4
Sodium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Minimum	8.15	7.73	5.19	5.62	4.85	4.99	9.16	9.66	16.5	14.6	13.2	15.1
Maximum	11.4	9.23	6.84	6.37	7.27	6.19	12.2	10.8	20.8	17.3	17.8	17.8
Mean	9.28	8.70	5.95	5.97	6.23	5.79	10.73	10.27	18.86	16.40	16.21	16.68
Standard Deviation	0.62	0.50	0.43	0.25	0.52	0.40	0.74	0.50	0.91	0.94	1.19	0.84
Median	9.23	8.765	5.94	5.975	6.23	5.85	10.9	10.235	18.9	16.5	16.6	16.7

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	8	0	0	0	0	0	0	0	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	1.29	0.727	0.12	0.196
Maximum	0.5	ND	ND	ND	ND	ND	ND	ND	2.32	2.06	0.483	0.302
Mean	0.18	ID	ID	ID	ID	ID	ID	ID	1.64	1.53	0.27	0.24
Standard Deviation	0.16	ID	ID	ID	ID	ID	ID	ID	0.28	0.48	0.11	0.05
Median	0.1	ID	ID	ID	ID	ID	ID	ID	1.58	1.53	0.27	0.2255
1,2-Dichloropropane [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	6.26	4.64	0.321	0.328
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	12.5	8.31	1.33	0.546
Mean	ID	ID	ID	ID	ID	ID	ID	ID	7.98	6.52	0.88	0.43
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	1.61	1.33	0.31	0.08
Median	ID	ID	ID	ID	ID	ID	ID	ID	7.43	6.205	0.888	0.3955
Benzene [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	3	0	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	0.934	0.579	0.518	0.449
Maximum	ND	ND	ND	ND	ND	ND	0.25	ND	1.76	0.964	1.17	0.594
Mean	ID	ID	ID	ID	ID	ID	0.096	ID	1.131	0.797	0.881	0.520
Standard Deviation	ID	ID	ID	ID	ID	ID	0.031	ID	0.227	0.147	0.190	0.057
Median	ID	ID	ID	ID	ID	ID	0.1	ID	1.04	0.7735	0.932	0.497
Chloroethane [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	26	0	0	0	0	0	0	0	20	2	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	0.594	ID	ID	ID	ID	ID	ID	ID	0.411	ID	ID	ID
Standard Deviation	0.839	ID	ID	ID	ID	ID	ID	ID	0.196	ID	ID	ID
Median	0.1	ID	ID	ID	ID	ID	ID	ID	0.41	ID	ID	ID
Tetrachloroethene [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	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	147	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	44	6	0	0	0	0	88	8	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	0.463	24.1	22.8	2.7	2.9
Maximum	0.6	0.331	ND	ND	ND	ND	8.7	0.595	52.7	39.4	11.2	3.71
Mean	0.175	0.160	ID	ID	ID	ID	1.993	0.532	33.487	29.113	7.360	3.298
Standard Deviation	0.128	0.098	ID	ID	ID	ID	2.079	0.049	7.889	6.138	2.589	0.280
Median	0.1	0.133	ID	ID	ID	ID	1.1	0.54	31.8	28.8	8.42	3.24
Dichlorodifluoromethane [ug/L]												
No. of Analyses	103	8	104	8	89	8	88	8	23	8	23	8
No. of Detections	101	8	0	0	24	5	87	8	23	8	23	8
Minimum	ND	1.59	ND	ND	ND	ND	ND	1.27	3.21	2.68	0.225	0.494
Maximum	30.00	3.81	ND	ND	1.75	0.249	20.00	2.34	8.82	4.4	1.13	0.909
Mean	10.010	2.546	ID	ID	0.217	0.136	4.679	1.646	5.179	3.540	0.592	0.682
Standard Deviation	6.508	0.740	ID	ID	0.255	0.079	3.735	0.408	1.359	0.652	0.283	0.144
Median	8.10	2.43	ID	ID	0.1	0.149	3.31	1.505	5.27	3.415	0.57	0.6915

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	172	8	104	8	89	8	89	8	23	8	23	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	0.20	ID	0.09	ID
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.46	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	150	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	17	0	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	0.632	0.469	0.222	0.183
Maximum	ND	ND	ND	ND	ND	ND	0.41	ND	1.15	1.05	0.401	0.259
Mean	ID	ID	ID	ID	ID	ID	0.122	ID	0.829	0.814	0.312	0.231
Standard Deviation	ID	ID	ID	ID	ID	ID	0.076	ID	0.173	0.179	0.053	0.028
Median	ID	ID	ID	ID	ID	ID	0.1	ID	0.745	0.824	0.319	0.238
Trichloroethene [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	13	7	23	8
Minimum	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.856	0.92
Maximum	ND	ND	ND	ND	ND	ND	ND	ND	0.18	0.192	1.45	1.29
Mean	ID	ID	ID	ID	ID	ID	ID	ID	0.125	0.148	1.033	1.163
Standard Deviation	ID	ID	ID	ID	ID	ID	ID	ID	0.036	0.044	0.134	0.122
Median	ID	ID	ID	ID	ID	ID	ID	ID	0.137	0.1555	1.02	1.19
Trichlorofluoromethane [ug/L]												
No. of Analyses	137	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	133	8	0	0	0	0	86	8	0	0	0	0
Minimum	ND	0.733	ND	ND	ND	ND	ND	0.519	ND	ND	ND	ND
Maximum	23	2.45	ND	ND	ND	ND	9	1.6	ND	ND	ND	ND
Mean	6.156	1.647	ID	ID	ID	ID	2.068	1.026	ID	ID	ID	ID
Standard Deviation	5.505	0.659	ID	ID	ID	ID	2.229	0.360	ID	ID	ID	ID
Median	3.95	1.94	ID	ID	ID	ID	0.929	1.085	ID	ID	ID	ID
Vinyl Chloride [ug/L]												
No. of Analyses	172	8	104	8	89	8	89	8	23	8	23	8
No. of Detections	160	5	0	0	0	0	89	8	23	8	23	8
Minimum	ND	ND	ND	ND	ND	ND	0.04	0.0368	22.6	11.4	1.78	1.62
Maximum	40	0.0474	ND	ND	ND	ND	1	0.32	53.1	21.9	9.19	6.66
Mean	5.940	0.018	ID	ID	ID	ID	0.314	0.084	32.096	17.463	4.378	4.483
Standard Deviation	8.273	0.015	ID	ID	ID	ID	0.226	0.097	6.498	4.423	2.075	1.512
Median	0.72	0.01485	ID	ID	ID	ID	0.319	0.04655	31.2	18.7	4.09	4.37

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
pH, Field [standard units]				
No. of Analyses	103	8	23	8
No. of Detections	103	8	23	8
Minimum	5.97	6.25	6.51	7.31
Maximum	7.95	6.57	8.95	7.72
Mean	6.82	6.36	7.65	7.58
Standard Deviation	0.33	0.09	0.41	0.16
Median	6.8	6.365	7.73	7.655
Specific Conductance, Field [umhos/cm]				
No. of Analyses	103	8	23	8
No. of Detections	103	8	23	8
Minimum	130.0	144.1	133.2	114.1
Maximum	650.0	156.7	190.4	165.8
Mean	168.9	148.6	173.8	154.2
Standard Deviation	49.8	4.6	10.7	16.6
Median	165	146.6	176	157.85
Alkalinity [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	46.5	50.6	67.5	67.3
Maximum	78	59.1	70.9	69.8
Mean	58.99	54.61	69.22	68.84
Standard Deviation	5.82	2.71	1.10	0.94
Median	59	55.2	69.5	69.1
Ammonia-N [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	10	0	4	0
Minimum	ND	ND	ND	ND
Maximum	0.43	ND	0.005	ND
Mean	0.013	ID	0.003	ID
Standard Deviation	0.044	ID	0.002	ID
Median	0.005	ID	0.003	ID
Chloride [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	3	4.1	2.89	2.86
Maximum	6.23	4.69	3.28	3.1
Mean	4.38	4.33	3.09	3.02
Standard Deviation	0.45	0.19	0.10	0.09
Median	4.29	4.305	3.08	3.055
Nitrate-N [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	101	8	23	8
Minimum	ND	2.71	0.014	0.017
Maximum	8.1	4.41	0.027	0.028
Mean	3.810	3.598	0.020	0.021
Standard Deviation	0.916	0.564	0.003	0.004
Median	3.70	3.48	0.02	0.02
Sulfate [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	6.71	6.19	12.3	13.8
Maximum	11	7.91	13.8	14.6
Mean	8.4	7.0	13.1	14.1
Standard Deviation	0.8	0.5	0.4	0.3
Median	8.315	7.125	13.1	14.1
Total Dissolved Solids [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	54	101	111	115
Maximum	150	128	141	133
Mean	117	116	129	128
Standard Deviation	15	10	6	7
Median	120	118.5	130	130.5

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Arsenic, Dissolved [ug/L]				
No. of Analyses	102	8	23	8
No. of Detections	16	8	23	8
Minimum	ND	0.494	1.6	1.72
Maximum	2.1	0.566	2	2.08
Mean	0.513	0.529	1.751	1.881
Standard Deviation	0.159	0.023	0.105	0.131
Median	0.500	0.531	1.730	1.865
Arsenic, Total [ug/L]				
No. of Analyses	30	8	23	8
No. of Detections	15	8	23	8
Minimum	ND	0.497	1.57	1.69
Maximum	0.523	0.535	1.92	2.09
Mean	0.495	0.517	1.724	1.859
Standard Deviation	0.013	0.014	0.088	0.129
Median	0.500	0.521	1.710	1.850
Calcium, Dissolved [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	9.67	11	10.4	13.6
Maximum	15.9	12.4	14.6	14.7
Mean	11.9	11.8	13.3	14.0
Standard Deviation	1.1	0.4	1.0	0.3
Median	11.9	11.7	13.7	14
Calcium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Minimum	9.51	11.4	11.5	13.8
Maximum	12.5	12.5	14.9	14.7
Mean	11.44	11.85	13.50	14.10
Standard Deviation	0.66	0.38	0.93	0.31
Median	11.6	11.75	13.7	14
Iron, Dissolved [mg/L]				
No. of Analyses	102	8	23	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	0.007	ID	ID	ID
Iron, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	9	1	7	0
Minimum	ND	ND	ND	ND
Maximum	0.0687	0.0137	0.334	ND
Mean	0.012	ID	0.029	ID
Standard Deviation	0.016	ID	0.071	ID
Median	0.005	ID	0.005	ID
Magnesium, Dissolved [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	7.1	9.14	7.95	9.28
Maximum	11.9	9.97	10	9.84
Mean	9.29	9.61	9.25	9.60
Standard Deviation	0.75	0.31	0.57	0.18
Median	9.295	9.66	9.41	9.605
Magnesium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Minimum	8.27	9.17	7.8	9.35
Maximum	10	10	10.3	9.88
Mean	9.24	9.45	9.36	9.56
Standard Deviation	0.44	0.26	0.62	0.15
Median	9.395	9.365	9.62	9.53

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Manganese, Dissolved [ug/L]				
No. of Analyses	102	8	23	8
No. of Detections	4	2	23	8
Minimum	ND	ND	0.639	0.254
Maximum	2.90	1.38	35.60	0.69
Mean	0.49	ID	3.48	0.48
Standard Deviation	0.38	ID	7.18	0.16
Median	0.50	ID	1.51	0.47
Manganese, Total [ug/L]				
No. of Analyses	30	8	23	8
No. of Detections	7	2	23	8
Minimum	ND	ND	1.3	0.61
Maximum	2.2	0.3	243	1.9
Mean	0.41	ID	24	1.113
Standard Deviation	0.47	ID	54	0.475
Median	0.43	ID	5.3	1.050
Potassium, Dissolved [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	0.9	1.07	2.3	2.62
Maximum	1.5	1.21	2.9	2.87
Mean	1.10	1.14	2.66	2.73
Standard Deviation	0.11	0.05	0.16	0.10
Median	1.1	1.14	2.7	2.695
Potassium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Minimum	1.02	1.08	2.49	2.6
Maximum	1.29	1.18	2.97	2.76
Mean	1.14	1.13	2.71	2.69
Standard Deviation	0.06	0.03	0.11	0.06
Median	1.135	1.14	2.7	2.705
Sodium, Dissolved [mg/L]				
No. of Analyses	102	8	23	8
No. of Detections	102	8	23	8
Minimum	4.5	5.64	5.47	5.57
Maximum	7.31	6.7	6.99	6.76
Mean	6.1	6.2	6.3	6.2
Standard Deviation	0.5	0.4	0.4	0.4
Median	6.195	6.22	6.21	6.2
Sodium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Minimum	5.64	5.99	5.22	5.96
Maximum	6.78	6.63	6.88	6.63
Mean	6.27	6.23	6.31	6.24
Standard Deviation	0.28	0.24	0.39	0.25
Median	6.295	6.14	6.44	6.145

Table 3-1 *(continued)*
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]				
No. of Analyses	101	8	23	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	101	8	23	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	101	8	23	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	101	8	23	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
Tetrachloroethene [ug/L]				
No. of Analyses	101	8	23	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	101	8	23	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	101	8	23	8
No. of Detections	11	0	0	0
Minimum	ND	ND	ND	ND
Maximum	0.64	ND	ND	ND
Mean	0.125	ID	ID	ID
Standard Deviation	0.103	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 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Toluene [ug/L]				
No. of Analyses	101	8	23	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	101	8	23	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	101	8	23	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	101	8	23	8
No. of Detections	20	0	0	0
Minimum	ND	ND	ND	ND
Maximum	0.56	ND	ND	ND
Mean	0.143	ID	ID	ID
Standard Deviation	0.113	ID	ID	ID
Median	0.1	ID	ID	ID
Vinyl Chloride [ug/L]				
No. of Analyses	101	8	23	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 2022

	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	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	6.76	7.36	6.59	6.95	6.84	7.13	7.07	7.71	6.65	7.06	6.64	6.47
Maximum	8.38	7.82	8.37	7.46	8.54	7.60	9.20	8.17	7.80	7.54	7.55	6.92
Mean	7.68	7.57	7.44	7.19	7.62	7.35	8.08	7.91	7.50	7.27	6.97	6.70
Standard Deviation	0.30	0.17	0.28	0.19	0.25	0.15	0.30	0.15	0.19	0.17	0.19	0.15
Median	7.75	7.535	7.46	7.15	7.63	7.35	8.125	7.935	7.51	7.305	6.94	6.7
Specific Conductance, Field [umhos/cm]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	100.0	163.9	115.0	102.5	100.0	191.7	136.1	167.7	165.0	206.9	150.0	172.1
Maximum	194.2	176.8	185.0	151.2	230.0	202.9	200.0	179.8	265.0	214.7	210.0	178.4
Mean	162.7	168.2	143.1	138.8	197.0	194.8	173.0	172.0	219.2	210.3	196.0	175.0
Standard Deviation	16.9	5.1	14.4	15.2	23.6	3.5	14.2	3.6	21.8	3.4	11.9	2.5
Median	160	165.45	140	142.1	200	194.15	170	171.8	217.5	209.8	199.4	175.25
Alkalinity [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	58	76.7	30	62	64	82.8	67.2	74.8	88	97.2	67.4	69.6
Maximum	100	79.6	66.3	63.8	110	86.3	86	77.9	140	101	80.2	72.2
Mean	74.09	78.36	58.34	63.06	84.16	84.99	74.59	76.51	99.32	99.33	69.95	70.56
Standard Deviation	4.91	0.91	4.63	0.62	11.67	1.12	3.24	1.07	6.87	1.14	2.57	0.86
Median	73.9	78.35	58.7	63.2	84.5	85.3	74.95	76.3	100	99.65	69.5	70.55
Ammonia-N [mg/L]												
No. of Analyses	102	8	101	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	8	1	88	8	74	8	17	7	4	0
Minimum	0.073	0.225	ND	ND	ND	0.0176	0.03	0.241	ND	ND	ND	ND
Maximum	0.32	0.25	0.06	0.0039	0.2	0.0556	0.3	0.312	0.03	0.0036	0.0587	ND
Mean	0.209	0.235	0.008	ID	0.045	0.032	0.225	0.258	0.008	0.002	0.006	ID
Standard Deviation	0.050	0.007	0.008	ID	0.033	0.011	0.044	0.023	0.007	0.001	0.013	ID
Median	0.21	0.233	0.005	ID	0.0351	0.02945	0.232	0.2535	0.005	0.0025	0.001	ID
Chloride [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	2.7	3.12	2.6	3	3.7	4.43	3	3.49	3.38	3.35	4.58	4.61
Maximum	5	3.44	5	3.25	37.6	4.81	9.11	3.79	5.6	17.4	5.24	5.25
Mean	3.21	3.33	3.09	3.09	5.42	4.58	3.92	3.70	3.85	5.25	4.99	4.94
Standard Deviation	0.32	0.10	0.35	0.08	3.26	0.11	0.77	0.10	0.32	4.91	0.17	0.22
Median	3.125	3.355	3	3.1	5	4.575	3.81	3.73	3.815	3.54	5.03	4.935
Nitrate-N [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	46	6	102	8	35	2	36	7	1	0	23	8
Minimum	ND	ND	0.55	0.638	ND	ND	ND	ND	ND	ND	1.59	1.6
Maximum	0.34	0.024	1.9	0.697	0.81	0.013	0.232	0.028	0.082	ND	2.57	2.05
Mean	0.022	0.015	0.737	0.677	0.023	ID	0.026	0.019	ID	ID	2.115	1.789
Standard Deviation	0.037	0.008	0.138	0.022	0.080	ID	0.030	0.007	ID	ID	0.295	0.168
Median	0.016	0.0155	0.737	0.682	0.01	ID	0.025	0.019	ID	ID	2.15	1.74
Sulfate [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	8.7	10.6	9	9.63	12	16.1	11	13.2	14.9	14.1	12	12
Maximum	14	11.3	12	10.1	24	18.4	14.2	13.7	18	33.2	14	13.7
Mean	10.5	11.0	10.2	9.8	18.7	16.9	13.1	13.4	16.4	17.6	13.1	13.1
Standard Deviation	0.6	0.2	0.5	0.2	2.1	0.7	0.6	0.2	0.9	6.3	0.5	0.7
Median	10.5	11.05	10	9.825	18	16.7	13.05	13.3	16.25	15.9	13.1	13.3
Total Dissolved Solids [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	63	123	53	99.3	80	124	90	124	90	135	129	109
Maximum	160	136	150	117	170	147	450	153	170	159	149	138
Mean	117	131	103	110	134	140	135	137	146	149	137	127
Standard Deviation	16	5	15	6	19	8	41	9	14	9	5	10
Median	120	133	105	111	140	141.5	133	137.5	150	148.5	135	129

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	2.1	4.75	1.7	2.03	0.979	0.94	2	2.89	3.84	3.95	1.11	1.27
Maximum	22	5.12	5.6	2.17	27	1.02	3.41	3.17	8.00	4.25	1.38	1.41
Mean	6.817	4.949	2.110	2.114	3.451	0.978	2.894	3.040	4.555	4.103	1.314	1.324
Standard Deviation	3.011	0.119	0.387	0.050	3.689	0.026	0.392	0.088	0.666	0.120	0.060	0.042
Median	6.090	4.960	2.015	2.130	2.100	0.975	3.000	3.060	4.475	4.130	1.330	1.330
Arsenic, Total [ug/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Minimum	4.55	4.97	1.85	2.05	1.08	1.02	2.94	3.34	3.54	6.45	1.16	1.28
Maximum	5.92	7.31	2.28	2.18	2.11	1.54	10.8	3.76	15.5	18.1	1.78	1.4
Mean	5.143	5.686	2.045	2.105	1.421	1.161	4.330	3.479	7.452	9.904	1.331	1.334
Standard Deviation	0.236	0.731	0.098	0.052	0.240	0.181	1.625	0.152	3.505	4.233	0.112	0.047
Median	5.120	5.430	2.040	2.095	1.350	1.075	3.790	3.455	6.800	7.805	1.310	1.335
Calcium, Dissolved [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	9.2	15.6	7.7	11.1	9.2	14.7	11.2	17.1	13.6	19.3	10.8	13.5
Maximum	18	16.9	13	12.1	19.6	15.5	18.7	18.6	23	21.4	14.6	14.3
Mean	13.4	16.0	10.1	11.7	14.2	15.1	16.0	17.7	18.7	19.9	13.4	13.8
Standard Deviation	1.7	0.4	1.2	0.3	1.9	0.2	1.4	0.5	1.5	0.6	0.9	0.3
Median	13.1	15.85	9.9	11.7	14.5	15.1	15.95	17.75	18.65	19.8	13.6	13.65
Calcium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Minimum	12.2	15.7	7.97	11.4	13.5	14.9	14.9	17.6	17.6	19.6	11.9	13.5
Maximum	16.8	16.3	12.8	11.8	16.8	15.7	19.1	18.1	22.2	21.2	14.9	14.2
Mean	14.97	15.99	10.98	11.61	15.09	15.33	17.22	17.83	19.90	20.16	13.64	13.80
Standard Deviation	1.19	0.19	1.10	0.16	0.79	0.23	1.19	0.18	1.16	0.49	0.71	0.23
Median	15.4	16	11.2	11.6	15.2	15.3	17.6	17.85	20	20	13.7	13.85
Iron, Dissolved [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	73	8	51	1	101	8	74	8	74	8	0	0
Minimum	ND	0.0124	ND	ND	ND	0.0139	0.033	0.0908	0.29	0.666	ND	ND
Maximum	0.22	0.0344	0.42	0.01	0.191	0.0766	0.23	0.115	0.975	0.804	ND	ND
Mean	0.04	0.02	0.03	ID	0.06	0.05	0.10	0.10	0.70	0.74	ID	ID
Standard Deviation	0.04	0.01	0.06	ID	0.04	0.02	0.04	0.01	0.13	0.04	ID	ID
Median	0.0305	0.0187	0.007	ID	0.047	0.048	0.0969	0.09835	0.7195	0.7415	ID	ID
Iron, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	30	8	19	4	31	8	31	8	31	8	14	2
Minimum	ND	0.112	ND	ND	0.0607	0.107	0.14	0.45	0.729	1.63	ND	ND
Maximum	0.193	0.854	0.937	0.0204	1.09	0.86	10.5	1.01	5.85	6.09	1.38	0.0909
Mean	0.050	0.299	0.064	0.012	0.323	0.268	2.358	0.678	2.262	3.024	0.098	ID
Standard Deviation	0.049	0.247	0.176	0.008	0.254	0.255	2.767	0.203	1.509	1.595	0.296	ID
Median	0.032	0.1855	0.01445	0.0106	0.245	0.172	1.48	0.6525	1.73	2.255	0.0128	ID
Magnesium, Dissolved [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	6.3	9.6	6.2	9.6	8.4	13.6	5.4	6.89	10	13.7	10.8	11.8
Maximum	11	10.5	10.1	9.99	17.1	14.7	8.06	7.77	16.2	14.8	13.7	12.8
Mean	8.37	9.99	8.00	9.77	12.87	14.05	6.79	7.36	13.21	14.34	12.09	12.29
Standard Deviation	0.95	0.29	1.02	0.13	1.87	0.33	0.64	0.26	1.37	0.34	0.74	0.37
Median	8.3	9.975	7.85	9.745	13	14.05	6.79	7.35	13.4	14.4	12.1	12.2
Magnesium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Minimum	7.81	9.83	7.86	9.21	12.2	13.7	6.13	7.21	11.9	13.9	11	11.7
Maximum	11.1	10.2	10.7	9.78	16	14.6	9.59	7.62	15.9	15.1	13.4	12.6
Mean	9.39	9.98	9.24	9.50	14.29	14.08	7.49	7.41	14.28	14.34	12.18	12.31
Standard Deviation	0.94	0.13	0.83	0.17	0.90	0.32	0.72	0.15	0.89	0.41	0.57	0.29
Median	9.62	10	9.34	9.49	14.5	13.95	7.51	7.475	14.4	14.4	12.3	12.35

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	102	8	102	8	102	8	74	8	74	8	23	8
No. of Detections	100	8	5	3	101	8	74	8	74	8	16	3
Minimum	ND	110	ND	ND	ND	317	42	57.7	67.8	81.9	ND	ND
Maximum	255	149	140	2.4	1350	533	85	64	123	101	16	0.19
Mean	141	136	1.9	0.44	439	471	64	61	93	92	0.95	0.09
Standard Deviation	33	13	14	0.81	185	65	7.5	2.6	7.9	6.8	3.2	0.06
Median	142	138	0.50	0.05	473	489.00	64	61	92	90	0.23	0.05
Manganese, Total [ug/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	18	8	31	8	31	8	31	8	22	8
Minimum	147	187	ND	0.13	441	487	53	66	85	89	ND	0.133
Maximum	557	849	15	2.8	863	653	203	91	211	270	50	2.9
Mean	220	329	1.2	0.67	550	541	87	72	111	142	4.5	0.62
Standard Deviation	85	218	2.8	0.89	87	52	33	7.9	29	63	11	0.94
Median	188	275	0.50	0.30	522	522	78	69	101	108	0.56	0.26
Potassium, Dissolved [mg/L]												
No. of Analyses	102	8	102	8	103	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	103	8	74	8	74	8	23	8
Minimum	1.6	2.63	1.40	1.74	1.70	2.26	2.10	2.82	1.55	2.02	1.35	1.46
Maximum	3.6	2.97	2.30	1.92	3.30	2.54	3.30	3.24	2.50	2.31	1.68	1.64
Mean	2.57	2.76	1.74	1.83	2.42	2.38	2.88	3.03	2.07	2.13	1.55	1.54
Standard Deviation	0.28	0.12	0.17	0.07	0.23	0.10	0.23	0.15	0.18	0.09	0.08	0.08
Median	2.56	2.72	1.78	1.83	2.44	2.34	2.92	3.00	2.11	2.12	1.54	1.52
Potassium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Minimum	2.12	2.67	1.67	1.76	2.29	2.31	2.76	2.94	2.02	2.09	1.46	1.47
Maximum	2.95	2.83	2.08	1.91	2.86	2.59	3.37	3.18	2.36	2.27	1.80	1.64
Mean	2.70	2.72	1.84	1.81	2.50	2.43	3.07	3.05	2.19	2.16	1.59	1.52
Standard Deviation	0.16	0.06	0.10	0.05	0.11	0.09	0.16	0.09	0.10	0.06	0.08	0.05
Median	2.7	2.7	1.84	1.80	2.47	2.42	3.06	3.02	2.18	2.14	1.58	1.51
Sodium, Dissolved [mg/L]												
No. of Analyses	102	8	102	8	102	8	74	8	74	8	23	8
No. of Detections	102	8	102	8	102	8	74	8	74	8	23	8
Minimum	4.77	5.68	4.3	5.22	4.8	6.07	6.5	8.42	5.08	6.02	5.9	5.81
Maximum	7.5	6.44	10	6.01	7.54	7.04	9.73	10.1	7.56	6.9	7.46	7.11
Mean	5.9	6.1	5.5	5.7	6.4	6.7	8.2	9.3	6.2	6.5	6.7	6.5
Standard Deviation	0.5	0.3	0.9	0.3	0.6	0.3	0.8	0.6	0.5	0.3	0.4	0.4
Median	5.995	6.155	5.4	5.88	6.4	6.77	8.3	9.335	6.245	6.44	6.74	6.545
Sodium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Minimum	5.36	5.89	5.02	5.37	6.09	6.49	7.06	8.63	5.33	6.16	5.92	6.22
Maximum	6.96	6.6	6.74	5.98	8.01	7.1	10.1	10	7.1	6.83	7.25	7.15
Mean	6.09	6.19	5.92	5.66	6.93	6.77	8.70	9.34	6.55	6.53	6.69	6.68
Standard Deviation	0.46	0.26	0.43	0.24	0.43	0.23	0.76	0.40	0.41	0.24	0.37	0.34
Median	6.13	6.115	5.935	5.695	7.04	6.76	8.8	9.38	6.58	6.52	6.76	6.55

Table 3-1 ***(continued)***
Summary of Statistical Analyses for Groundwater Well Samples
Vashon Island Closed Landfill
1986 through 2022

	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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
Tetrachloroethene [ug/L]												
No. of Analyses	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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 2022

	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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	102	8	103	8	103	8	74	8	74	8	23	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 2022

	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	I	D	--	--	--
Specific Conductance, Field [umhos/cm]	D	D	I	--	D	--
Alkalinity [mg/L]	D	D	--	--	D	--
Ammonia-N [mg/L]	--[a]	D	--[a]	--	--	--
Chloride [mg/L]	D	--	I	--	--	--
Nitrate-N [mg/L]	--	I	I	--	I	--
Sulfate [mg/L]	D	--	D	--	D	--
Total Dissolved Solids [mg/L]	D	D	I	--	D	--
Arsenic, Dissolved [ug/L]	D	D	D	--	I	--
Arsenic, Total [ug/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]	D	--	I	--	--	--
Manganese, Dissolved [ug/L]	D	D	D	--	--	--
Manganese, Total [ug/L]	--	--	D	--	D	--
Potassium, Dissolved [mg/L]	D	D	I	--	--	--
Potassium, Total [mg/L]	D	--	--	--	D	--
Sodium, Dissolved [mg/L]	D	D	I	--	--	--
Sodium, Total [mg/L]	D	I	I	--	--	--
1,1-Dichloroethane [ug/L]	--	D	--	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--
Benzene [ug/L]	--	--	--	--	--	--
Chloroethane [ug/L]	--	--[a]	--	--	--	--
Tetrachloroethene [ug/L]	D	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--
Dichlorodifluoromethane [ug/L]	--	D	--	--	--	--
Toluene [ug/L]	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]	D	D	--	--	--	--
Vinyl Chloride [ug/L]	--	D	--	--	--	--

Table 3-2 *(continued)*
Summary of Trend Results for Groundwater Well
Samples Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2022

	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]	--	--	D	--	D	--	--	--	--	--	D	--
Specific Conductance, Field [umhos/cm]	D	D	I	--	I	--	D	--	D	--	D	D
Alkalinity [mg/L]	D	--	I	--	--	--	D	D	D	--	D	D
Ammonia-N [mg/L]	--[a]	--	--	--	--	--	I	--	D	--	D	--
Chloride [mg/L]	D	D	--	--	D	--	D	--	D	--	D	D
Nitrate-N [mg/L]	--	--	I	I	--[a]	--	I	--	--	--	--	--
Sulfate [mg/L]	--	D	D	--	D	--	--	--	I	--	I	--
Total Dissolved Solids [mg/L]	D	--	I	--	I	--	D	--	D	--	D	D
Arsenic, Dissolved [ug/L]	--	--	--	--	I	--	--	--	D	--	--	--
Arsenic, Total [ug/L]	I	--	I	--	I	--	--	D	--	--	I	--
Calcium, Dissolved [mg/L]	D	--	I	--	I	--	D	D	D	--	--	D
Calcium, Total [mg/L]	D	--	I	--	--	--	--	D	D	--	--	D
Iron, Dissolved [mg/L]	D	--	D	--	I	--	D	--	D	D	I	D
Iron, Total [mg/L]	D	--	--	--	I	D	I	D	D	D	I	D
Magnesium, Dissolved [mg/L]	D	--	I	--	I	--	D	D	D	--	--	D
Magnesium, Total [mg/L]	D	D	--	I	I	--	--	--	D	--	--	--
Manganese, Dissolved [ug/L]	--	--	D	--	--	--	--	D	D	--	--	D
Manganese, Total [ug/L]	--	--	--	--	D	--	--	--	D	--	--	D
Potassium, Dissolved [mg/L]	D	--	I	--	--	--	D	D	--	--	--	--
Potassium, Total [mg/L]	D	--	--	--	--	--	--	--	--	--	D	--
Sodium, Dissolved [mg/L]	--	--	I	--	--	--	--	--	--	--	--	--
Sodium, Total [mg/L]	--	--	I	--	I	--	--	--	--	--	--	--
1,1-Dichloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	D	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--	--	--	D	--	D	--
Benzene [ug/L]	--	--	--	--	--	--	--	--	D	--	D	D
Chloroethane [ug/L]	--	--	--	--	--	--	--	--	D	--	--	--
Tetrachloroethene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	I	--	--	--	--	--	D	--	--	D	--
Dichlorodifluoromethane [ug/L]	D	--	--	--	I	--	D	--	--	--	--	--
Toluene [ug/L]	--	--	--	--	--	--	--	--	D	--	--[a]	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	D	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--	--	--	I	--	--	--
Trichlorofluoromethane [ug/L]	D	--	--	--	--	--	D	--	--	--	--	--
Vinyl Chloride [ug/L]	D	--	--	--	--	--	D	--	D	--	--	--

Table 3-2 *(continued)*
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2022

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

Table 3-2 ***(continued)***
Summary of Trend Results for Groundwater Well Samples
Summary of Trend Analysis
Vashon Island Closed Landfill
1986 through 2022

	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	I	D	--	D	--	D	--	--	--
Specific Conductance, Field [umhos/cm]	I	--	I	D	--	--	I	--	I	D	D	--
Alkalinity [mg/L]	I	--	I	--	D	--	--	--	--	--	D	--
Ammonia-N [mg/L]	--	--	--[a]	--	D	--	I	--	--[a]	--	D	--
Chloride [mg/L]	--	--	I	--	D	--	--	--	D	D	--	--
Nitrate-N [mg/L]	--	I	--	D	D	--	D	--	--	--	--	I
Sulfate [mg/L]	I	--	--	--	D	--	--	--	D	--	--	--
Total Dissolved Solids [mg/L]	I	--	I	--	D	--	I	--	I	--	--	--
Arsenic, Dissolved [ug/L]	D	--	D	--	D	--	D	--	D	--	--	--
Arsenic, Total [ug/L]	--	I	--	--	--	--	I	--	--	--	--	I
Calcium, Dissolved [mg/L]	I	--	I	--	--	--	I	--	I	--	--	--
Calcium, Total [mg/L]	I	--	I	--	--	--	--	--	I	--	--	--
Iron, Dissolved [mg/L]	I	--	D	--	--	--	I	I	I	--	--	--
Iron, Total [mg/L]	I	I	--	--	I	--	I	--	I	--	D	--
Magnesium, Dissolved [mg/L]	I	--	I	--	--	--	I	--	I	--	--	--
Magnesium, Total [mg/L]	I	--	I	--	--	--	I	--	I	--	I	D
Manganese, Dissolved [ug/L]	I	--	D	--	D	--	I	--	--	--	D	--
Manganese, Total [ug/L]	I	--	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	--
Sodium, Total [mg/L]	I	--	I	--	--	--	--	--	I	--	I	--
1,1-Dichloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Benzene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Toluene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
***trans*-1,2-Dichloroethene [ug/L]**	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethene [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride [ug/L]	--	--	--	--	--	--	--	--	--	--	--	--

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
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 2022

	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	38	50	50	8	50	8
No. of Detections	38	50	50	8	50	8
Trend	D	**I**	D	--	--	--
S-value	-304	261	-369	2	-62	4
Probability	0.000139	0.029564	0.002066	0.901539	0.609676	0.710523
Significant	YES	YES	YES	NO	NO	NO
Specific Conductance, Field [umhos/cm]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	38	50	50	8	50	8
Trend	D	D	**I**	--	D	--
S-value	-458	-772	470	-1	-406	-4
Probability	8.41E-09	1.12E-10	8.06E-05	1	0.000692	0.710523
Significant	YES	YES	YES	NO	YES	NO
Alkalinity [mg/L]						
No. of Analyses	31	34	50	8	50	8
No. of Detections	31	34	50	8	50	8
Trend	D	D	--	--	D	--
S-value	-296	-265	-182	11	-708	12
Probability	5.18E-07	9.06E-05	0.129832	0.212486	3.3E-09	0.173546
Significant	YES	YES	NO	NO	YES	NO
Ammonia-N [mg/L]						
No. of Analyses	37	50	50	8	50	8
No. of Detections	11	23	9	0	1	0
Trend	--[a]	D	--[a]	--	--	--
S-value	-448	-740	-679	0	-617	0
Probability	1.95E-09	4.18E-10	6.66E-10	NaN	9.73E-10	NaN
Significant	YES	YES	YES	--	--	--
Chloride [mg/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	38	49	50	8	50	8
Trend	D	--	**I**	--	--	--
S-value	-339	-40	248	-9	-90	2
Probability	2.02E-05	0.743809	0.038597	0.318567	0.456144	0.901539
Significant	YES	NO	YES	NO	NO	NO
Nitrate-N [mg/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	38	38	50	8	50	8
Trend	--	**I**	**I**	--	**I**	--
S-value	8	582	826	1	535	0
Probability	0.929795	1.01E-06	5.1E-12	1	7.94E-06	1
Significant	NO	YES	YES	NO	YES	NO
Sulfate [mg/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	38	50	50	8	50	8
Trend	D	--	D	--	D	--
S-value	-541	-64	-534	2	-905	-4
Probability	1.06E-11	0.598054	8.2E-06	0.901539	3.84E-14	0.710523
Significant	YES	NO	YES	NO	YES	NO
Total Dissolved Solids [mg/L]						
No. of Analyses	33	50	50	8	50	8
No. of Detections	33	50	50	8	50	8
Trend	D	D	**I**	--	D	--
S-value	-243	-715	401	-8	-502	-6
Probability	0.000175	2.3E-09	0.000799	0.37908	2.67E-05	0.520912
Significant	YES	YES	YES	NO	YES	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Arsenic, Dissolved [ug/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	5	23	50	8	50	8
Trend	D	D	D	--	I	--
S-value	-421	-535	-244	0	444	7
Probability	7.38E-09	1.08E-06	0.04184	1	0.000209	0.454427
Significant	YES	YES	YES	NO	YES	NO
Arsenic, Total [ug/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	11	18	29	8	32	8
Trend	D	--	--	--	I	--
S-value	-55	5	12	14	192	5
Probability	0.014473	0.888388	0.836033	0.095108	0.001922	0.617989
Significant	YES	NO	NO	NO	YES	NO
Calcium, Dissolved [mg/L]						
No. of Analyses	32	44	50	8	50	8
No. of Detections	32	44	50	8	50	8
Trend	D	D	I	--	--	--
S-value	-292	-557	668	14	-168	-8
Probability	2.32E-06	1.86E-08	2.4E-08	0.107762	0.161969	0.386476
Significant	YES	YES	YES	NO	NO	NO
Calcium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Trend	D	I	I	--	--	--
S-value	-80	98	154	9	-47	4
Probability	0.000375	0.000661	0.004092	0.318567	0.455516	0.710523
Significant	YES	YES	YES	NO	NO	NO
Iron, Dissolved [mg/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	21	26	6	0	18	1
Trend	D	D	D	--	--	--
S-value	-399	-428	-237	0	-18	5
Probability	2.73E-07	0.000232	0.000445	NaN	0.868159	0.382733
Significant	YES	YES	YES	--	NO	--
Iron, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	14	18	2	29	2
Trend	--	D	D	--	D	--
S-value	-21	-97	-125	1	-281	3
Probability	0.367395	0.00069	0.016332	1	5.55E-06	0.742308
Significant	NO	YES	YES	--	YES	--
Magnesium, Dissolved [mg/L]						
No. of Analyses	32	44	50	8	50	8
No. of Detections	32	44	50	8	50	8
Trend	--	D	I	--	--	--
S-value	-49	-589	636	10	-130	2
Probability	0.435715	2.71E-09	1.08E-07	0.26551	0.278954	0.900004
Significant	NO	YES	YES	NO	NO	NO
Magnesium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Trend	D	--	I	--	--	--
S-value	-56	44	116	0	-69	1
Probability	0.013091	0.131772	0.030854	1	0.26954	1
Significant	YES	NO	YES	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc1					
Well Location	MW-3	MW-4	MW-10		MW-13	
Time Interval	Long	Long	Long	Short	Long	Short
Manganese, Dissolved [ug/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	31	43	7	2	26	7
Trend	D	D	D	--	--	--
S-value	-392	-509	-580	13	66	10
Probability	8.07E-07	2.12E-05	1.92E-08	0.04852	0.571475	0.26551
Significant	YES	YES	YES	--	NO	NO
Manganese, Total [ug/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	20	6	29	8
Trend	--	--	D	--	D	--
S-value	-16	-27	-216	9	-227	-6
Probability	0.499461	0.36302	4.13E-05	0.318567	0.000246	0.536187
Significant	NO	NO	YES	NO	YES	NO
Potassium, Dissolved [mg/L]						
No. of Analyses	32	44	50	8	50	8
No. of Detections	32	44	50	8	50	8
Trend	D	D	**I**	--	--	--
S-value	-398	-628	465	7	-13	-3
Probability	1.18E-10	2.07E-10	0.000102	0.454427	0.919925	0.803089
Significant	YES	YES	YES	NO	NO	NO
Potassium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Trend	D	--	--	--	D	--
S-value	-87	16	16	-6	-202	-3
Probability	0.000106	0.599062	0.777994	0.52982	0.001103	0.803089
Significant	YES	NO	NO	NO	YES	NO
Sodium, Dissolved [mg/L]						
No. of Analyses	32	44	50	8	50	8
No. of Detections	32	44	50	8	50	8
Trend	D	D	**I**	--	--	--
S-value	-206	-563	626	-8	141	-16
Probability	0.000883	1.27E-08	1.7E-07	0.386476	0.241468	0.063487
Significant	YES	YES	YES	NO	NO	NO
Sodium, Total [mg/L]						
No. of Analyses	16	19	29	8	32	8
No. of Detections	16	19	29	8	32	8
Trend	D	**I**	**I**	--	--	--
S-value	-74	66	122	-14	-36	-5
Probability	0.001014	0.022879	0.023127	0.107762	0.569985	0.617989
Significant	YES	YES	YES	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	38	50	50	8	50	8
No. of Detections	0	17	0	0	0	0
Trend	--	D	--	--	--	--
S-value	0	-733	0	0	0	0
Probability	NaN	2.91E-10	NaN	NaN	NaN	NaN
Significant	--	YES	--	--	--	--
1,2-Dichloropropane [ug/L]						
No. of Analyses	38	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	38	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	38	50	50	8	50	8
No. of Detections	0	6	0	0	0	0
Trend	--	--[a]	--	--	--	--
S-value	0	-756	0	0	0	0
Probability	NaN	1.83E-11	NaN	NaN	NaN	NaN
Significant	--	YES	--	--	--	--
Tetrachloroethene [ug/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	7	0	0	0	0	0
Trend	D	--	--	--	--	--
S-value	-368	0	0	0	0	0
Probability	1.23E-06	NaN	NaN	NaN	NaN	NaN
Significant	YES	--	--	--	--	--
***cis*-1,2-Dichloroethene [ug/L]**						
No. of Analyses	35	50	50	8	50	8
No. of Detections	0	27	0	0	0	0
Trend	--	--	--	--	--	--
S-value	0	111	0	0	0	0
Probability	NaN	0.353874	NaN	NaN	NaN	NaN
Significant	--	NO	--	--	--	--
Dichlorodifluoromethane [ug/L]						
No. of Analyses	31	35	50	8	50	8
No. of Detections	0	12	0	0	0	0
Trend	--	D	--	--	--	--
S-value	0	-378	0	0	0	0
Probability	NaN	7.42E-09	NaN	NaN	NaN	NaN
Significant	--	YES	--	--	--	--

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	38	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	37	50	50	8	50	8
No. of Detections	0	1	0	0	0	0
Trend	--	--	--	--	--	--
S-value	0	-686	0	0	0	0
Probability	NaN	2.6E-10	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--	--
Trichloroethene [ug/L]						
No. of Analyses	38	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	32	45	50	8	50	8
No. of Detections	16	27	0	0	0	0
Trend	D	D	--	--	--	--
S-value	-135	-557	0	0	0	0
Probability	0.026798	3.49E-08	NaN	NaN	NaN	NaN
Significant	YES	YES	--	--	--	--
Vinyl Chloride [ug/L]						
No. of Analyses	38	50	50	8	50	8
No. of Detections	0	15	0	0	0	0
Trend	--	D	--	--	--	--
S-value	0	-796	0	0	0	0
Probability	NaN	6.66E-12	NaN	NaN	NaN	NaN
Significant	--	YES	--	--	--	--

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	--	--	D	--	D	--	--	--	--	--	D	--
S-value	127	4	-333	2	-588	11	-27	4	-17	9	-82	11
Probability	0.291569	0.710523	0.005422	0.901539	9.02E-07	0.212486	0.827699	0.710523	0.671964	0.318567	0.032074	0.212486
Significant	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO
Specific Conductance, Field [umhos/cm]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	D	I	--	I	--	D	--	D	--	D	D
S-value	-655	-20	461	14	379	-6	-322	-16	-218	-9	-151	-20
Probability	4.42E-08	0.018741	0.000112	0.107762	0.001507	0.536187	0.007205	0.063487	9.86E-09	0.318567	7.45E-05	0.018741
Significant	YES	YES	YES	NO	YES	NO	YES	NO	YES	NO	YES	YES
Alkalinity [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	--	I	--	--	--	D	D	D	--	D	D
S-value	-927	-7	244	8	196	-13	-758	-21	-226	-2	-193	-18
Probability	9.33E-15	0.454427	0.042037	0.386476	0.102799	0.126484	2.37E-10	0.012649	2.77E-09	0.901539	3.89E-07	0.035448
Significant	YES	NO	YES	NO	NO	NO	YES	YES	YES	NO	YES	YES
Ammonia-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	11	0	2	0	46	8	35	8	23	8	23	8
Trend	--[a]	--	--	--	--	--	I	--	D	--	D	--
S-value	-460	0	-622	0	130	11	239	-12	-118	1	-77	-14
Probability	1.32E-05	NaN	1.34E-09	NaN	0.280294	0.212486	0.044365	0.166905	0.001994	1	0.044431	0.107762
Significant	YES	--	--	--	NO	NO	YES	NO	YES	NO	YES	NO
Chloride [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	D	--	--	D	--	D	--	D	--	D	D
S-value	-608	-18	192	6	-654	-3	-817	-5	-224	14	-122	-22
Probability	3.81E-07	0.035448	0.109992	0.536187	4.6E-08	0.803089	8.52E-12	0.610492	3.83E-09	0.107762	0.00139	0.009375
Significant	YES	YES	NO	NO	YES	NO	YES	NO	YES	NO	YES	YES
Nitrate-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	39	8	49	8	11	0	50	8	2	0	1	0
Trend	--	--	I	I	--[a]	--	I	--	--	--	--	--
S-value	-208	-6	743	18	-205	0	352	-14	13	-7	1	-17
Probability	0.081555	0.536187	5.4E-10	0.035448	0.030429	NaN	0.003319	0.107762	0.585312	NaN	1	NaN
Significant	NO	NO	YES	YES	YES	--	YES	NO	--	--	--	--
Sulfate [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	--	D	D	--	D	--	--	--	I	--	I	--
S-value	-53	-17	-528	7	-338	-1	-161	-11	108	-1	176	10
Probability	0.663317	0.046063	1.01E-05	0.454427	0.00472	1	0.180468	0.212486	0.004642	1	3.72E-06	0.26551
Significant	NO	YES	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO
Total Dissolved Solids [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	--	I	--	I	--	D	--	D	--	D	D
S-value	-722	-6	374	5	392	-9	-717	-11	-193	-2	-143	-25
Probability	1.61E-09	0.536187	0.001766	0.617989	0.001052	0.310926	2.09E-09	0.212486	3.89E-07	0.901539	0.000175	0.00277
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	YES

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	34	8	50	8	50	8	43	8	23	8	23	8
Trend	--	--	--	--	I	--	--	--	D	--	--	--
S-value	-210	-2	-93	-13	445	10	62	4	-85	-6	27	-16
Probability	0.075078	0.901539	0.440895	0.134625	0.000202	0.26551	0.609207	0.710523	0.026417	0.536187	0.491987	0.063487
Significant	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO
Arsenic, Total [ug/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	16	8	31	8	31	8	28	8	23	8	23	8
Trend	I	--	I	--	I	--	--	D	--	--	I	--
S-value	135	-4	160	-9	272	-8	114	-24	-37	-7	107	-10
Probability	0.021448	0.710523	0.006694	0.318567	4.09E-06	0.386476	0.054654	0.004434	0.341718	0.454427	0.005046	0.26551
Significant	YES	NO	YES	NO	YES	NO	NO	YES	NO	NO	YES	NO
Calcium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	--	I	--	I	--	D	D	D	--	--	D
S-value	-613	-8	525	12	511	-12	-561	-19	-89	-2	24	-22
Probability	3.03E-07	0.386476	1.13E-05	0.173546	1.91E-05	0.166905	2.79E-06	0.024822	0.020032	0.901539	0.543418	0.009375
Significant	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO	NO	YES
Calcium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Trend	D	--	I	--	--	--	--	D	D	--	--	D
S-value	-192	-2	147	16	38	-13	-72	-17	-161	0	-58	-18
Probability	0.001159	0.897842	0.01297	0.063487	0.528422	0.111961	0.22706	0.046063	2.38E-05	1	0.132087	0.035448
Significant	YES	NO	YES	NO	NO	NO	NO	YES	YES	NO	NO	YES
Iron, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	3	1	4	0	30	8	50	8	23	8	23	8
Trend	D	--	D	--	I	--	D	--	D	D	I	D
S-value	-100	5	-118	0	606	-15	-360	-10	-168	-23	108	-28
Probability	0.043327	0.382733	0.036702	NaN	1.62E-07	0.080905	0.002673	0.26551	1.01E-05	0.006091	0.004604	0.000837
Significant	YES	--	YES	--	YES	NO	YES	NO	YES	YES	YES	YES
Iron, Total [mg/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	18	1	22	1	30	8	31	8	23	8	23	8
Trend	D	--	--	--	I	D	I	D	D	D	I	D
S-value	-159	5	-105	-1	219	-20	168	-22	-179	-19	159	-18
Probability	0.007288	0.382733	0.073198	1	0.00021	0.018741	0.004528	0.009375	2.55E-06	0.024822	2.93E-05	0.035448
Significant	YES	--	NO	--	YES	YES	YES	YES	YES	YES	YES	YES
Magnesium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	--	I	--	I	--	D	D	D	--	--	D
S-value	-742	-16	568	15	577	-7	-559	-18	-119	-2	-54	-20
Probability	5.67E-10	0.059451	2.07E-06	0.080905	1.42E-06	0.444833	3.02E-06	0.035448	0.001817	0.901539	0.16105	0.018741
Significant	YES	NO	YES	NO	YES	NO	YES	YES	YES	NO	NO	YES
Magnesium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Trend	D	D	--	I	I	--	--	--	D	--	--	--
S-value	-229	-21	107	17	123	-5	-55	-15	-99	-5	-28	-16
Probability	0.000105	0.012649	0.070786	0.046063	0.037879	0.617989	0.358581	0.080905	0.009597	0.617989	0.475641	0.063487
Significant	YES	YES	NO	YES	YES	NO	NO	NO	YES	NO	NO	NO

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	49	8	6	0	50	8	50	8	23	8	23	8
Trend	--	--	D	--	--	--	--	D	D	--	--	D
S-value	158	8	-651	0	117	3	112	-18	-111	-13	55	-25
Probability	0.188979	0.386476	1.44E-10	NaN	0.331885	0.803089	0.353098	0.035448	0.003616	0.134625	0.153246	0.00277
Significant	NO	NO	YES	--	NO	NO	NO	YES	YES	NO	NO	YES
Manganese, Total [ug/L]												
No. of Analyses	32	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	32	8	24	6	31	8	31	8	23	8	23	8
Trend	--	--	--	--	D	--	--	--	D	--	--	D
S-value	15	12	-112	1	-264	-1	89	-16	-155	-8	16	-25
Probability	0.820377	0.173546	0.057591	1	7.8E-06	1	0.134736	0.063487	4.62E-05	0.386476	0.691887	0.00277
Significant	NO	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	YES
Potassium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	D	--	I	--	--	--	D	D	--	--	--	--
S-value	-429	-7	511	3	122	-7	-495	-20	-7	-6	-42	0
Probability	0.000338	0.454427	1.95E-05	0.803089	0.310999	0.454427	3.56E-05	0.018741	0.873918	0.536187	0.277259	1
Significant	YES	NO	YES	NO	NO	NO	YES	YES	NO	NO	NO	NO
Potassium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Trend	D	--	--	--	--	--	--	--	--	--	D	--
S-value	-194	-3	26	13	-54	11	-80	-7	-66	2	-77	3
Probability	0.001028	0.803089	0.670678	0.126484	0.367158	0.212486	0.179049	0.454427	0.085709	0.901539	0.04458	0.803089
Significant	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
Sodium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	23	8	23	8
Trend	--	--	I	--	--	--	--	--	--	--	--	--
S-value	-159	-8	557	-4	-61	-6	92	-3	-37	-11	66	-13
Probability	0.186224	0.386476	3.29E-06	0.710523	0.615637	0.52982	0.445564	0.803089	0.340705	0.212486	0.085709	0.134625
Significant	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
Sodium, Total [mg/L]												
No. of Analyses	31	8	31	8	31	8	31	8	23	8	23	8
No. of Detections	31	8	31	8	31	8	31	8	23	8	23	8
Trend	--	--	I	--	I	--	--	--	--	--	--	--
S-value	-80	-16	142	6	129	-12	44	-3	-15	-15	63	-15
Probability	0.179175	0.063487	0.016537	0.536187	0.029543	0.173546	0.46295	0.803089	0.710217	0.080905	0.10106	0.080905
Significant	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	23	8	23	8
Trend	--	--	--	--	--	--	--	--	--	--	D	--
S-value	0	0	0	0	0	0	0	0	-56	-12	-94	-15
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.146201	0.173546	0.014009	0.080905
Significant	--	--	--	--	--	--	--	--	NO	NO	YES	NO
1,2-Dichloropropane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	23	8	23	8
Trend	--	--	--	--	--	--	--	--	D	--	D	--
S-value	0	0	0	0	0	0	0	0	-81	-16	-114	-14
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.034615	0.063487	0.002832	0.107762
Significant	--	--	--	--	--	--	--	--	YES	NO	YES	NO
Benzene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	23	8	23	8
Trend	--	--	--	--	--	--	--	--	D	--	D	D
S-value	0	0	0	0	0	0	0	0	-140	-14	-101	-20
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.00024	0.107762	0.008265	0.018741
Significant	--	--	--	--	--	--	--	--	YES	NO	YES	YES
Chloroethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	20	2	0	1
Trend	--	--	--	--	--	--	--	--	D	--	--	--
S-value	0	0	0	0	0	0	0	0	-112	-1	0	-5
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.003362	1	NaN	0.382733
Significant	--	--	--	--	--	--	--	--	YES	--	--	--
Tetrachloroethene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	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	23	8	23	8
No. of Detections	13	6	0	0	0	0	50	8	23	8	23	8
Trend	--	**I**	--	--	--	--	--	D	--	--	D	--
S-value	183	23	0	0	0	0	-186	-20	-61	-16	-92	-13
Probability	0.075325	0.006091	NaN	NaN	NaN	NaN	0.121669	0.018741	0.113051	0.063487	0.016208	0.134625
Significant	NO	YES	--	--	--	--	NO	YES	NO	NO	YES	NO
Dichlorodifluoromethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	0	0	23	5	50	8	23	8	23	8
Trend	D	--	--	--	**I**	--	D	--	--	--	--	--
S-value	-580	-8	0	0	445	-15	-643	-12	-22	0	-10	-10
Probability	1.27E-06	0.386476	NaN	NaN	5.02E-05	0.074619	7.85E-08	0.173546	0.579022	1	0.812054	0.26551
Significant	YES	NO	--	--	YES	NO	YES	NO	NO	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	1	0	0	0	6	1	7	0
Trend	--	--	--	--	--	--	--	--	D	--	--[a]	--
S-value	0	0	0	0	-551	0	0	0	-140	-5	-84	0
Probability	NaN	NaN	NaN	NaN	1.25E-08	NaN	NaN	NaN	2.67E-05	0.382733	0.020117	NaN
Significant	--	--	--	--	--	--	--	--	YES	--	YES	--
***trans*-1,2-Dichloroethene [ug/L]**												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	8	0	23	8	23	8
Trend	--	--	--	--	--	--	--	--	D	--	--	--
S-value	0	0	0	0	0	0	-41	0	-91	-5	-32	-10
Probability	NaN	NaN	NaN	NaN	NaN	NaN	0.678046	NaN	0.017457	0.617989	0.412454	0.26551
Significant	--	--	--	--	--	--	NO	--	YES	NO	NO	NO
Trichloroethene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	0	0	0	0	0	0	0	0	13	7	23	8
Trend	--	--	--	--	--	--	--	--	**I**	--	--	--
S-value	0	0	0	0	0	0	0	0	85	8	41	-14
Probability	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.023057	0.386476	0.290103	0.107762
Significant	--	--	--	--	--	--	--	--	YES	NO	NO	NO
Trichlorofluoromethane [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	8	0	0	0	0	50	8	0	0	0	0
Trend	D	--	--	--	--	--	D	--	--	--	--	--
S-value	-664	-12	0	0	0	0	-602	-6	0	0	0	0
Probability	2.92E-08	0.173546	NaN	NaN	NaN	NaN	4.97E-07	0.536187	NaN	NaN	NaN	NaN
Significant	YES	NO	--	--	--	--	YES	NO	--	--	--	--
Vinyl Chloride [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	23	8	23	8
No. of Detections	50	5	0	0	0	0	50	8	23	8	23	8
Trend	D	--	--	--	--	--	D	--	D	--	--	--
S-value	-713	7	0	0	0	0	-871	-14	-99	2	-36	-10
Probability	2.57E-09	0.444833	NaN	NaN	NaN	NaN	3E-13	0.107762	0.009647	0.901539	0.355128	0.26551
Significant	YES	NO	--	--	--	--	YES	NO	YES	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
pH, Field [standard units]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	--	--	D	--
S-value	35	5	-76	1
Probability	0.775968	0.610492	0.045891	1
Significant	NO	NO	YES	NO
Specific Conductance, Field [umhos/cm]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	I	D	D	--
S-value	247	-20	-80	-4
Probability	0.03886	0.018741	0.036743	0.710523
Significant	YES	YES	YES	NO
Alkalinity [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	D	--	D	--
S-value	-285	-16	-107	2
Probability	0.017488	0.063487	0.004985	0.901539
Significant	YES	NO	YES	NO
Ammonia-N [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	3	0	4	0
Trend	--[a]	--	--[a]	--
S-value	-610	0	-108	0
Probability	5.2E-09	NaN	0.002039	NaN
Significant	YES	--	YES	--
Chloride [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	D	--	D	--
S-value	-244	4	-98	-10
Probability	0.041955	0.710523	0.010279	0.258095
Significant	YES	NO	YES	NO
Nitrate-N [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	D	I	--	I
S-value	-469	22	23	22
Probability	9.02E-05	0.009375	0.55622	0.008321
Significant	YES	YES	NO	YES
Sulfate [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	D	D	--	--
S-value	-433	-24	22	0
Probability	0.000301	0.004434	0.577424	1
Significant	YES	YES	NO	NO
Total Dissolved Solids [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	--	--	--	--
S-value	169	-10	23	-5
Probability	0.158469	0.26551	0.559664	0.617989
Significant	NO	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Arsenic, Dissolved [ug/L]				
No. of Analyses	50	8	23	8
No. of Detections	15	8	23	8
Trend	--[a]	--	**I**	--
S-value	-258	10	88	10
Probability	0.00921	0.26551	0.021229	0.26551
Significant	YES	NO	YES	NO
Arsenic, Total [ug/L]				
No. of Analyses	30	8	23	8
No. of Detections	15	8	23	8
Trend	--	**I**	**I**	--
S-value	-56	20	107	12
Probability	0.292622	0.018741	0.004884	0.173546
Significant	NO	YES	YES	NO
Calcium, Dissolved [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	--	--	**I**	--
S-value	174	-6	122	-4
Probability	0.146401	0.520912	0.00134	0.700116
Significant	NO	NO	YES	NO
Calcium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Trend	**I**	--	**I**	--
S-value	148	-10	90	10
Probability	0.008348	0.26551	0.018431	0.247888
Significant	YES	NO	YES	NO
Iron, Dissolved [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	5	0	1	0
Trend	D	--	--	--
S-value	-181	0	-22	0
Probability	0.003683	NaN	0.113436	NaN
Significant	YES	--	--	--
Iron, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	9	1	7	0
Trend	--	--	--	--
S-value	-79	-1	-45	0
Probability	0.084405	1	0.151325	NaN
Significant	NO	--	NO	--
Magnesium, Dissolved [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	--	--	**I**	--
S-value	170	-12	115	8
Probability	0.157379	0.173546	0.002588	0.386476
Significant	NO	NO	YES	NO
Magnesium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Trend	**I**	--	**I**	--
S-value	175	-10	99	-5
Probability	0.001901	0.26551	0.009597	0.617989
Significant	YES	NO	YES	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Manganese, Dissolved [ug/L]				
No. of Analyses	50	8	23	8
No. of Detections	0	2	23	8
Trend	--	--	D	D
S-value	0	13	-195	-18
Probability	NaN	0.04852	2.94E-07	0.035448
Significant	--	--	YES	YES
Manganese, Total [ug/L]				
No. of Analyses	30	8	23	8
No. of Detections	7	2	23	8
Trend	D	--	--[a]	--
S-value	-170	-7	-81	-12
Probability	0.001307	0.32394	0.034615	0.173546
Significant	YES	--	YES	NO
Potassium, Dissolved [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	I	--	--	--
S-value	348	-2	74	-6
Probability	0.003568	0.900004	0.053219	0.536187
Significant	YES	NO	NO	NO
Potassium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Trend	--	--	--	--
S-value	34	-1	54	1
Probability	0.550759	1	0.160171	1
Significant	NO	NO	NO	NO
Sodium, Dissolved [mg/L]				
No. of Analyses	50	8	23	8
No. of Detections	50	8	23	8
Trend	I	--	I	--
S-value	310	-16	121	-10
Probability	0.009715	0.063487	0.001528	0.26551
Significant	YES	NO	YES	NO
Sodium, Total [mg/L]				
No. of Analyses	30	8	23	8
No. of Detections	30	8	23	8
Trend	I	D	I	--
S-value	167	-18	114	-10
Probability	0.003051	0.035448	0.002762	0.26551
Significant	YES	YES	YES	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
1,1-Dichloroethane [ug/L]				
No. of Analyses	50	8	23	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	23	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	23	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	23	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--
Tetrachloroethene [ug/L]				
No. of Analyses	50	8	23	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	23	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	23	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	Channel Cc3			
Well Location	MW-8		MW-36	
Time Interval	Long	Short	Long	Short
Toluene [ug/L]				
No. of Analyses	50	8	23	8
No. of Detections	1	0	0	0
Trend	--	--	--	--
S-value	-547	0	0	0
Probability	1.59E-08	NaN	NaN	NaN
Significant	--	--	--	--
trans **-1,2-Dichloroethene [ug/L]**				
No. of Analyses	50	8	23	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	23	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	23	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	23	8
No. of Detections	0	0	0	0
Trend	--	--	--	--
S-value	0	0	0	0
Probability	NaN	NaN	NaN	NaN
Significant	--	--	--	--

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	D	--	D	I	D	--	D	--	D	--	--	--
S-value	-347	-14	-472	19	-297	3	-265	14	-314	10	-48	13
Probability	0.003776	0.107762	8.06E-05	0.024822	0.013186	0.803089	0.027139	0.107762	0.00876	0.26551	0.214018	0.134625
Significant	YES	NO	YES	YES	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	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	D	--	--	I	--	I	D	D	--
S-value	534	-13	586	-18	-62	-16	399	-12	338	-24	-121	-2
Probability	7.68E-06	0.134625	8.49E-07	0.035448	0.609015	0.063487	0.000835	0.173546	0.004754	0.004434	0.001517	0.901539
Significant	YES	NO	YES	YES	NO	NO	YES	NO	YES	YES	YES	NO
Alkalinity [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	D	--	--	--	--	--	D	--
S-value	466	-11	648	2	-838	-6	-102	1	-160	-10	-119	1
Probability	9.94E-05	0.212486	6.18E-08	0.901539	2.5E-12	0.536187	0.397847	1	0.176637	0.26551	0.00179	1
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	23	8
No. of Detections	50	8	3	1	49	8	50	8	14	7	4	0
Trend	--	--	--[a]	--	D	--	I	--	--[a]	--	D	--
S-value	115	-15	-614	5	-559	16	252	4	-589	8	-106	0
Probability	0.340143	0.074619	6.01E-09	0.382733	3.03E-06	0.063487	0.035596	0.710523	9.25E-09	0.386476	0.001422	NaN
Significant	NO	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	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	--	--	I	--	D	--	--	--	D	D	--	--
S-value	220	-10	321	-6	-691	4	-139	-15	-532	-17	-29	-3
Probability	0.066714	0.26551	0.007372	0.52982	7.74E-09	0.710523	0.247937	0.080905	8.89E-06	0.046063	0.459294	0.803089
Significant	NO	NO	YES	NO	YES	NO	NO	NO	YES	YES	NO	NO
Nitrate-N [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	24	6	50	8	18	2	35	7	1	0	23	8
Trend	--	I	--	D	D	--	D	--	--	--	--	I
S-value	46	19	-184	-18	-443	-7	-421	2	-139	0	-43	26
Probability	0.691152	0.024822	0.125672	0.035448	2.82E-05	0.32394	0.000391	0.901539	0.004846	NaN	0.267327	0.001982
Significant	NO	YES	NO	YES	YES	--	YES	NO	--	--	NO	YES
Sulfate [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	--	--	D	--	--	--	D	--	--	--
S-value	400	-14	186	-9	-399	0	198	-16	-529	-16	2	-11
Probability	0.000803	0.102358	0.120258	0.318567	0.000852	1	0.097843	0.054127	9.73E-06	0.054127	0.978878	0.212486
Significant	YES	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO
Total Dissolved Solids [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	D	--	I	--	I	--	--	--
S-value	622	-5	552	-2	-451	-10	342	0	286	-3	46	2
Probability	1.94E-07	0.612407	3.87E-06	0.901539	0.000162	0.258095	0.004261	1	0.016831	0.803089	0.232409	0.901539
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	D	--	D	--	D	--	D	--	D	--	--	--
S-value	-720	6	-336	6	-1007	-16	-543	9	-600	13	-66	12
Probability	1.8E-09	0.536187	0.005003	0.520912	3.82E-17	0.059451	5.75E-06	0.308325	5.36E-07	0.134625	0.08425	0.143943
Significant	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO
Arsenic, Total [ug/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Trend	--	I	--	--	--	--	I	--	--	--	--	I
S-value	-42	24	89	16	-36	-5	135	-1	95	-12	-2	17
Probability	0.485537	0.004434	0.115637	0.059451	0.55164	0.617989	0.022664	1	0.110118	0.173546	0.978637	0.046063
Significant	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES
Calcium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	--	--	I	--	I	--	--	--
S-value	679	-9	638	3	-195	6	557	5	502	-3	55	9
Probability	1.37E-08	0.318567	9.77E-08	0.803089	0.10411	0.520912	3.2E-06	0.617989	2.7E-05	0.788653	0.152575	0.308325
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO
Calcium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Trend	I	--	I	--	--	--	--	--	I	--	--	--
S-value	250	0	220	7	30	-1	101	4	136	-6	24	6
Probability	2.24E-05	1	9.15E-05	0.437302	0.621599	1	0.088705	0.706197	0.021287	0.52982	0.54172	0.520912
Significant	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	NO	NO
Iron, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	21	8	4	1	49	8	50	8	50	8	0	0
Trend	I	--	D	--	--	--	I	I	I	--	--	--
S-value	283	8	-184	5	-110	-2	278	20	425	8	0	0
Probability	0.008397	0.386476	0.001085	0.382733	0.361694	0.901539	0.020478	0.018741	0.000389	0.386476	NaN	NaN
Significant	YES	NO	YES	--	NO	NO	YES	YES	YES	NO	--	--
Iron, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	30	8	19	4	31	8	31	8	31	8	14	2
Trend	I	I	--	--	I	--	I	--	I	--	D	--
S-value	315	18	14	1	162	-8	135	-12	122	-12	-101	5
Probability	9.38E-08	0.035448	0.811668	1	0.006204	0.386476	0.022755	0.173546	0.039699	0.173546	0.006332	0.510798
Significant	YES	YES	NO	NO	YES	NO	YES	NO	YES	NO	YES	--
Magnesium, Dissolved [mg/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	--	--	I	--	I	--	--	--
S-value	678	0	727	1	-103	5	669	-12	441	-5	57	-1
Probability	1.47E-08	1	1.25E-09	1	0.393032	0.617989	2.28E-08	0.173546	0.000228	0.617989	0.138592	1
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO
Magnesium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Trend	I	--	I	--	--	--	I	--	I	--	I	D
S-value	255	0	200	-7	-8	-1	136	-11	149	-8	88	-17
Probability	1.57E-05	1	0.000382	0.454427	0.904935	1	0.021742	0.212486	0.011684	0.368803	0.021018	0.042707
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	YES	YES

Table 3-3 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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 [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	50	8	4	3	49	8	50	8	50	8	16	3
Trend	I	--	D	--	D	--	I	--	--	--	D	--
S-value	396	-8	-507	6	-434	1	312	0	47	-8	-152	4
Probability	0.000945	0.386476	5.58E-07	0.473542	0.000291	1	0.009275	1	0.700358	0.386476	5.1E-05	0.667169
Significant	YES	NO	YES	NO	YES	NO	YES	NO	NO	NO	YES	NO
Manganese, Total [ug/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	18	8	31	8	31	8	31	8	22	8
Trend	I	--	D	--	--	--	I	--	--	--	D	--
S-value	163	6	-170	-2	65	-15	143	0	95	-16	-155	8
Probability	0.005869	0.536187	0.001951	0.901539	0.276558	0.080905	0.015801	1	0.109878	0.063487	4.76E-05	0.386476
Significant	YES	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	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	--	--	I	--	I	--	--	--
S-value	582	-5	637	2	-63	7	393	6	435	1	21	0
Probability	1.15E-06	0.610492	1E-07	0.901539	0.603585	0.454427	0.001021	0.536187	0.000279	1	0.596499	1
Significant	YES	NO	YES	NO	NO	NO	YES	NO	YES	NO	NO	NO
Potassium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Trend	I	--	I	--	--	--	--	--	--	--	--	--
S-value	233	5	146	-7	-49	-4	-3	5	52	5	-69	-10
Probability	7.84E-05	0.610492	0.009541	0.454427	0.414194	0.710523	0.972836	0.617989	0.385056	0.617989	0.071247	0.258095
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	23	8
No. of Detections	50	8	50	8	50	8	50	8	50	8	23	8
Trend	I	--	I	--	--	--	--	--	I	--	I	--
S-value	414	-12	716	-11	196	-14	215	2	417	-10	85	-12
Probability	0.000549	0.173546	2.21E-09	0.212486	0.102823	0.107762	0.073347	0.901539	0.0005	0.26551	0.026522	0.173546
Significant	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	YES	NO
Sodium, Total [mg/L]												
No. of Analyses	31	8	30	8	31	8	31	8	31	8	23	8
No. of Detections	31	8	30	8	31	8	31	8	31	8	23	8
Trend	I	--	I	--	--	--	--	--	I	--	I	--
S-value	170	-12	187	-8	113	-13	39	-1	173	-16	110	-16
Probability	0.004068	0.166905	0.000902	0.386476	0.056724	0.134625	0.518368	1	0.00341	0.063487	0.00398	0.063487
Significant	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	YES	NO

Table 3-3 *(continued)*
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	23	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	23	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	23	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	23	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	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene [ug/L]												
No. of Analyses	50	8	50	8	50	8	50	8	50	8	23	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	23	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	23	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 ***(continued)***
Summary of Trend Analyses for Groundwater Well Samples Groundwater
Trends in Individual Wells
Vashon Island Closed Landfill
1986 through 2022

	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	50	8	50	8	50	8	50	8	50	8	23	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	-541	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	2.28E-08	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	23	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	23	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	23	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	23	8
No. of Detections	0	0	0	0	1	0	0	0	0	0	0	0
Trend	--	--	--	--	--	--	--	--	--	--	--	--
S-value	0	0	0	0	-453	0	0	0	0	0	0	0
Probability	NaN	NaN	NaN	NaN	1.89E-06	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 2022

	West Hillslope Seep/Weir							
Well Location	**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	84	8	116	8	116	8	33	8
No. of Detections	84	8	116	8	116	8	33	8
Minimum	6.54	7.33	6.88	7.9	ND	7.46	6.42	7.62
Maximum	8.76	7.71	8.89	8.21	ND	7.81	10.18	7.97
Mean	7.54	7.49	7.95	8.02	ID	7.62	7.61	7.82
Standard Deviation	0.42	0.12	0.37	0.11	ID	0.12	0.67	0.14
Median	7.605	7.495	8.035	7.98	ID	7.63	7.6	7.84
Specific Conductance, Field [umhos/cm]								
No. of Analyses	85	8	117	8	117	8	32	8
No. of Detections	85	8	117	8	117	8	32	8
Minimum	70	158.1	325	236.2	94.6	76.4	110	152.8
Maximum	860	221.9	1200	577	1034	300.5	370	201.6
Mean	304.65	177.99	728.21	457.96	428.91	234.45	190.82	179.65
Standard Deviation	159.73	20.42	183.63	107.86	164.15	68.00	45.51	18.39
Median	235	172.45	705.8	482.25	405	240.75	188.75	182.35
Alkalinity [mg/L]								
No. of Analyses	56	8	76	8	75	8		
No. of Detections	56	8	76	8	75	8		
Minimum	64.2	65.1	222	245	86.6	114		
Maximum	150	81.3	530	304	290	139		
Mean	88.50	72.19	376.63	266.38	166.29	123.50		
Standard Deviation	17.50	6.68	76.07	21.85	51.83	10.42		
Median	85.25	71.05	371.5	254.5	146	120		
Ammonia-N [mg/L]								
No. of Analyses	84	8	118	8	117	8		
No. of Detections	55	8	54	8	42	8		
Minimum	ND	0.0114	ND	0.0022	ND	0.0054		
Maximum	0.14	0.0342	45	0.0075	0.2	0.0098		
Mean	0.024	0.017	0.395	0.005	0.016	0.008		
Standard Deviation	0.026	0.008	4.141	0.002	0.024	0.002		
Median	0.01695	0.01365	0.0088	0.0062	0.0065	0.0079		
Chemical Oxygen Demand [mg/L]								
No. of Analyses	84	8	117	8	116	8		
No. of Detections	77	7	115	8	102	8		
Minimum	ND	ND	ND	13	ND	5.6		
Maximum	100	29.6	130	22.4	160	18		
Mean	19.79	16.89	20.90	16.73	17.72	12.38		
Standard Deviation	16.88	7.37	17.43	3.50	19.60	4.70		
Median	14.5	17.5	16	16	14	11		
Chloride [mg/L]								
No. of Analyses	84	8	116	8	116	8		
No. of Detections	84	8	114	8	114	8		
Minimum	3	5.73	ND	15.4	ND	7.96		
Maximum	15	7.21	79	19	48	9.04		
Mean	6.05	6.27	29.90	16.90	11.67	8.40		
Standard Deviation	1.77	0.45	11.56	1.21	5.84	0.38		
Median	5.62	6.295	30	16.5	9.78	8.285		
Nitrate-N [mg/L]								
No. of Analyses	84	8	118	8	117	8		
No. of Detections	76	8	89	8	109	8		
Minimum	ND	0.486	ND	0.0707	ND	0.141		
Maximum	4.26	2.43	9	0.212	1.4	0.525		
Mean	1.48	1.53	0.23	0.12	0.36	0.32		
Standard Deviation	1.07	0.75	0.83	0.05	0.27	0.14		
Median	1.4	1.62	0.12	0.10655	0.3	0.257		

Table 3-4 ***(continued)***
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2022

	West Hillslope Seep/Weir							
Well Location	**SW-W1**		**SW-W2**		**SW-W3**		**SW-E**	
Time Interval	Long	Short	Long	Short	Long	Short	Long	Short
Sulfate [mg/L]								
No. of Analyses	84	8	118	8	117	8		
No. of Detections	83	8	118	8	117	8		
Minimum	ND	6.32	4.6	13.8	6	11.6		
Maximum	35.9	10.6	29.9	16.2	109	12.4		
Mean	11.12	8.00	9.28	15.08	12.10	11.91		
Standard Deviation	4.77	1.25	3.58	0.86	9.23	0.27		
Median	10	7.775	8.81	14.9	11.6	11.8		
Arsenic, Dissolved [mg/L]								
No. of Analyses	52	8	55	8	55	8	32	8
No. of Detections	49	8	53	8	55	8	32	8
Minimum	ND	0.00172	ND	0.0012	0.0017	0.00288	0.00112	0.00153
Maximum	0.0086	0.0049	0.0160	0.0016	0.0039	0.0037	0.0023	0.0022
Mean	0.0027	0.0028	0.0017	0.0014	0.0029	0.0033	0.0018	0.0019
Standard Deviation	0.0018	0.0010	0.0020	0.0001	0.0006	0.0003	0.0003	0.0002
Median	0.0023	0.0028	0.0014	0.0014	0.0028	0.0032	0.0018	0.0018
Arsenic, Total [mg/L]								
No. of Analyses	85	8	117	8	116	8	32	8
No. of Detections	85	8	117	8	115	8	32	8
Minimum	0.00197	0.00329	0.00151	0.00158	ND	0.00372	0.00149	0.00169
Maximum	0.0830	0.0078	0.0170	0.0064	0.0520	0.0051	0.0106	0.0026
Mean	0.0107	0.0050	0.0045	0.0032	0.0059	0.0044	0.0024	0.0022
Standard Deviation	0.0113	0.0017	0.0028	0.0016	0.0059	0.0005	0.0015	0.0003
Median	0.0070	0.0044	0.0036	0.0031	0.0047	0.0044	0.0022	0.0022
Calcium, Dissolved [mg/L]								
No. of Analyses	52	8	55	8	55	8	32	8
No. of Detections	52	8	55	8	55	8	32	8
Minimum	12.2	13.6	35	43.8	17.2	20.9	7.78	12.8
Maximum	18.5	16.5	74.3	54.6	33	25.7	17	16.2
Mean	15.54	14.71	55.84	47.98	23.65	22.89	13.88	14.64
Standard Deviation	1.63	0.94	8.02	3.84	3.40	1.73	2.64	1.33
Median	15.6	14.65	56	46.4	23	22.9	14.7	14.8
Calcium, Total [mg/L]								
No. of Analyses	80	8	111	8	110	8	32	8
No. of Detections	80	8	111	8	110	8	32	8
Minimum	12.4	14	27	43.7	17.3	21.2	8.51	12.8
Maximum	84.8	16.6	127	54.7	93	25.4	18.9	16.5
Mean	27.92	15.15	72.23	48.79	39.68	23.15	14.57	14.99
Standard Deviation	19.38	0.96	20.85	3.74	19.03	1.56	2.65	1.49
Median	18	15.05	67	47.75	33.5	22.65	15.3	15.2
Iron, Dissolved [mg/L]								
No. of Analyses	52	8	55	8	55	8	32	8
No. of Detections	51	8	55	8	55	8	32	8
Minimum	ND	0.0758	0.0115	0.0127	0.018	0.0355	0.033	0.0381
Maximum	1.43	0.534	8.97	0.138	0.215	0.0901	0.221	0.0924
Mean	0.2612	0.2226	0.2319	0.0357	0.0711	0.0572	0.0738	0.0608
Standard Deviation	0.2784	0.1475	1.2043	0.0418	0.0505	0.0166	0.0466	0.0204
Median	0.1795	0.1765	0.0284	0.0225	0.0490	0.0543	0.0531	0.0555
Iron, Total [mg/L]								
No. of Analyses	85	8	117	8	116	8	32	8
No. of Detections	85	8	117	8	116	8	32	8
Minimum	0.682	0.941	0.364	0.392	0.49	0.407	0.226	0.306
Maximum	76	3.43	27.9	5.25	37.5	6.03	14.9	2.97
Mean	7.41	1.76	4.21	2.02	3.32	1.57	1.30	0.77
Standard Deviation	10.29	0.82	4.71	1.57	5.18	1.89	2.69	0.89
Median	3.70	1.76	2.64	1.87	1.81	0.78	0.58	0.49

Table 3-4 ***(continued)***
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2022

	West Hillslope Seep/Weir							
Well Location	**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	52	8	55	8	55	8	32	8
No. of Detections	52	8	55	8	55	8	32	8
Minimum	10.1	11.2	28.9	36.1	11.7	17.7	6.36	10.5
Maximum	16	12.6	63.6	45.2	25.8	21.3	15.8	14.3
Mean	12.60	11.70	47.42	39.33	19.42	19.11	12.38	12.91
Standard Deviation	1.25	0.49	7.46	3.11	2.87	1.29	2.58	1.39
Median	12.65	11.60	46.60	38.15	19.40	18.70	12.65	13.45
Magnesium, Total [mg/L]								
No. of Analyses	80	8	111	8	111	8	32	8
No. of Detections	80	8	111	8	111	8	32	8
Minimum	10.1	11	20	36.1	14.5	17.7	6.98	10.8
Maximum	55.3	13	104	45.6	89	23.6	15.7	14.4
Mean	18.44	11.75	61.17	39.36	31.25	19.45	12.83	13.05
Standard Deviation	9.80	0.71	18.75	3.67	14.45	2.09	2.32	1.42
Median	14.05	11.55	56.90	37.40	26.00	18.35	13.55	13.25
Manganese, Dissolved [mg/L]								
No. of Analyses	52	8	55	8	55	8	32	8
No. of Detections	52	8	55	8	55	8	32	8
Minimum	0.0113	0.137	0.0155	0.0219	0.112	0.375	0.00616	0.00748
Maximum	3.18	0.845	2.4	0.0796	0.581	0.631	0.0188	0.0121
Mean	0.397	0.364	0.110	0.041	0.311	0.452	0.010	0.010
Standard Deviation	0.485	0.242	0.320	0.022	0.101	0.082	0.002	0.001
Median	0.277	0.293	0.050	0.033	0.310	0.440	0.010	0.011
Manganese, Total [mg/L]								
No. of Analyses	85	8	116	8	115	8	32	8
No. of Detections	85	8	116	8	115	8	32	8
Minimum	0.325	0.424	0.126	0.107	0.254	0.55	0.0243	0.0238
Maximum	18	1.17	17.9	0.926	8.56	0.925	1.14	0.0992
Mean	2.287	0.767	1.883	0.424	1.167	0.655	0.103	0.060
Standard Deviation	2.730	0.294	2.457	0.270	1.420	0.120	0.193	0.026
Median	1.310	0.699	0.965	0.421	0.762	0.644	0.061	0.060
Potassium, Dissolved [mg/L]								
No. of Analyses	52	8	55	8	55	8	32	8
No. of Detections	51	8	55	8	54	8	32	8
Minimum	ND	0.799	1.2	2.69	ND	2.01	1.68	1.68
Maximum	1.53	1.45	4.05	3.08	2.8	2.38	2.78	1.95
Mean	1.10	1.05	3.16	2.93	2.13	2.19	1.99	1.86
Standard Deviation	0.21	0.19	0.40	0.15	0.37	0.13	0.20	0.09
Median	1.11	1.06	3.17	2.98	2.16	2.22	1.99	1.89
Potassium, Total [mg/L]								
No. of Analyses	80	8	112	8	111	8	32	8
No. of Detections	80	8	112	8	111	8	32	8
Minimum	0.82	0.805	1.8	2.64	1.7	2.04	1.65	1.7
Maximum	2.8	1.73	5.6	3.22	17	2.66	3.38	2.05
Mean	1.34	1.10	3.43	2.97	2.62	2.25	2.00	1.93
Standard Deviation	0.39	0.28	0.52	0.18	1.46	0.21	0.28	0.11
Median	1.22	1.05	3.37	3.02	2.40	2.20	1.98	1.94

Table 3-4 *(continued)*
Summary of Statistical Analyses for West Hillslope Seep/Weir Surface Water Samples
Vashon Island Closed Landfill
1986 through 2022

	West Hillslope Seep/Weir							
Well Location	**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	52	8	55	8	55	8	32	8
No. of Detections	52	8	55	8	55	8	32	8
Minimum	5.44	6.22	9.55	13.9	6.21	8.36	4.47	5.84
Maximum	8.04	7.24	19.3	17.5	11.1	9.88	7.8	7.5
Mean	6.90	6.77	15.29	15.41	8.72	8.83	6.51	6.71
Standard Deviation	0.60	0.36	1.72	1.14	0.86	0.56	0.87	0.52
Median	6.87	6.80	15.40	15.35	8.71	8.65	6.65	6.80
Sodium, Total [mg/L]								
No. of Analyses	80	8	112	8	110	8	32	8
No. of Detections	80	8	112	8	110	8	32	8
Minimum	5.33	6.28	7.8	13.9	6.52	8.25	4.73	5.9
Maximum	17.2	7.72	25	17.3	18.2	10.4	7.57	7.47
Mean	8.57	6.77	16.01	15.15	10.90	9.00	6.59	6.71
Standard Deviation	2.88	0.50	2.35	1.42	2.84	0.86	0.79	0.61
Median	7.27	6.64	16.00	14.35	10.00	8.49	6.74	6.58
Vinyl Chloride [ug/L]								
No. of Analyses	82	8	115	8	114	8	32	8
No. of Detections	22	5	1	1	87	8	0	0
Minimum	ND	ND	ND	ND	ND	0.0291	ND	ND
Maximum	1	0.0238	ND	ND	1	0.0642	ND	ND
Mean	0.056	0.011	ID	ID	0.075	0.042	ID	ID
Standard Deviation	0.187	0.006	ID	ID	0.155	0.013	ID	ID
Median	0.010	0.011	ID	ID	0.044	0.039	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, 2022

	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	8	8	8	8	8
No. of Detections	0	0	0	8	6
Minimum	ND	ND	ND	0.03	ND
Maximum	ND	ND	ND	0.05	0.05
Mean	ID	ID	ID	0.04	0.03
Standard Deviation	ID	ID	ID	0.01	0.02
Median	ID	ID	ID	0.0392	0.0374
2-Methyl-1-Propanol [ug/L]					
No. of Analyses	8	8	8	8	8
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	8	8	8	8	8
No. of Detections	0	0	1	8	7
Minimum	ND	ND	ND	1.44	ND
Maximum	ND	ND	0.266	5.39	1.28
Mean	ID	ID	ID	3.44	0.82
Standard Deviation	ID	ID	ID	1.25	0.41
Median	ID	ID	ID	3.44	0.8575
Bis(2-Ethylhexyl)Phthalate [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	1	4	3	6	5
Minimum	ND	ND	ND	ND	ND
Maximum	19.1	7.4	4.72	25.4	20.2
Mean	ID	1.859	1.022	8.071	4.927
Standard Deviation	ID	2.619	1.545	10.029	7.738
Median	ID	0.659	0.26075	2.14	0.856
Diethyl Phthalate [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	0	0	1	8	1
Minimum	ND	ND	ND	0.901	ND
Maximum	ND	ND	0.551	1.51	0.54
Mean	ID	ID	ID	1.17	ID
Standard Deviation	ID	ID	ID	0.24	ID
Median	ID	ID	ID	1.065	ID

NOTES:

Short - eight most recent analyses in the last two years.
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, 2022

	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	8	8	8	8	8
No. of Detections	0	0	0	8	6
Trend	--	--	--	--	--
S-value	0	-2	2	-14	-16
Probability	NaN	NaN	NaN	0.107762	0.063487
Significant	--	--	--	NO	NO
2-Methyl-1-Propanol [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	0	0	0	0	0
Trend	--	--	--	--	--
S-value	0	0	0	0	-1
Probability	NaN	NaN	NaN	NaN	NaN
Significant	--	--	--	--	--
Bis(2-Chloroethyl)Ether [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	0	0	1	8	7
Trend	--	--	--	--	--
S-value	-2	7	-6	-6	-14
Probability	NaN	NaN	0.52982	0.536187	0.107762
Significant	--	--	--	NO	NO
Bis(2-Ethylhexyl)Phthalate [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	1	4	3	6	5
Trend	--	--	--	--	--
S-value	3	12	-3	0	-2
Probability	0.803089	0.173546	0.803089	1	0.901539
Significant	--	NO	NO	NO	NO
Diethyl Phthalate [ug/L]					
No. of Analyses	8	8	8	8	8
No. of Detections	0	0	1	8	1
Trend	--	--	--	--	--
S-value	-2	7	2	0	7
Probability	NaN	NaN	0.900004	1	0.454427
Significant	--	--	--	NO	--

NOTES:

Short	- eight most recent analyses in the last two years.
--	- 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. 2021 - Dec. 2022
General Indicators		
pH (Field)	6.5 to 8.3	6.47 to 8.17
Specific Conductance (Field)	80 to 545	102.5 to 214.7
Chloride [mg/L]	1.6 to 14	3.00 to 17.4
Nitrate [mg/L]	<0.2 to 5.8	<0.01 to 2.05
Sulfate [mg/L]	<0.50 to 41	9.63 to 33.2
Metals		
Arsenic, Total [ug/L]	<1 to 17	1.02 to 18.1
Iron, Total [mg/L]	0.040 to 10	<0.010 to 6.09
Manganese, Total [ug/L]	5 to 960	0.125 to 849
Sodium, Total [mg/L]	5 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	0.05	ug/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	10	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	50	ug/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 01/12/1994. Revised 3/15/2023

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)

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, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-3	2/1/2022	5.65	MCL2; SGWC2	< 6.5
		MW-3	5/11/2022	5.72		
		MW-3	9/13/2022	5.6		
Arsenic, Total[1]	ug/L	MW-3	2/1/2022	0.0691	SGWC1	0.05
		MW-3	5/11/2022	0.171		
		MW-4	9/14/2022	0.33		
		MW-10	1/31/2022	1.72		
		MW-10	5/9/2022	1.72		
		MW-10	9/12/2022	1.72		
		MW-10	11/7/2022	1.7		
		MW-13	1/31/2022	1.96		
		MW-13	5/9/2022	1.94		
		MW-13	9/13/2022	2.2		
		MW-13	11/7/2022	2.33		

[1] Natural Background for arsenic in the Puget Sound Basin is 8 ug/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 (Appendix A)

Table B-2

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-35	2/3/2022	6.43	MCL2; SGWC2	< 6.5
		MW-35	9/15/2022	6.45		
Arsenic, Total[1]	ug/L	MW-2	2/3/2022	1.02	SGWC1	0.05
		MW-2	5/12/2022	0.911		
		MW-2	9/15/2022	0.886		
		MW-2	11/9/2022	0.889		
		MW-9	2/2/2022	2.4		
		MW-9	5/10/2022	2.31		
		MW-9	9/13/2022	2.33		
		MW-9	11/8/2022	2.28		
		MW-20	2/3/2022	2.16		
		MW-20	5/12/2022	2.2		
		MW-20	9/15/2022	2.09		
		MW-20	11/9/2022	2.12		
		MW-21	2/3/2022	1.49		
		MW-21	5/12/2022	1.48		
		MW-21	9/15/2022	1.26		
		MW-21	11/9/2022	1.2		
		MW-33	2/3/2022	38.6	MCL1; SGWC1	0.01 mg/L; 0.05
		MW-33	5/12/2022	37.7		
		MW-33	9/15/2022	36.1		
		MW-33	11/9/2022	38.6		
		MW-35	2/3/2022	51.8		
		MW-35	5/12/2022	32.7		
		MW-35	9/15/2022	31.7		
		MW-35	11/9/2022	31.8		
		MW-37	6/30/2022	1.02	SGWC1	0.05
		MW-37	9/15/2022	1.17		
		MW-37	11/9/2022	1.48		

Table B-2 *(continued)*

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
Iron, Dissolved	mg/L	MW-21	2/3/2022	0.457	MCL2; SGWC2	0.3; 0.3
		MW-33	2/3/2022	5.47		
		MW-33	5/12/2022	5.61		
		MW-33	9/15/2022	5.41		
		MW-33	11/9/2022	5.36		
		MW-35	2/3/2022	12.8		
		MW-35	5/12/2022	12.2		
		MW-35	9/15/2022	10.6		
		MW-35	11/9/2022	10.4		
Manganese, Dissolved	ug/L	MW-2	9/15/2022	56.1	MCL2; SGWC2	0.05 mg/L; 50
		MW-2	11/9/2022	55.7		
		MW-20	2/3/2022	126		
		MW-20	5/12/2022	133		
		MW-20	9/15/2022	146		
		MW-20	11/9/2022	130		
		MW-21	2/3/2022	361		
		MW-21	5/12/2022	168		
		MW-21	9/15/2022	158		
		MW-21	11/9/2022	186		
		MW-33	2/3/2022	883		
		MW-33	5/12/2022	877		
		MW-33	9/15/2022	881		
		MW-33	11/9/2022	877		
		MW-35	2/3/2022	2350		
		MW-35	5/12/2022	2290		
		MW-35	9/15/2022	2190		
		MW-35	11/9/2022	2140		
		MW-37	6/30/2022	58.5		
1,1-Dichloroethane	µg/L	MW-33	2/3/2022	1.91	SGWC1	1
		MW-33	9/15/2022	1.17		
		MW-33	11/9/2022	1.31		

Table B-2 *(continued)*

Channel Cc2: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
1,2-Dichloropropane	µg/L	MW-33	2/3/2022	6.36	MCL1; SGWC1	5; 0.6
		MW-33	5/12/2022	4.64	SGWC1	0.6
		MW-33	9/15/2022	5.41	MCL1; SGWC1	5; 0.6
		MW-33	11/9/2022	6.05	MCL1; SGWC1	5; 0.6
Bis(2-Chloroethyl)Ether	ug/L	MW-33	2/3/2022	3.37	SGWC1	0.07
		MW-33	5/12/2022	3.67	SGWC1	0.07
		MW-33	9/15/2022	3.51	SGWC1	0.07
		MW-33	11/9/2022	2.46	SGWC1	0.07
		MW-35	2/3/2022	0.86	SGWC1	0.07
		MW-35	5/12/2022	0.769	SGWC1	0.07
		MW-35	11/9/2022	0.855	SGWC1	0.07
Bis(2-Ethylhexyl)Phthalate	ug/L	MW-2	11/9/2022	19.1 L	MCL1; SGWC1	6
		MW-20	11/9/2022	7.4 L	MCL1; SGWC1	6
		MW-33	11/9/2022	15.2 L	MCL1; SGWC1	6
		MW-37	6/30/2022	7.27 BJ	MCL1; SGWC1	6
		MW-37	11/9/2022	6.56 L	MCL1; SGWC1	6
Vinyl Chloride	µg/L	MW-2	9/15/2022	0.0474 D	SGWC1	0.02
		MW-2	11/9/2022	0.0235 D	SGWC1	0.02
		MW-21	2/3/2022	0.0687	SGWC1	0.02
		MW-21	5/12/2022	0.0375	SGWC1	0.02
		MW-21	9/15/2022	0.0368 D	SGWC1	0.02
		MW-21	11/9/2022	0.0388 D	SGWC1	0.02
		MW-33	2/3/2022	21.9	MCL1; SGWC1	2; 0.02
		MW-33	5/12/2022	11.4	MCL1; SGWC1	2; 0.02
		MW-33	9/15/2022	21.8 D	MCL1; SGWC1	2; 0.02
		MW-33	11/9/2022	21.1 D	MCL1; SGWC1	2; 0.02
		MW-35	2/3/2022	6.66	MCL1; SGWC1	2; 0.02
		MW-35	5/12/2022	4.56	MCL1; SGWC1	2; 0.02
		MW-35	9/15/2022	4.18 D	MCL1; SGWC1	2; 0.02
		MW-35	11/9/2022	3.87 D	MCL1; SGWC1	2; 0.02

[1] Natural Background for arsenic in the Puget Sound Basin is 8 ug/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 (Appendix A)

Table B-3

Channel Cc3: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units	MW-8	1/31/2022	6.37	MCL2; SGWC2	< 6.5
		MW-8	5/9/2022	6.25		
		MW-8	9/12/2022	6.37		
Arsenic, Total[1]	ug/L	MW-8	1/31/2022	0.526	SGWC1	0.05
		MW-8	5/9/2022	0.532		
		MW-8	9/12/2022	0.52		
		MW-8	11/7/2022	0.535		
		MW-36	1/31/2022	1.79		
		MW-36	5/10/2022	2.09		
		MW-36	9/13/2022	1.88		
		MW-36	11/8/2022	1.93		

[1] Natural Background for arsenic in the Puget Sound Basin is 8 ug/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 (Appendix A)

Table B-4

Unit D Aquifer: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
pH (Field)	std. pH Units				MCL2; SGWC2	< 6.5
Arsenic, Total[1]	ug/L	MW-7	2/1/2022	5.52	SGWC1	0.05
		MW-7	5/10/2022	5.93		
		MW-7	9/13/2022	5.88		
		MW-7	11/8/2022	7.31		
		MW-12	1/31/2022	2.12		
		MW-12	5/9/2022	2.18		
		MW-12	9/13/2022	2.18		
		MW-12	11/8/2022	2.11		
		MW-19	2/2/2022	1.06		
		MW-19	5/10/2022	1.06		
		MW-19	9/13/2022	1.13		
		MW-19	11/8/2022	1.08		
		MW-26	2/2/2022	3.34		
		MW-26	5/10/2022	3.76		
		MW-26	9/13/2022	3.34		
		MW-26	11/8/2022	3.48		
		MW-29	2/2/2022	8.14		
		MW-29	5/10/2022	13.6	MCL1; SGWC1	0.01 mg/L; 0.05
		MW-29	9/15/2022	7.07	SGWC1	0.05
		MW-29	11/8/2022	6.45		
		MW-34	2/1/2022	1.33		
		MW-34	5/9/2022	1.37		
		MW-34	9/12/2022	1.4		
		MW-34	11/7/2022	1.34		

Table B-4 *(continued)*

Unit D Aquifer: Summary of groundwater quality criteria exceedances

January 1, 2022 - December 31, 2022

Parameter	Units	Site ID	Sample Date	Sample Value	Standard(s) Exceeded	Standard(s) Exceeded Numerical Limit
Iron, Dissolved	mg/L	MW-29	2/2/2022	0.666	MCL2; SGWC2	0.3; 0.3
		MW-29	5/10/2022	0.741		
		MW-29	9/15/2022	0.804		
		MW-29	11/8/2022	0.756		
Manganese, Dissolved	ug/L	MW-7	2/1/2022	140	MCL2; SGWC2	0.05 mg/L; 50
		MW-7	5/10/2022	126		
		MW-7	9/13/2022	145		
		MW-7	11/8/2022	110		
		MW-19	2/2/2022	491		
		MW-19	5/10/2022	465		
		MW-19	9/13/2022	487		
		MW-19	11/8/2022	492		
		MW-26	2/2/2022	58.9		
		MW-26	5/10/2022	62.1		
		MW-26	9/13/2022	63.7		
		MW-26	11/8/2022	58.4		
		MW-29	2/2/2022	81.9		
		MW-29	5/10/2022	99.3		
		MW-29	9/15/2022	88.9		
		MW-29	11/8/2022	86.4		

[1] Natural Background for arsenic in the Puget Sound Basin is 8 ug/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 (Appendix A)

Table B-5

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
pH (Field)	std. pH Units	MW-21	9/15/2022	6.53	< 6.60
		MW-35	2/3/2022	6.43	
		MW-35	5/12/2022	6.56	
		MW-35	9/15/2022	6.45	
Specific Conductance (Field)	umhos/cm	MW-2	2/3/2022	271.2	258.1
		MW-2	5/12/2022	262.8	
		MW-2	9/15/2022	260.5	
		MW-2	11/9/2022	263.7	
		MW-21	2/3/2022	270.8	
		MW-33	2/3/2022	539.9	
		MW-33	5/12/2022	565.0	
		MW-33	9/15/2022	576.0	
		MW-33	11/9/2022	561.3	
		MW-35	2/3/2022	572.5	
		MW-35	5/12/2022	546.0	
		MW-35	9/15/2022	512.0	
		MW-35	11/9/2022	488.8	
Alkalinity	mg/L	MW-2	2/3/2022	135	94.9
		MW-2	5/12/2022	136	
		MW-2	9/15/2022	136	
		MW-2	11/9/2022	141	
		MW-21	2/3/2022	140	
		MW-21	5/12/2022	127	
		MW-21	9/15/2022	131	
		MW-21	11/9/2022	131	
		MW-33	2/3/2022	316	
		MW-33	5/12/2022	328	
		MW-33	9/15/2022	343	
		MW-33	11/9/2022	334	
		MW-35	2/3/2022	331	
		MW-35	5/12/2022	306	
		MW-35	9/15/2022	310	
		MW-35	11/9/2022	297	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Ammonia	mg/L	MW-33	2/3/2022	0.0305	0.0285
		MW-33	5/12/2022	0.0306	
		MW-33	9/15/2022	0.0323	
		MW-33	11/9/2022	0.0306	
		MW-35	2/3/2022	0.0643	
		MW-35	5/12/2022	0.0649	
		MW-35	9/15/2022	0.0657	
		MW-35	11/9/2022	0.0635	
Chloride	mg/L	MW-9	2/2/2022	4.54	4.09
		MW-9	5/10/2022	5.38	
		MW-9	9/13/2022	4.96	
		MW-9	11/8/2022	4.94	
Nitrate	mg/L	MW-2	2/3/2022	1.230	0.039
		MW-2	5/12/2022	0.856	
		MW-2	9/15/2022	0.278	
		MW-2	11/9/2022	0.154	
		MW-9	2/2/2022	0.541	
		MW-9	5/10/2022	0.876	
		MW-9	9/13/2022	0.951	
		MW-9	11/8/2022	0.735	
		MW-21	2/3/2022	0.315	
		MW-21	5/12/2022	0.226	
		MW-21	9/15/2022	0.102	
		MW-21	11/9/2022	0.099	
		MW-37	9/15/2022	0.900	
		MW-37	11/9/2022	0.781	
Sulfate	mg/L	MW-33	9/15/2022	18.6	18.50
		MW-35	2/3/2022	26.0	
		MW-35	5/12/2022	29.2	
		MW-35	9/15/2022	31.9	
		MW-35	11/9/2022	29.1	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Total Dissolved Solids	mg/L	MW-2	2/3/2022	169.00	156.47
		MW-2	5/12/2022	174.00	
		MW-2	9/15/2022	178.00	
		MW-2	11/9/2022	179.00	
		MW-21	2/3/2022	166.00	
		MW-21	5/12/2022	169.00	
		MW-21	9/15/2022	174.00	
		MW-21	11/9/2022	174.00	
		MW-33	2/3/2022	325.00	
		MW-33	5/12/2022	370.00	
		MW-33	9/15/2022	394.00	
		MW-33	11/9/2022	373.00	
		MW-35	2/3/2022	401.00	
		MW-35	5/12/2022	405.00	
		MW-35	9/15/2022	401.00	
		MW-35	11/9/2022	371.00	
Total Organic Carbon	mg/L	MW-35	2/3/2022	3.76	2.33
		MW-35	5/12/2022	3.35	
		MW-35	9/15/2022	3.10	
		MW-35	11/9/2022	3.28	
Total Solids	mg/L	MW-33	2/3/2022	339	286
		MW-33	5/12/2022	397	
		MW-33	9/15/2022	391	
		MW-33	11/9/2022	394	
		MW-35	2/3/2022	701	
		MW-35	5/12/2022	449	
		MW-35	9/15/2022	491	
		MW-35	11/9/2022	425	
Total Suspended Solids	mg/L	MW-35	2/3/2022	323.0	9.7
		MW-35	5/12/2022	84.0	
		MW-35	9/15/2022	170.0	
		MW-35	11/9/2022	89.5	
		MW-37	9/15/2022	11.9	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Arsenic, Total	ug/L	MW-33	2/3/2022	38.6	4.3878
		MW-33	5/12/2022	37.7	
		MW-33	9/15/2022	36.1	
		MW-33	11/9/2022	38.6	
		MW-35	2/3/2022	51.8	
		MW-35	5/12/2022	32.7	
		MW-35	9/15/2022	31.7	
		MW-35	11/9/2022	31.8	
Barium, Total	mg/L	MW-35	2/3/2022	0.0402	0.0384
Calcium, Total	mg/L	MW-2	2/3/2022	20.3	15.1
		MW-2	5/12/2022	20.7	
		MW-2	9/15/2022	20.4	
		MW-2	11/9/2022	20.4	
		MW-9	9/13/2022	16.0	
		MW-9	11/8/2022	15.2	
		MW-21	2/3/2022	21.4	
		MW-21	5/12/2022	20.3	
		MW-21	9/15/2022	20.0	
		MW-21	11/9/2022	20.3	
		MW-33	2/3/2022	57.2	
		MW-33	5/12/2022	57.7	
		MW-33	9/15/2022	58.4	
		MW-33	11/9/2022	56.4	
		MW-35	2/3/2022	67.2	
		MW-35	5/12/2022	60.3	
		MW-35	9/15/2022	55.7	
		MW-35	11/9/2022	54.2	
		MW-37	9/15/2022	15.2	
		MW-37	11/9/2022	15.3	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Iron, Dissolved	mg/L	MW-21	2/3/2022	0.46	0.39
		MW-33	2/3/2022	5.47	
		MW-33	5/12/2022	5.61	
		MW-33	9/15/2022	5.41	
		MW-33	11/9/2022	5.36	
		MW-35	2/3/2022	12.80	
		MW-35	5/12/2022	12.20	
		MW-35	9/15/2022	10.60	
		MW-35	11/9/2022	10.40	
Magnesium, Total	mg/L	MW-2	2/3/2022	22.20	16.59
		MW-2	5/12/2022	19.70	
		MW-2	9/15/2022	21.50	
		MW-2	11/9/2022	21.10	
		MW-21	2/3/2022	21.80	
		MW-21	5/12/2022	17.80	
		MW-21	9/15/2022	18.90	
		MW-21	11/9/2022	19.30	
		MW-33	2/3/2022	43.00	
		MW-33	5/12/2022	40.10	
		MW-33	9/15/2022	45.90	
		MW-33	11/9/2022	44.70	
		MW-35	2/3/2022	47.20	
		MW-35	5/12/2022	41.20	
		MW-35	9/15/2022	41.60	
		MW-35	11/9/2022	42.40	
Manganese, Dissolved	ug/L	MW-33	2/3/2022	883	548
		MW-33	5/12/2022	877	
		MW-33	9/15/2022	881	
		MW-33	11/9/2022	877	
		MW-35	2/3/2022	2350	
		MW-35	5/12/2022	2290	
		MW-35	9/15/2022	2190	
		MW-35	11/9/2022	2140	

Table B-5 *(continued)*

Channel Cc2: Summary of groundwater prediction limit exceedances

Interwell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Potassium, Total	mg/L	MW-33	2/3/2022	3.14	2.51
		MW-33	5/12/2022	3.13	
		MW-33	9/15/2022	3.33	
		MW-33	11/9/2022	3.06	
		MW-35	2/3/2022	3.56	
		MW-35	5/12/2022	3.30	
		MW-35	9/15/2022	3.32	
		MW-35	11/9/2022	3.16	
Sodium, Total	mg/L	MW-2	2/3/2022	8.37	7.39
		MW-2	5/12/2022	7.73	
		MW-2	9/15/2022	8.94	
		MW-2	11/9/2022	8.59	
		MW-21	2/3/2022	9.84	
		MW-21	5/12/2022	9.87	
		MW-21	9/15/2022	10.80	
		MW-21	11/9/2022	9.86	
		MW-33	2/3/2022	15.80	
		MW-33	5/12/2022	14.60	
		MW-33	9/15/2022	16.70	
		MW-33	11/9/2022	16.00	
		MW-35	2/3/2022	16.70	
		MW-35	5/12/2022	15.10	
		MW-35	9/15/2022	16.20	
		MW-35	11/9/2022	16.70	
		MW-37	9/15/2022	7.55	
		MW-37	11/9/2022	7.50	
Vinyl Chloride	ug/L	MW-2	9/15/2022	0.05	0.02
		MW-2	11/9/2022	0.02	
		MW-21	2/3/2022	0.07	
		MW-21	5/12/2022	0.04	
		MW-21	9/15/2022	0.04	
		MW-21	11/9/2022	0.04	
		MW-33	2/3/2022	21.90	
		MW-33	5/12/2022	11.40	
		MW-33	9/15/2022	21.80	
		MW-33	11/9/2022	21.10	
		MW-35	2/3/2022	6.66	
		MW-35	5/12/2022	4.56	
		MW-35	9/15/2022	4.18	
		MW-35	11/9/2022	3.87	

Table B-6

Unit D Aquifer: Summary of groundwater prediction limit exceedances

Intrawell

January 1, 2022 - December 31, 2022

Parameter	Units	Well ID	Sample Date	Sample Value	Prediction Limit (PL) Value
Ammonia (NH_3)	mg/L	MW-26	9/13/2022	0.312	0.299
Total Solids	mg/L	MW-7	11/8/2022	148	145.26
Total Dissolved Solids	mg/L	MW-7	5/10/2022	3.2	1.6
		MW-7	9/13/2022	2.0	
		MW-7	11/8/2022	16.0	
Arsenic, Total	ug/L	MW-7	5/10/2022	5.93	5.69
		MW-7	9/13/2022	5.88	
		MW-7	11/8/2022	7.31	
Barium, Total	mg/L	MW-7	11/8/2022	0.0265	0.017379224
Iron, Dissolved	mg/L	MW-12	9/13/2022	0.0107	0.01
Manganese, Dissolved	ug/L	MW-12	9/13/2022	2.4	1.8

Table B-7

Channel Cc1: Summary of groundwater volatile organic compound detections

January 1, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
cis-1,2-Dichloroethene	ug/L	MW-4	9/14/2022	1.14
Trichlorofluoromethane	ug/L	MW-3	2/1/2022	0.166 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, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
1,1-Dichloroethane	ug/L	MW-33	2/3/2022	1.91
		MW-33	5/12/2022	0.727
		MW-33	9/15/2022	1.17
		MW-33	11/9/2022	1.31
		MW-35	2/3/2022	0.296
		MW-35	5/12/2022	0.217
		MW-35	9/15/2022	0.196 JT
		MW-35	11/9/2022	0.202
1,1-Dichloroethene	ug/L	MW-33	2/3/2022	0.216
		MW-33	9/15/2022	0.119 JT
		MW-33	11/9/2022	0.133 JT
1,2-Dichloroethane	ug/L	MW-33	2/3/2022	0.142 JT
		MW-33	11/9/2022	0.109 JT
1,2-Dichloropropane	ug/L	MW-33	2/3/2022	6.36
		MW-33	5/12/2022	4.64
		MW-33	9/15/2022	5.41
		MW-33	11/9/2022	6.05
		MW-35	2/3/2022	0.389
		MW-35	5/12/2022	0.328
		MW-35	9/15/2022	0.371
		MW-35	11/9/2022	0.402
Acetone	ug/L	MW-2	5/12/2022	7.23
		MW-20	5/12/2022	8.46
		MW-33	5/12/2022	4.94 JT
Benzene	ug/L	MW-33	2/3/2022	0.811
		MW-33	5/12/2022	0.579
		MW-33	9/15/2022	0.672
		MW-33	11/9/2022	0.736
		MW-35	2/3/2022	0.485
		MW-35	5/12/2022	0.476
		MW-35	9/15/2022	0.449
		MW-35	11/9/2022	0.482
Chloroethane	ug/L	MW-33	9/15/2022	0.196 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, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
cis-1,2-Dichloroethene	ug/L	MW-2	2/3/2022	0.139 JT
		MW-2	5/12/2022	0.221
		MW-2	9/15/2022	0.246
		MW-2	11/9/2022	0.331
		MW-21	2/3/2022	0.56
		MW-21	5/12/2022	0.538
		MW-21	9/15/2022	0.478
		MW-21	11/9/2022	0.463
		MW-33	2/3/2022	32.5
		MW-33	5/12/2022	23.3
		MW-33	9/15/2022	22.8
		MW-33	11/9/2022	25.1
		MW-35	2/3/2022	3.22
		MW-35	5/12/2022	3.22
		MW-35	9/15/2022	2.9
		MW-35	11/9/2022	3.26
Dichlorodifluoromethane	ug/L	MW-2	2/3/2022	2.86
		MW-2	5/12/2022	3.24
		MW-2	9/15/2022	2.16
		MW-2	11/9/2022	1.59
		MW-20	2/3/2022	0.217
		MW-21	2/3/2022	2.2
		MW-21	5/12/2022	1.66
		MW-21	9/15/2022	1.27
		MW-21	11/9/2022	1.28
		MW-33	2/3/2022	4.4
		MW-33	5/12/2022	2.91
		MW-33	9/15/2022	4.19
		MW-33	11/9/2022	3.52
		MW-35	2/3/2022	0.909
		MW-35	5/12/2022	0.752
		MW-35	9/15/2022	0.602
		MW-35	11/9/2022	0.494
		MW-37	6/30/2022	0.152 JT
		MW-37	9/15/2022	0.114 JT
		MW-37	11/9/2022	0.123 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, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
tran s-1,2-Dichloroethene	ug/L	MW-33	2/3/2022	1.05
		MW-33	5/12/2022	0.469
		MW-33	9/15/2022	0.764
		MW-33	11/9/2022	0.764
		MW-35	2/3/2022	0.257
		MW-35	5/12/2022	0.239
		MW-35	9/15/2022	0.183 JT
		MW-35	11/9/2022	0.194 JT
Trichloroethene	ug/L	MW-33	2/3/2022	0.192 JT
		MW-33	5/12/2022	0.147 JT
		MW-33	9/15/2022	0.146 JT
		MW-33	11/9/2022	0.167 JT
		MW-35	2/3/2022	1.29
		MW-35	5/12/2022	1.17
		MW-35	9/15/2022	0.92
		MW-35	11/9/2022	1.06
		MW-37	6/30/2022	0.231
		MW-37	9/15/2022	0.179 JT
		MW-37	11/9/2022	0.212
Trichlorofluoromethane	ug/L	MW-2	11/9/2022	0.733
		MW-2	9/15/2022	0.783
		MW-2	5/12/2022	1.97
		MW-2	2/3/2022	2.45
		MW-21	11/9/2022	0.619
		MW-21	9/15/2022	0.519
		MW-21	5/12/2022	1.16
		MW-21	2/3/2022	1.6
		MW-37	11/9/2022	0.284
		MW-37	9/15/2022	0.28
		MW-37	6/30/2022	0.32

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, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
Vinyl Chloride	ug/L	MW-2	2/3/2022	0.0135 JT
		MW-2	9/15/2022	0.0474 D
		MW-2	11/9/2022	0.0235 D
		MW-21	2/3/2022	0.0687
		MW-21	5/12/2022	0.0375
		MW-21	9/15/2022	0.0368 D
		MW-21	11/9/2022	0.0388 D
		MW-33	2/3/2022	21.9
		MW-33	5/12/2022	11.4
		MW-33	9/15/2022	21.8 D
		MW-33	11/9/2022	21.1 D
		MW-35	2/3/2022	6.66
		MW-35	5/12/2022	4.56
		MW-35	9/15/2022	4.18 D
		MW-35	11/9/2022	3.87 D

See Data Qualifiers Section in Appendix B for Qualifier Information.

Table B-9

Channel Cc3: Summary of groundwater volatile organic compound detections

January 1, 2022 - December 31, 2022

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, 2022 - December 31, 2022

Compound	Units	Site ID	Date	Sample Value
There were no volatile organic compounds detected this year in Unit D Aquifer samples.				

Table B-11

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

January 1, 2022 - December 31, 2022

Summary of trip blank volatile organic compound detections

Compound	Units	Sample ID	Date	Sample Value
Acetone	ug/L	VTRP220203X	2/3/2022	12.5
		VTRP220203Y	2/3/2022	12
		VTRP220203Z	2/3/2022	11.9

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**
2-Butanone	ug/L	WV85220207F	2/7/2022	2.41 JT
		WV9-220913F	9/13/2022	8.01
Acetone	ug/L	WV85220207F	2/7/2022	7.66
Carbon Disulfide	ug/L	WV9-220913F	9/13/2022	0.114 JT

See Data Qualifiers Section in Appendix B for Qualifier Information.

Summary of method blank volatile organic compound detections

Compound	Units	Workgroup ID	Date	Sample Value
Acetone	ug/L	WG180071-1	2/3/2022	12.7 B
		WG180071-2	2/3/2022	30 B
		WG180071-3	2/3/2022	22.5 B
		WG180071-4	2/3/2022	22.4 B
Bis(2-Ethylhexyl) phthalate	ug/L	WV37220630-	6/30/2022	7.27 BJ
		WG182552-1	7/13/2022	0.935 BJT
Diethylphthalate	ug/L	WV37220630-	7/13/2022	0.633 BGJT
		WG182552-1	7/13/2022	0.806 BJT

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, 2022 - December 31, 2022

Compound	Units	Site ID	Sample Date	Sample Value	Reg. Limit	Standard(s) Exceeded
Turbidity, Field	ntu	SW-W3	2/7/2022	29.2	25	SSWC; FA; FC
Iron, Total	mg/L	SW-E	11/16/2022	2.97	1	FC
		SW-W1	2/7/2022	3.43		
		SW-W1	5/11/2022	1.91		
		SW-W2	2/7/2022	2.98		
		SW-W2	5/11/2022	2.04		
		SW-W2	9/14/2022	2.21		
		SW-W2	11/16/2022	1.03		
		SW-W3	2/7/2022	2.14		
		SW-W3	5/11/2022	1.23		

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

Figure C−1A
Channel Cc1
Field pH

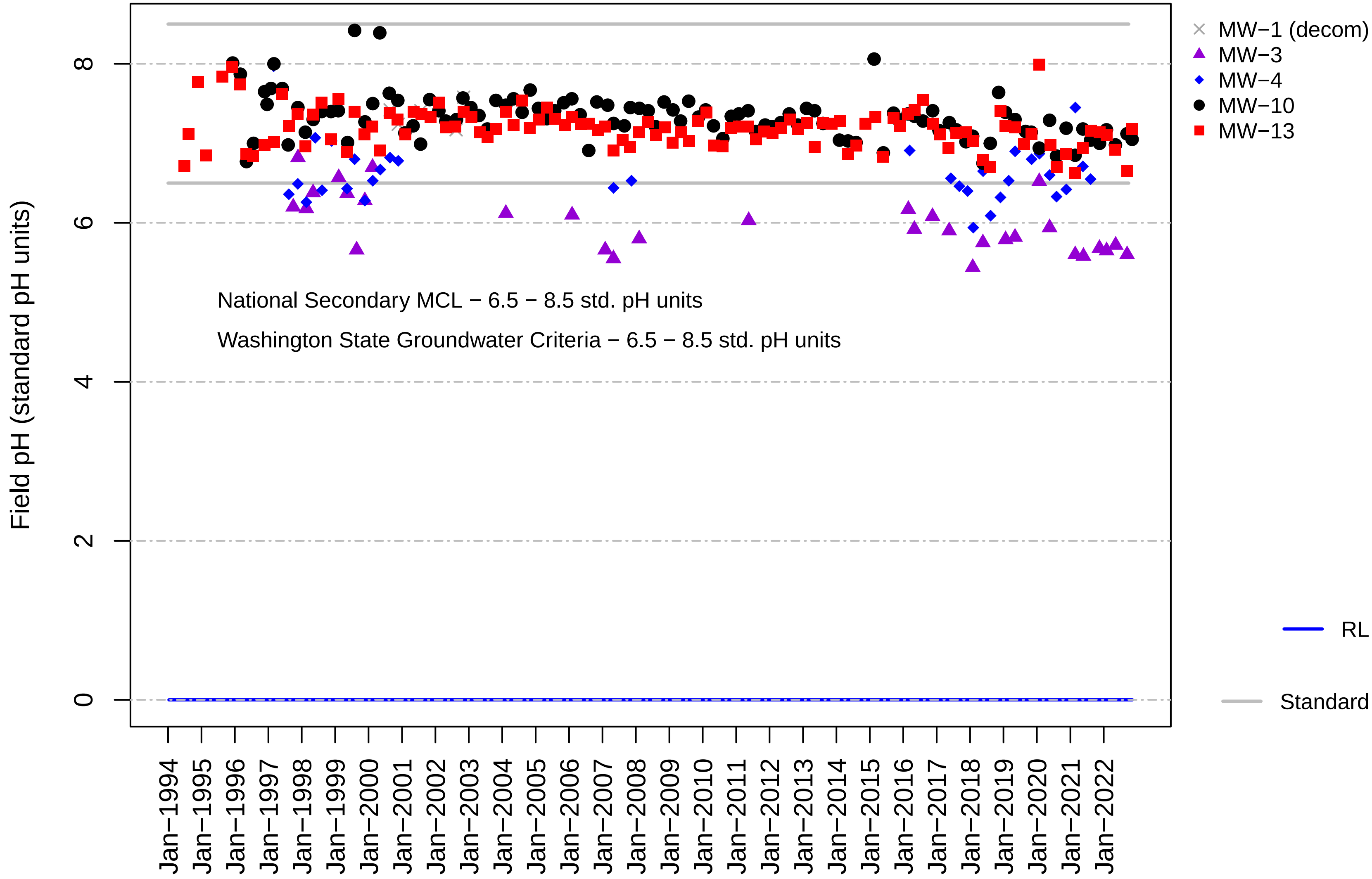


Figure C−1B
Channel Cc1
Field pH

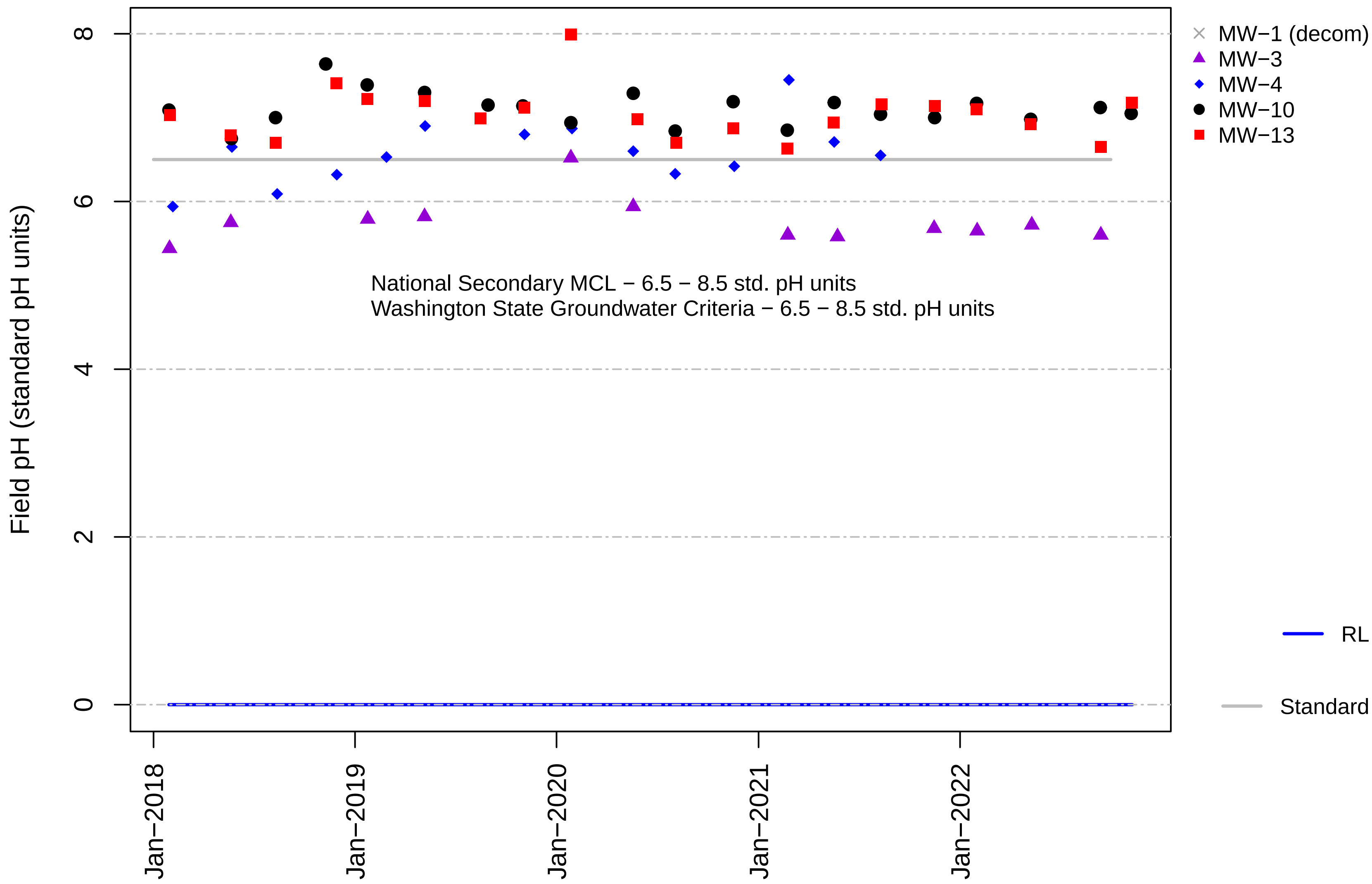


Figure C−2A
Channel Cc1
Field Specific Conductance

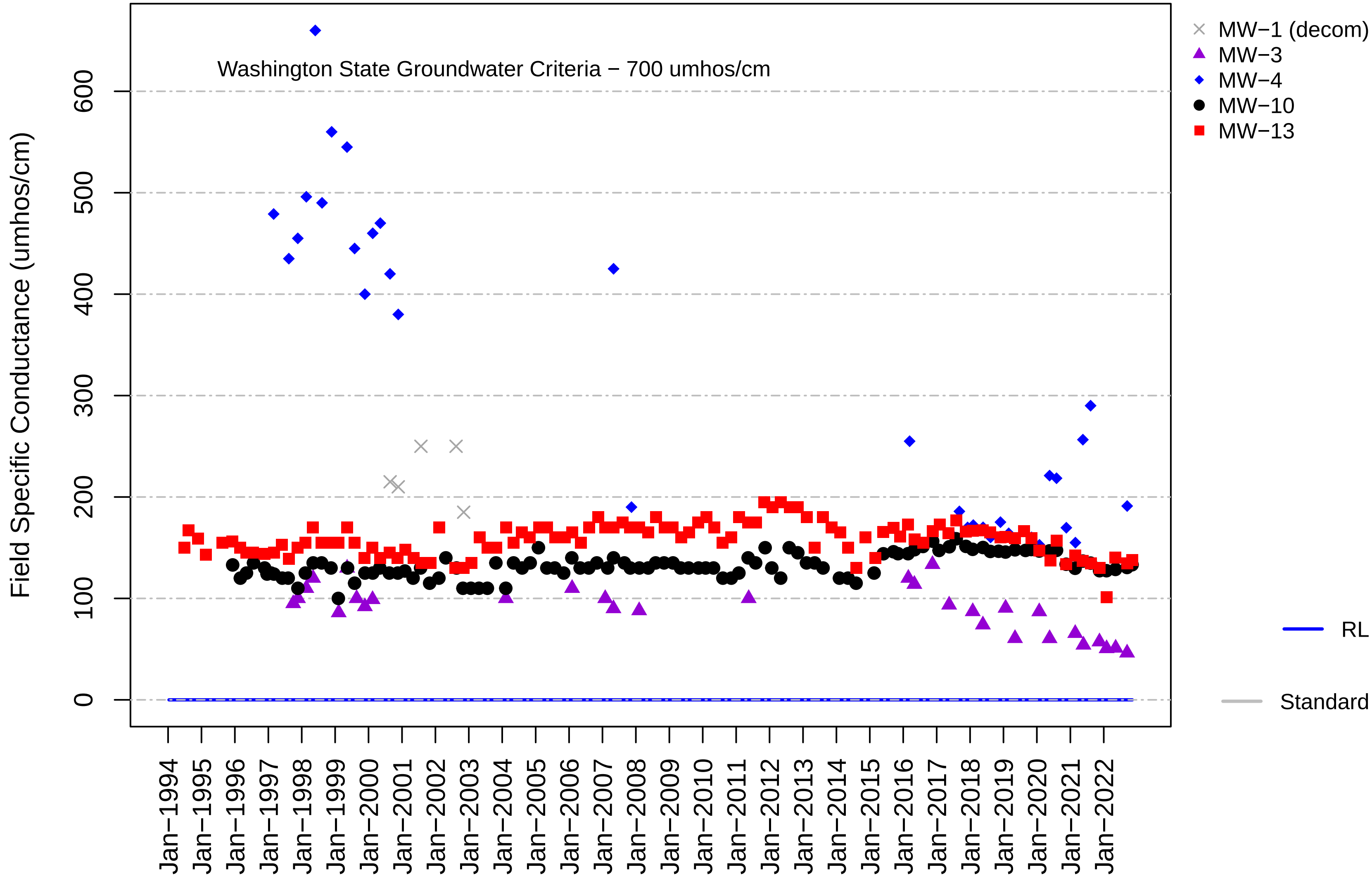
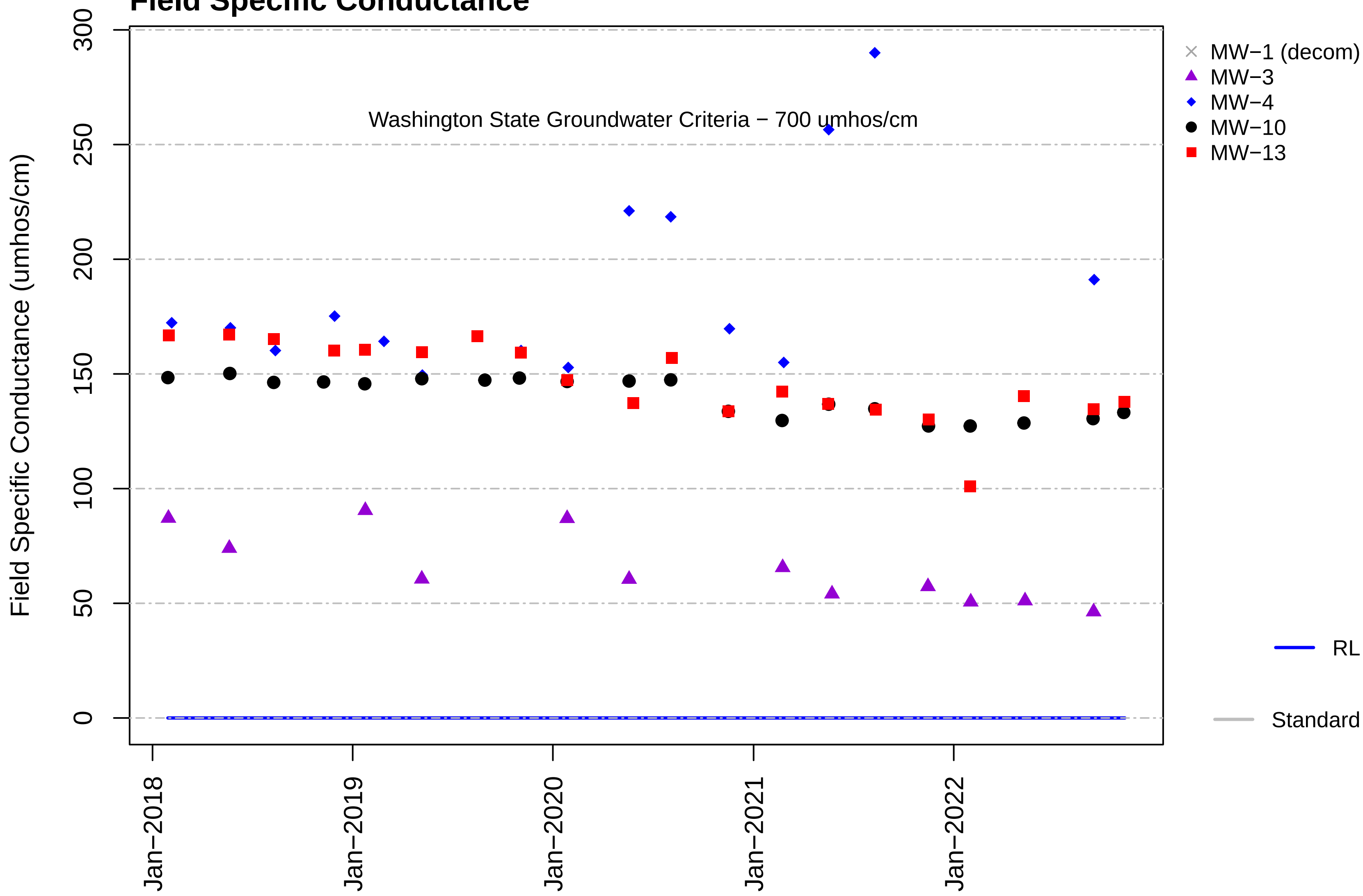


Figure C−2B
Channel Cc1
Field Specific Conductance



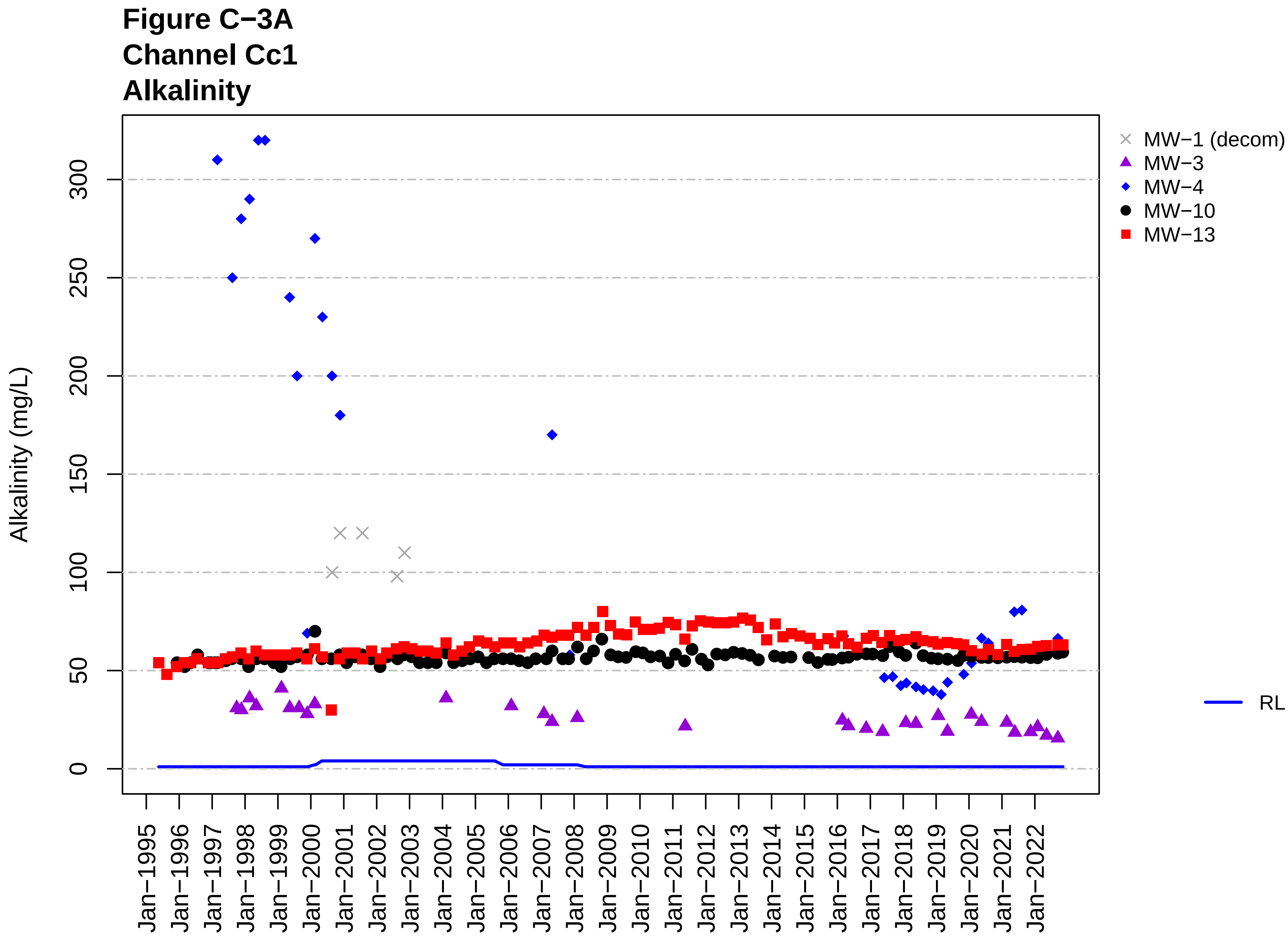


Figure C−3A
Channel Cc1
Alkalinity
Alkalinity (mg/L)
0
50
100
150
200
250
300
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

Figure C−3B
Channel Cc1
Alkalinity

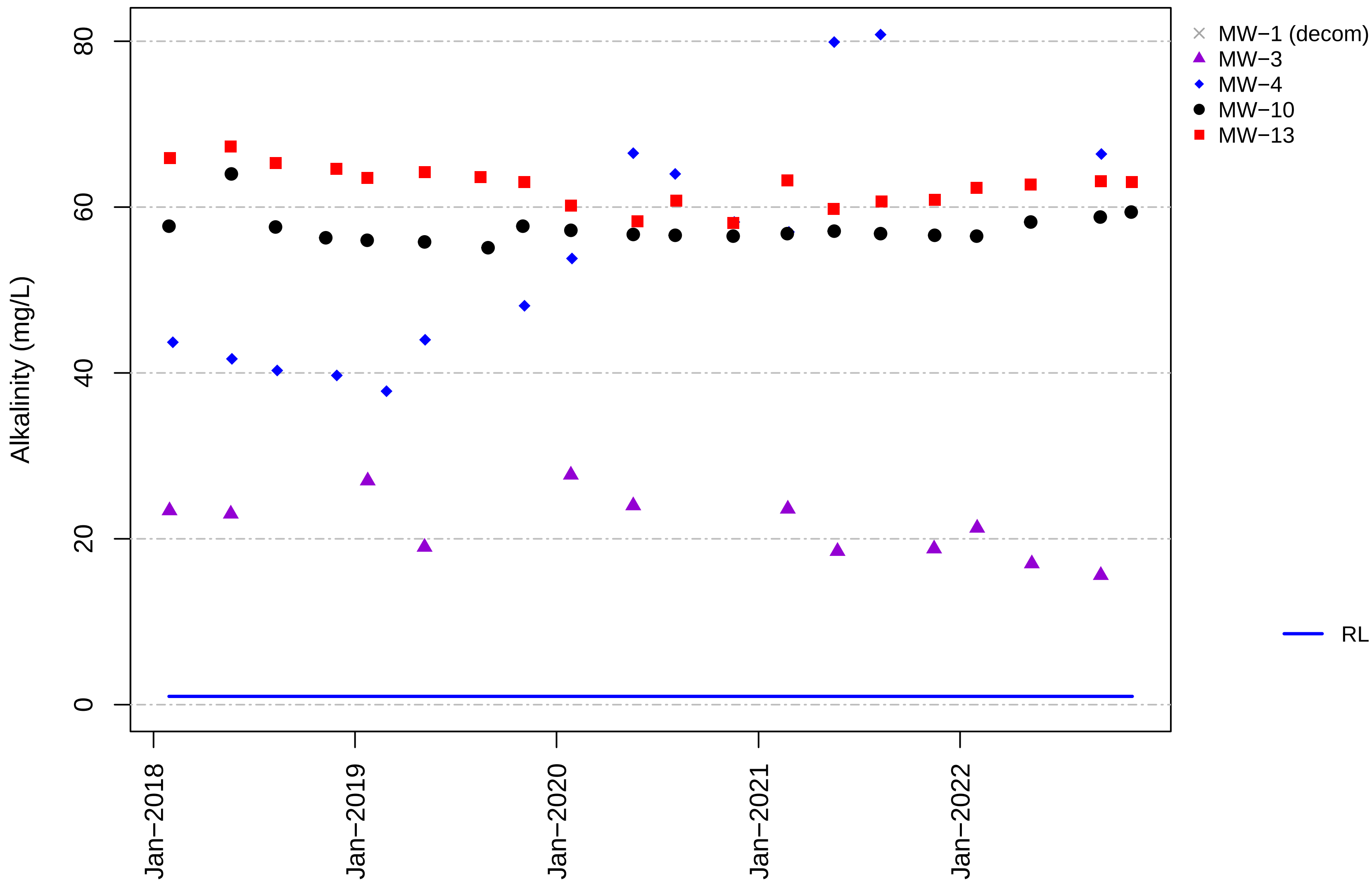
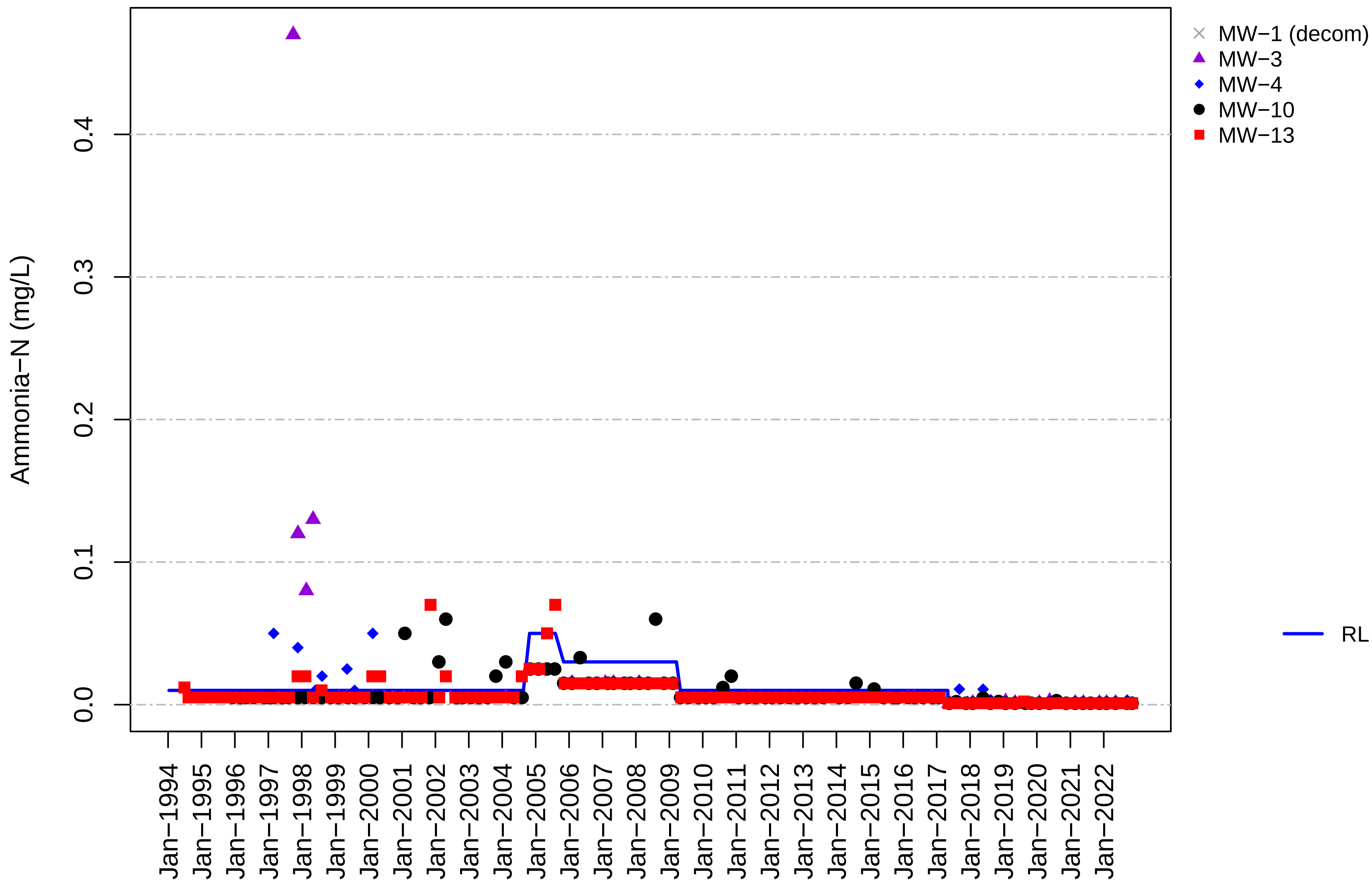


Figure C−4A
Channel Cc1
Ammonia



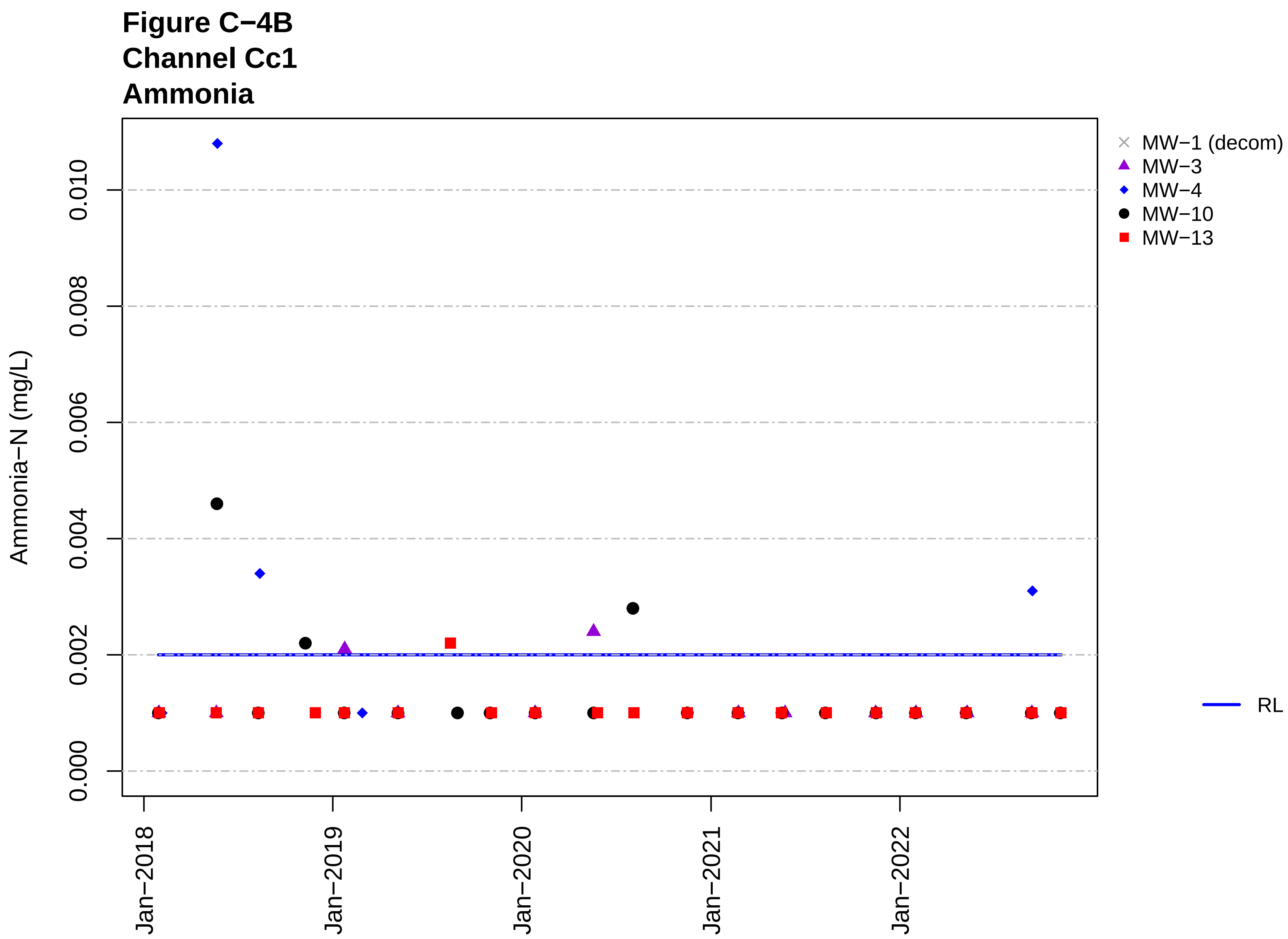
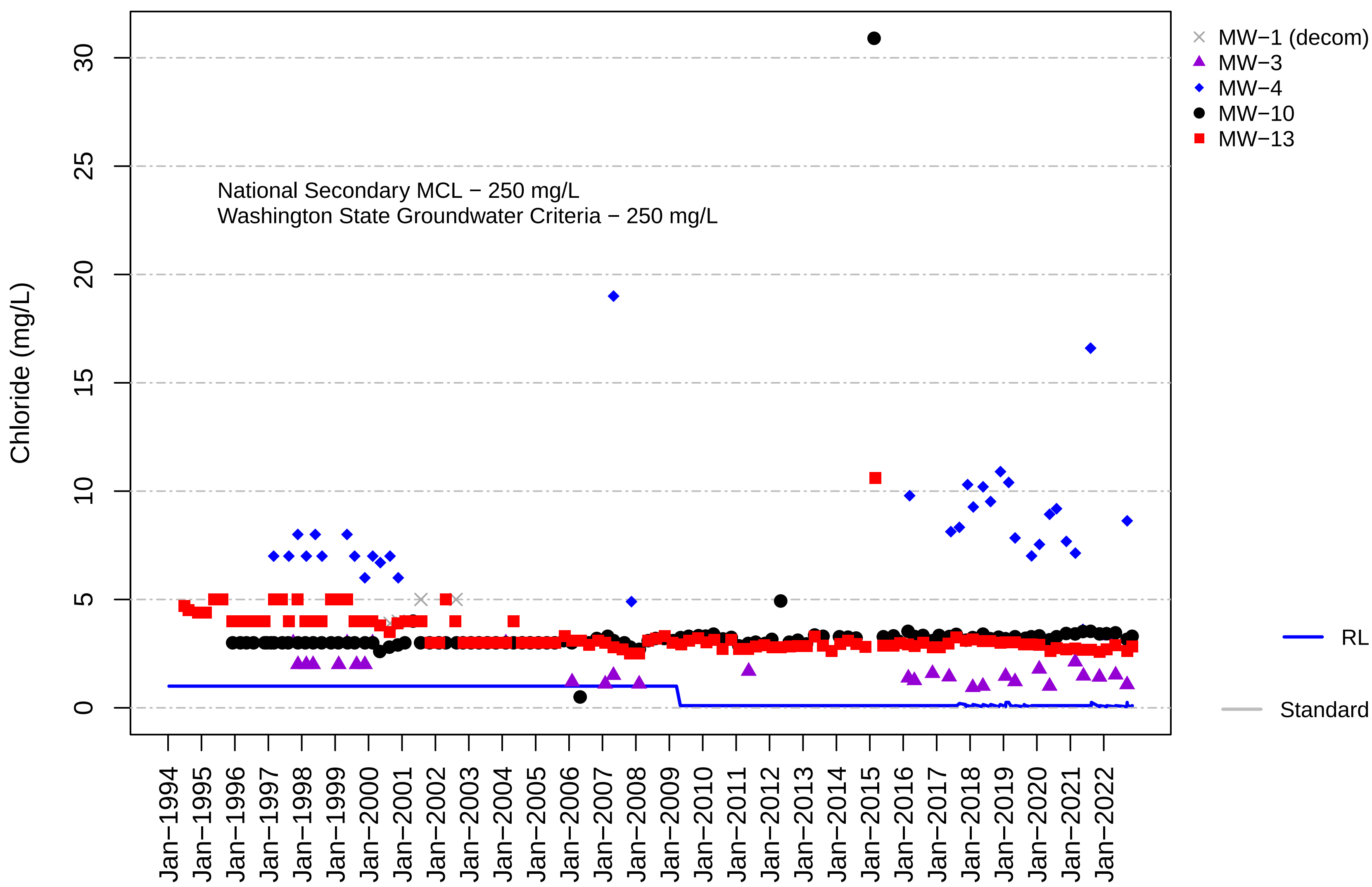


Figure C−4B
Channel Cc1
Ammonia
Ammonia−N (mg/L)
0.000
0.002
0.004
0.006
0.008
0.010
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

Figure C−5A
Channel Cc1
Chloride



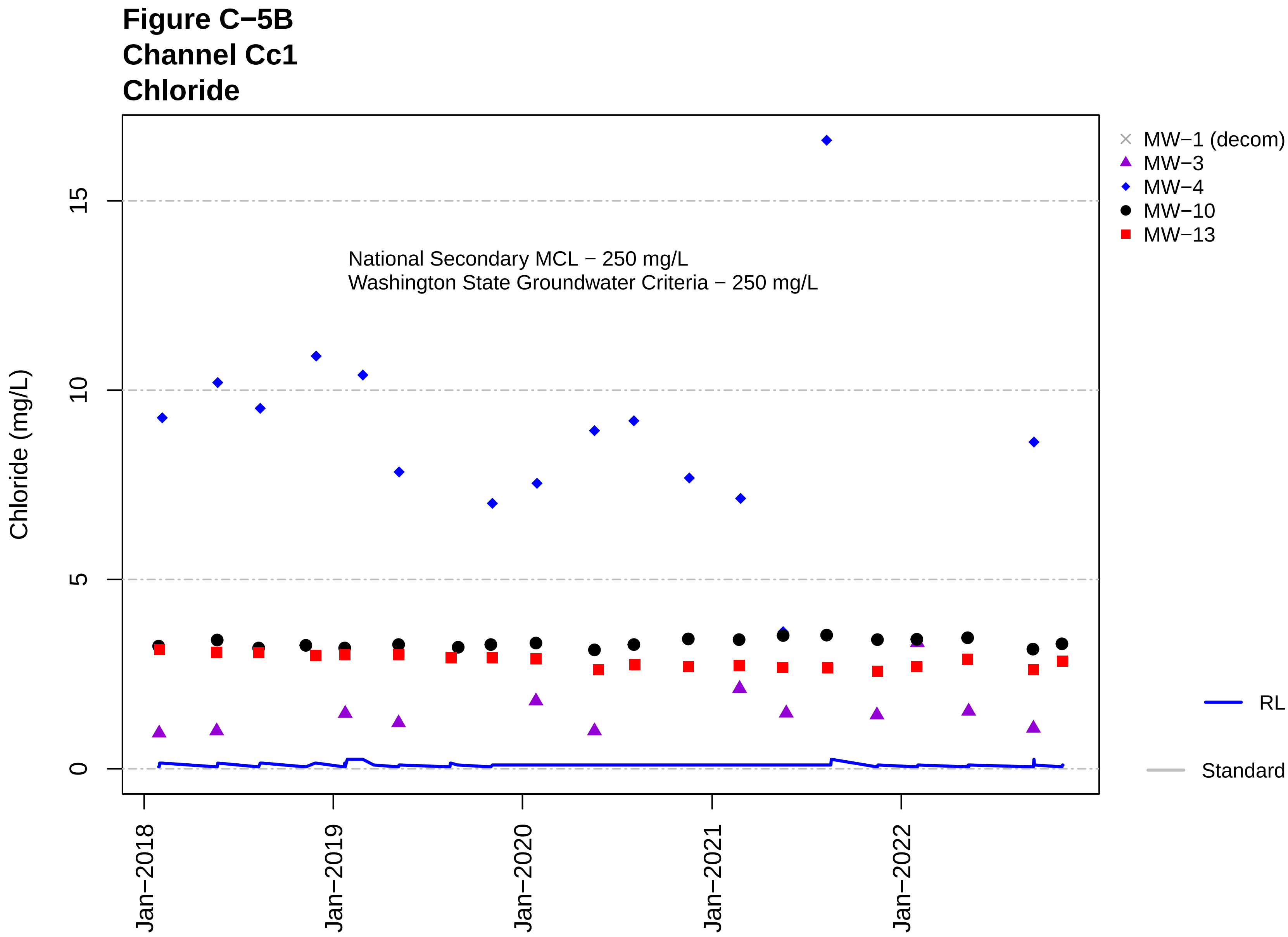


Figure C−5B
Channel Cc1
Chloride
Chloride (mg/L)
0
5
10
15
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

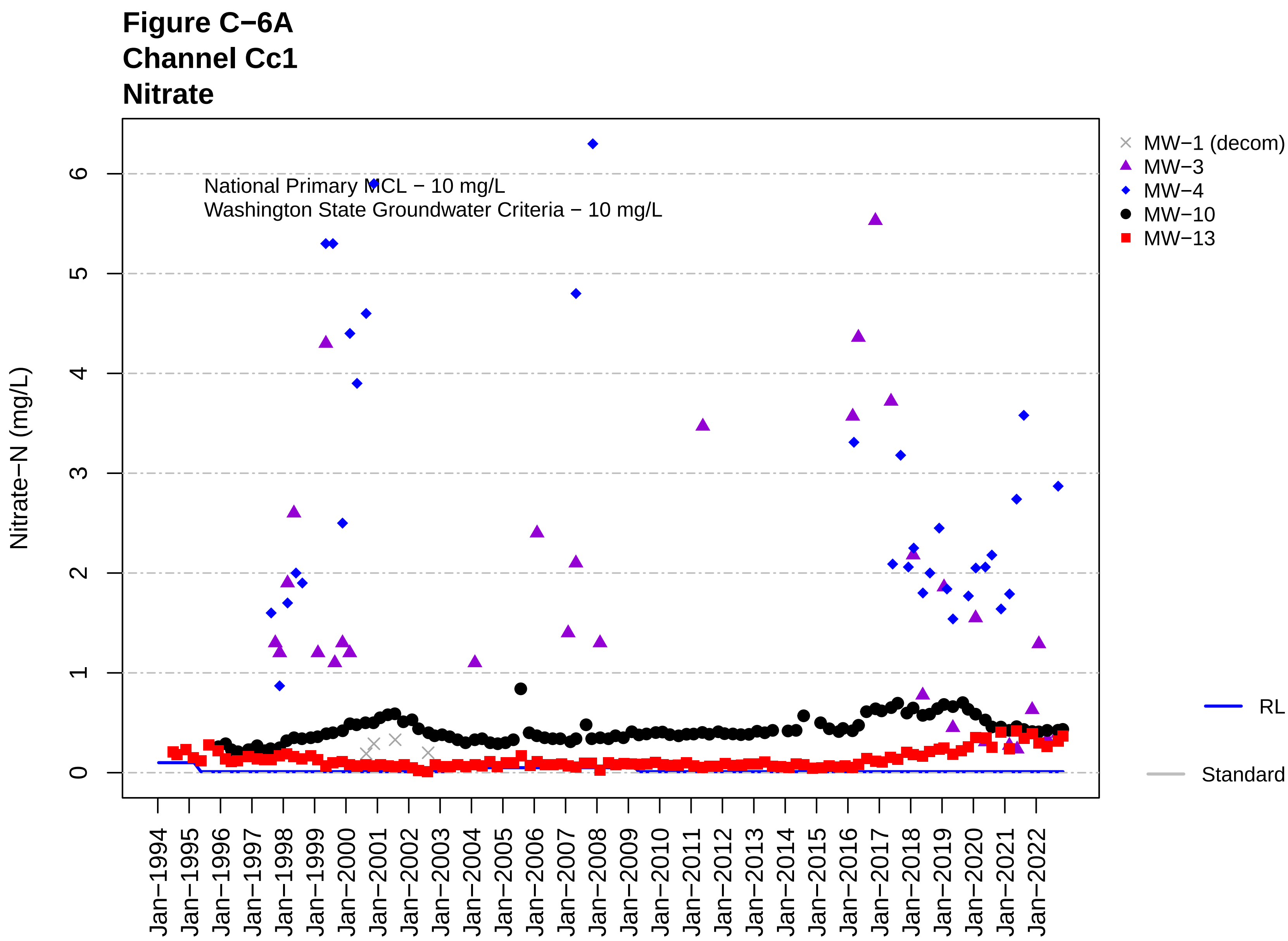


Figure C−6A
Channel Cc1
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
1
2
3
4
5
6
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

Figure C−6B
Channel Cc1
Nitrate

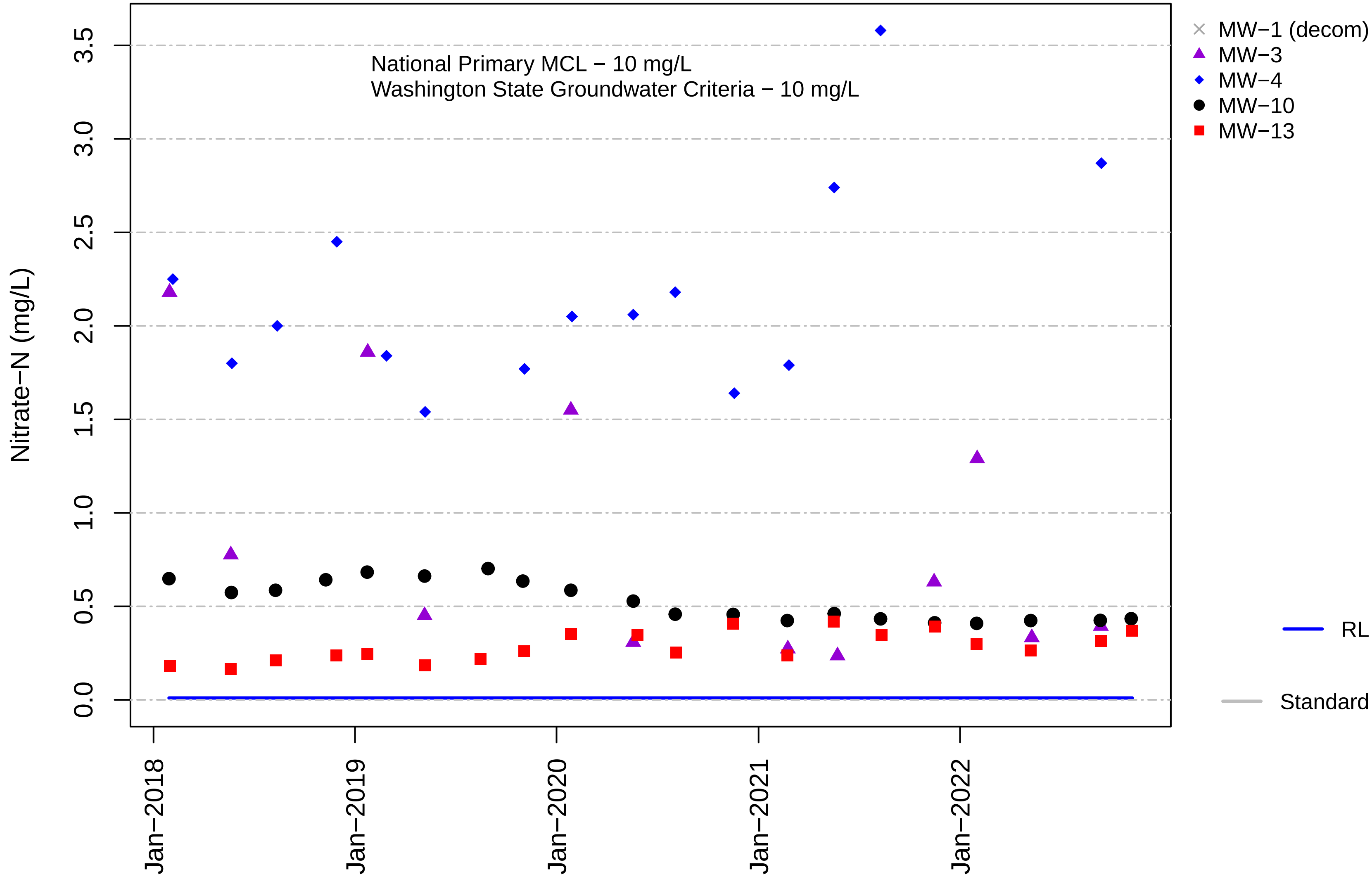


Figure C-7A
Channel Cc1
Sulfate

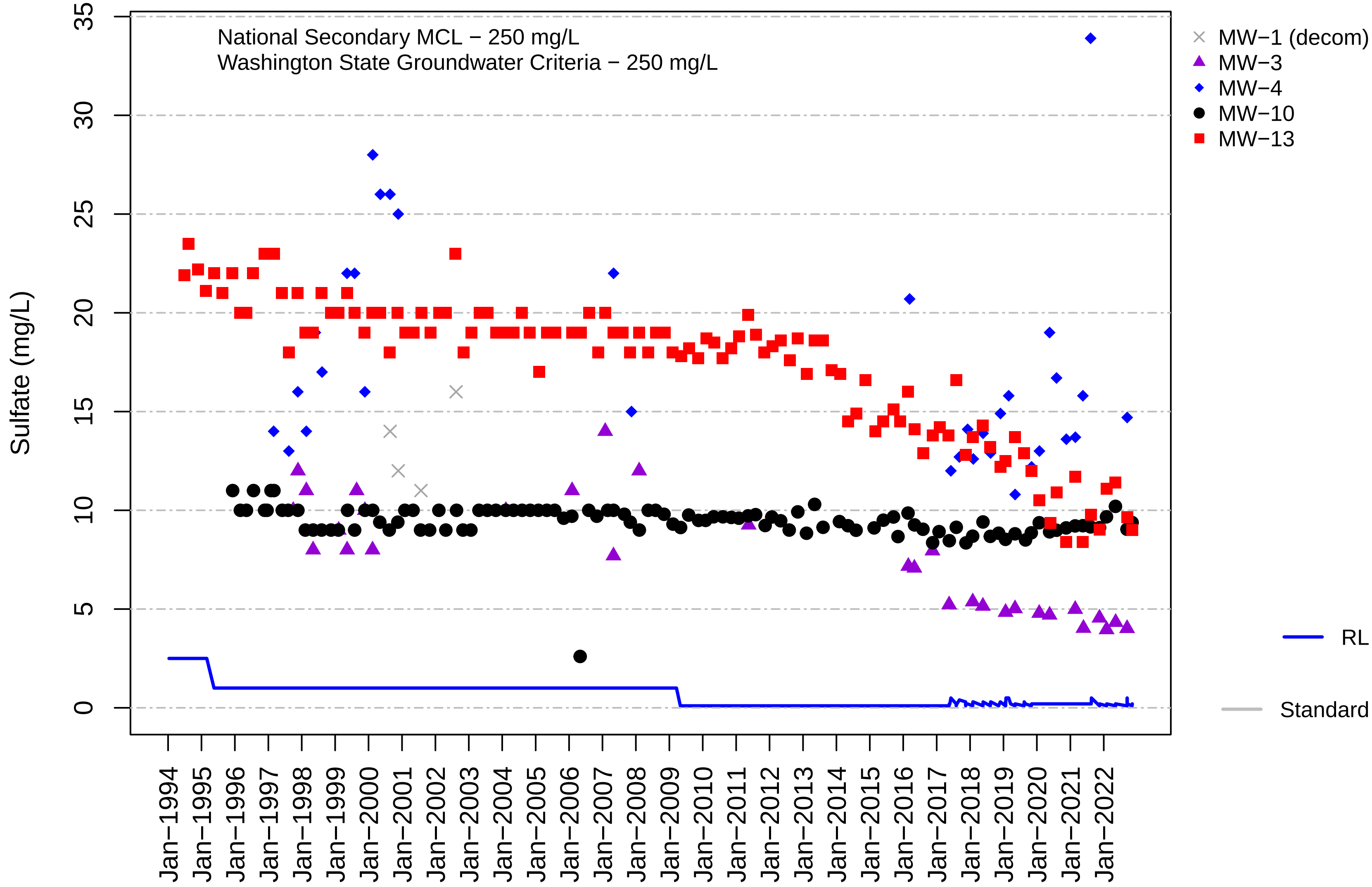


Figure C−7B
Channel Cc1
Sulfate

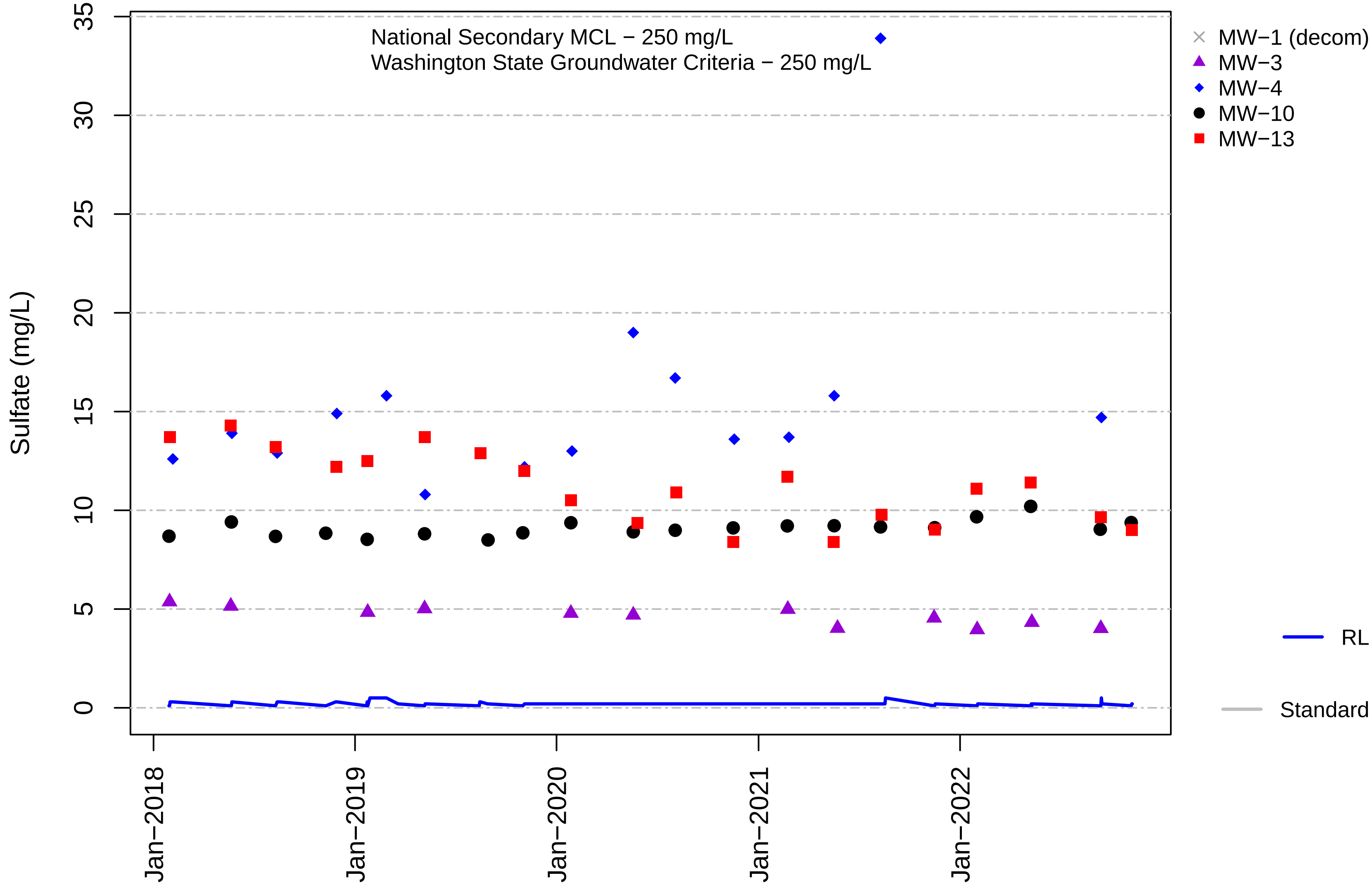


Figure C−8A
Channel Cc1
Total Dissolved Solids

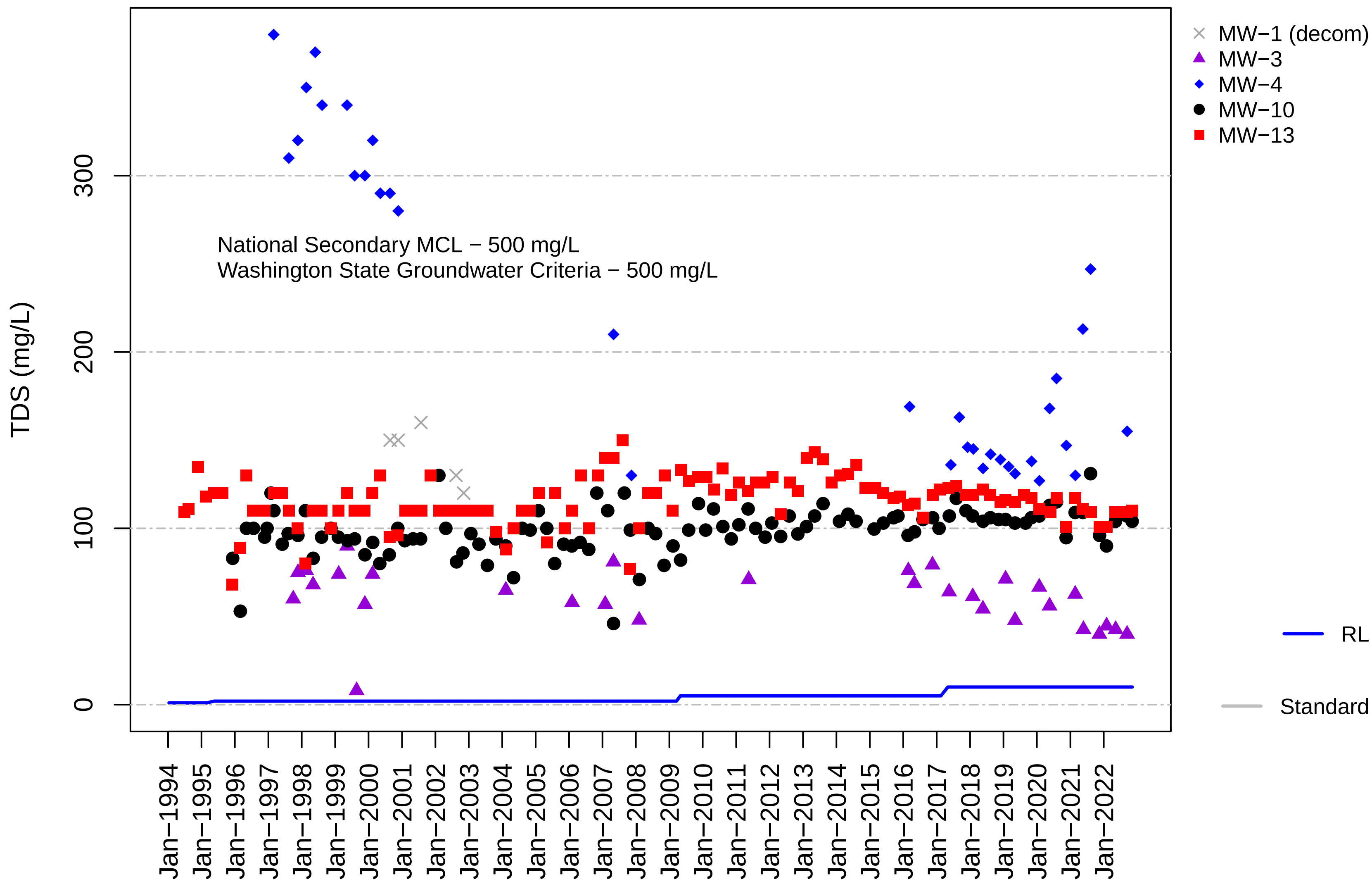


Figure C−8B
Channel Cc1
Total Dissolved Solids

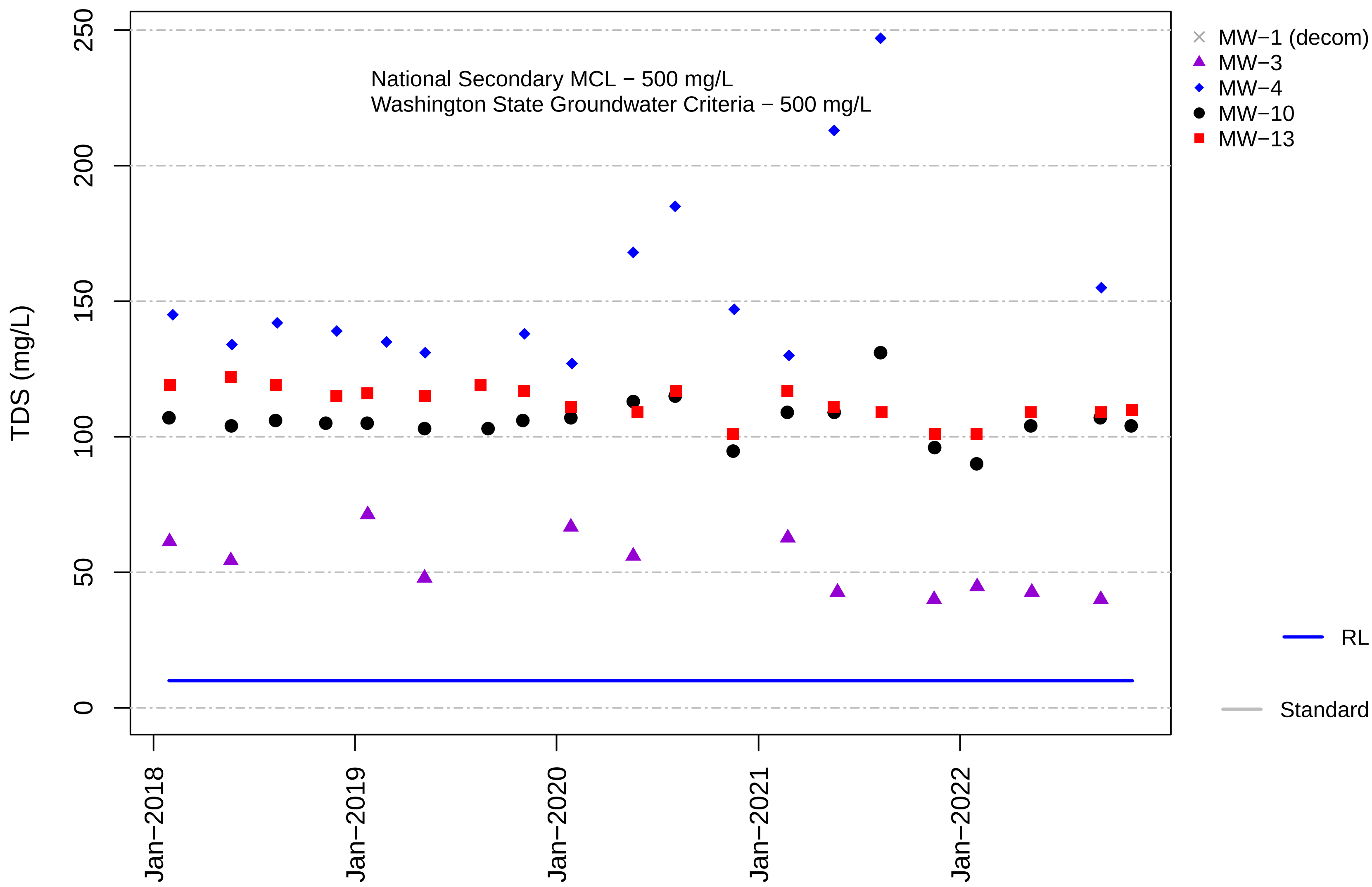


Figure C−9A
Channel Cc1
Arsenic

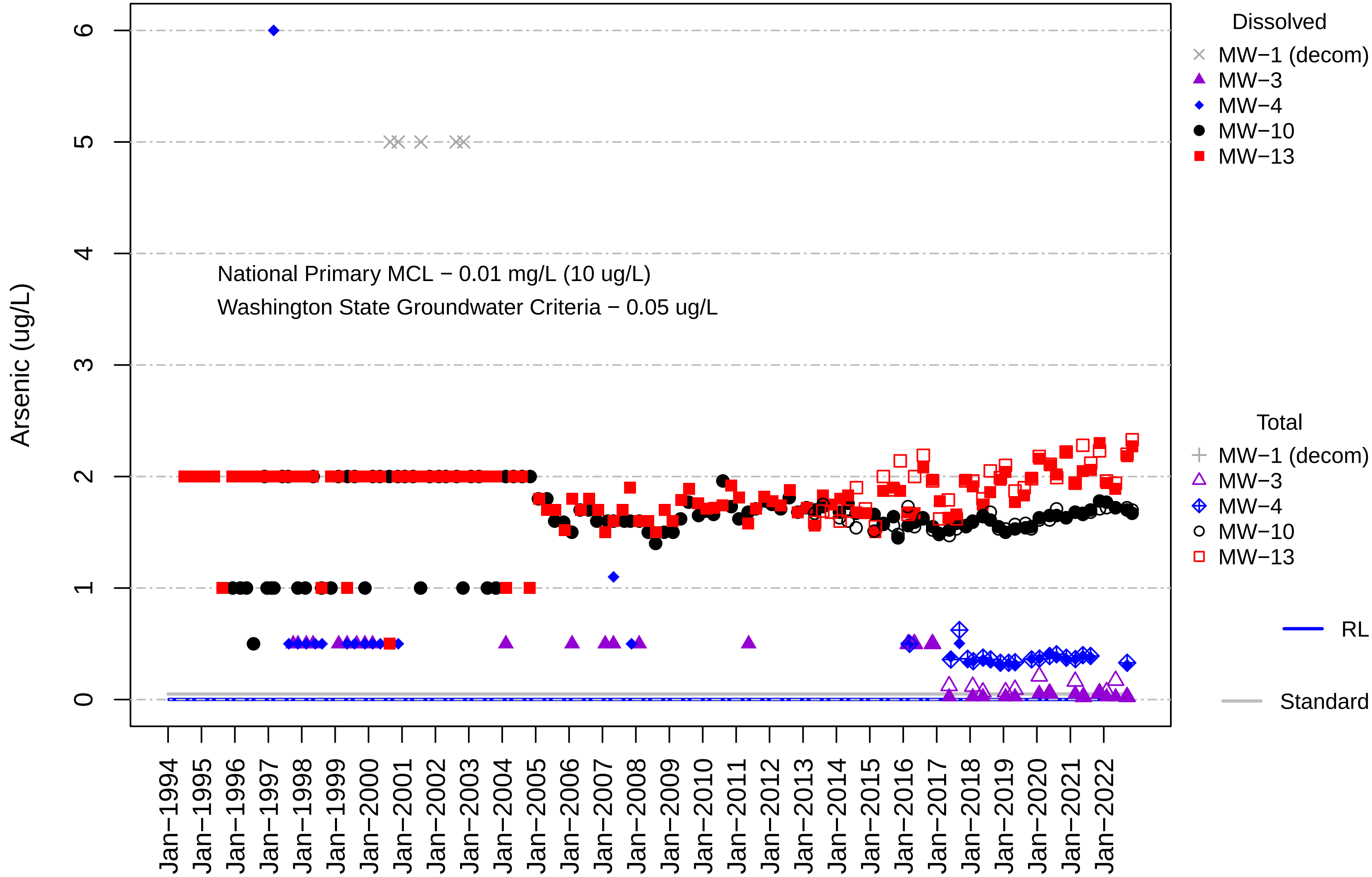


Figure C−9B
Channel Cc1
Arsenic

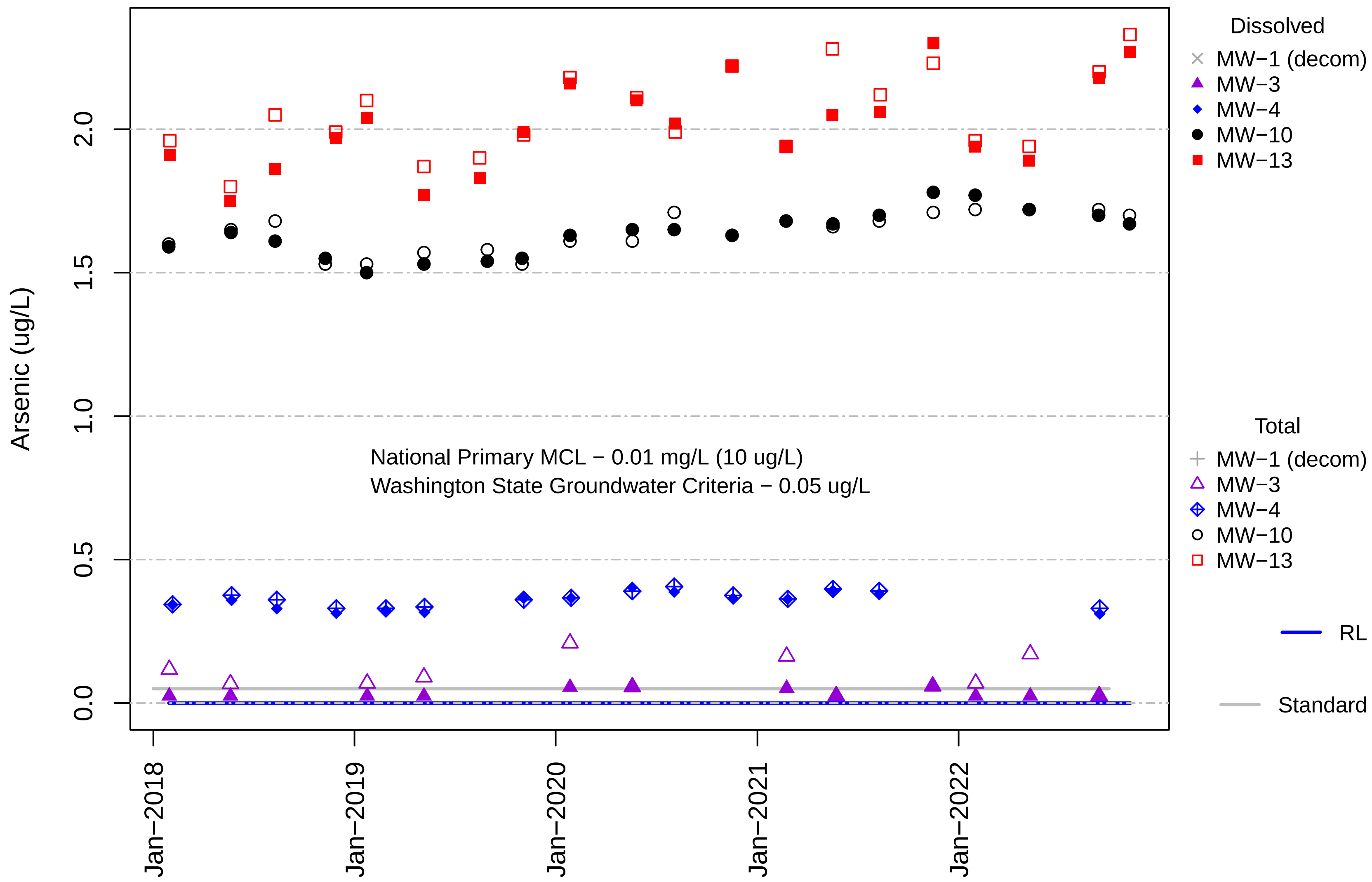


Figure C−10A
Channel Cc1
Calcium

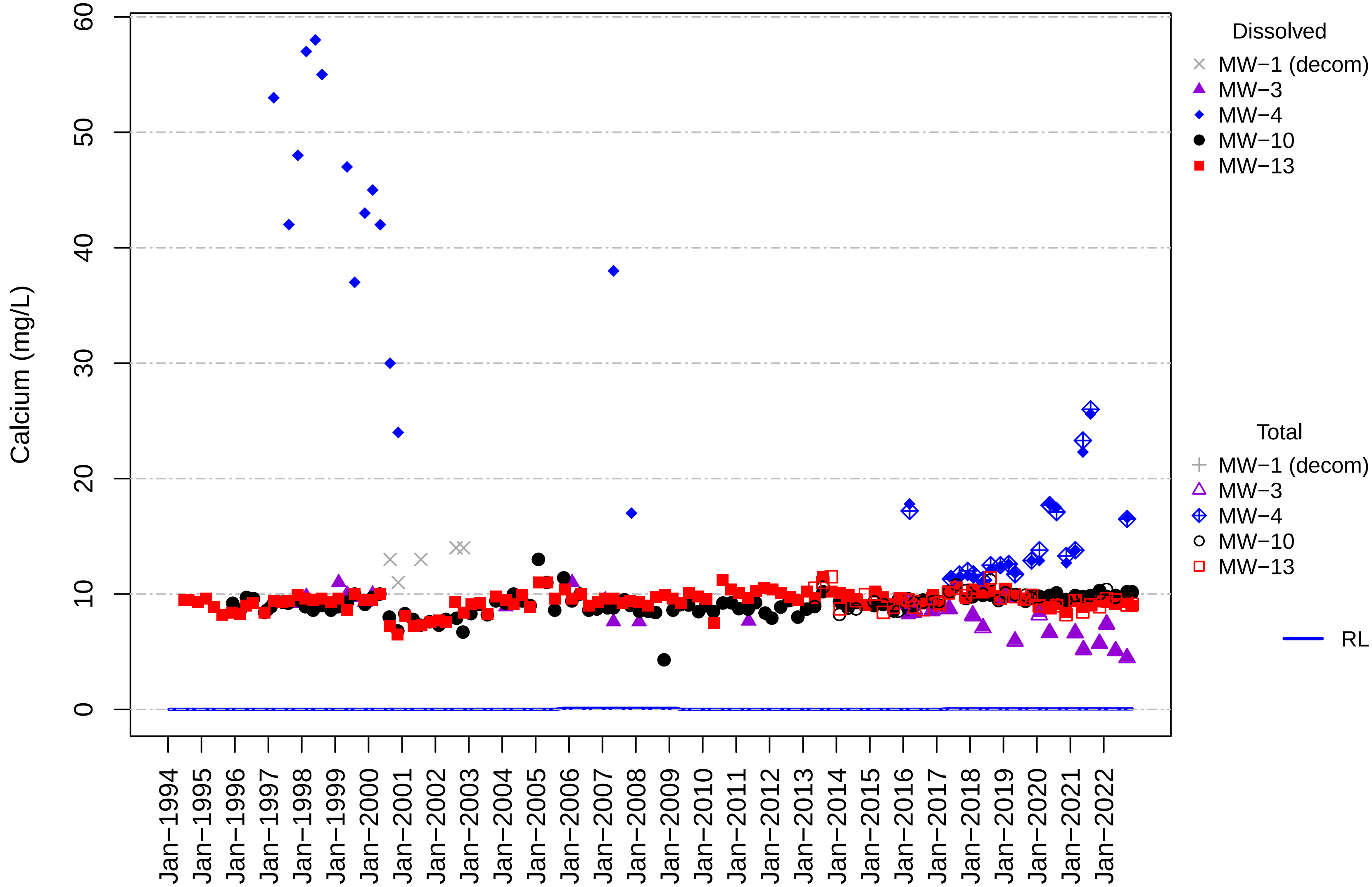


Figure C−10B
Channel Cc1
Calcium

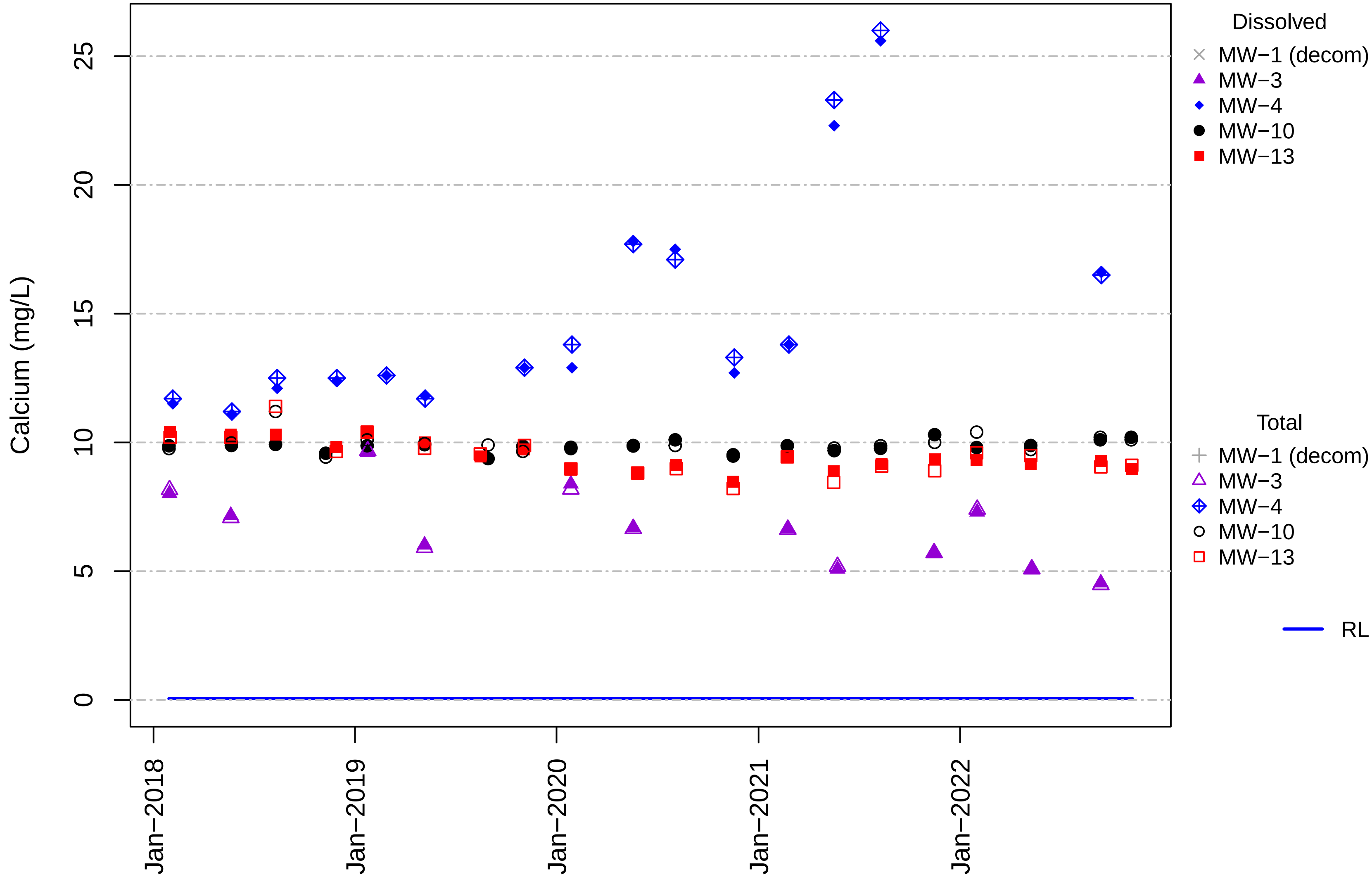


Figure C−11A
Channel Cc1
Iron

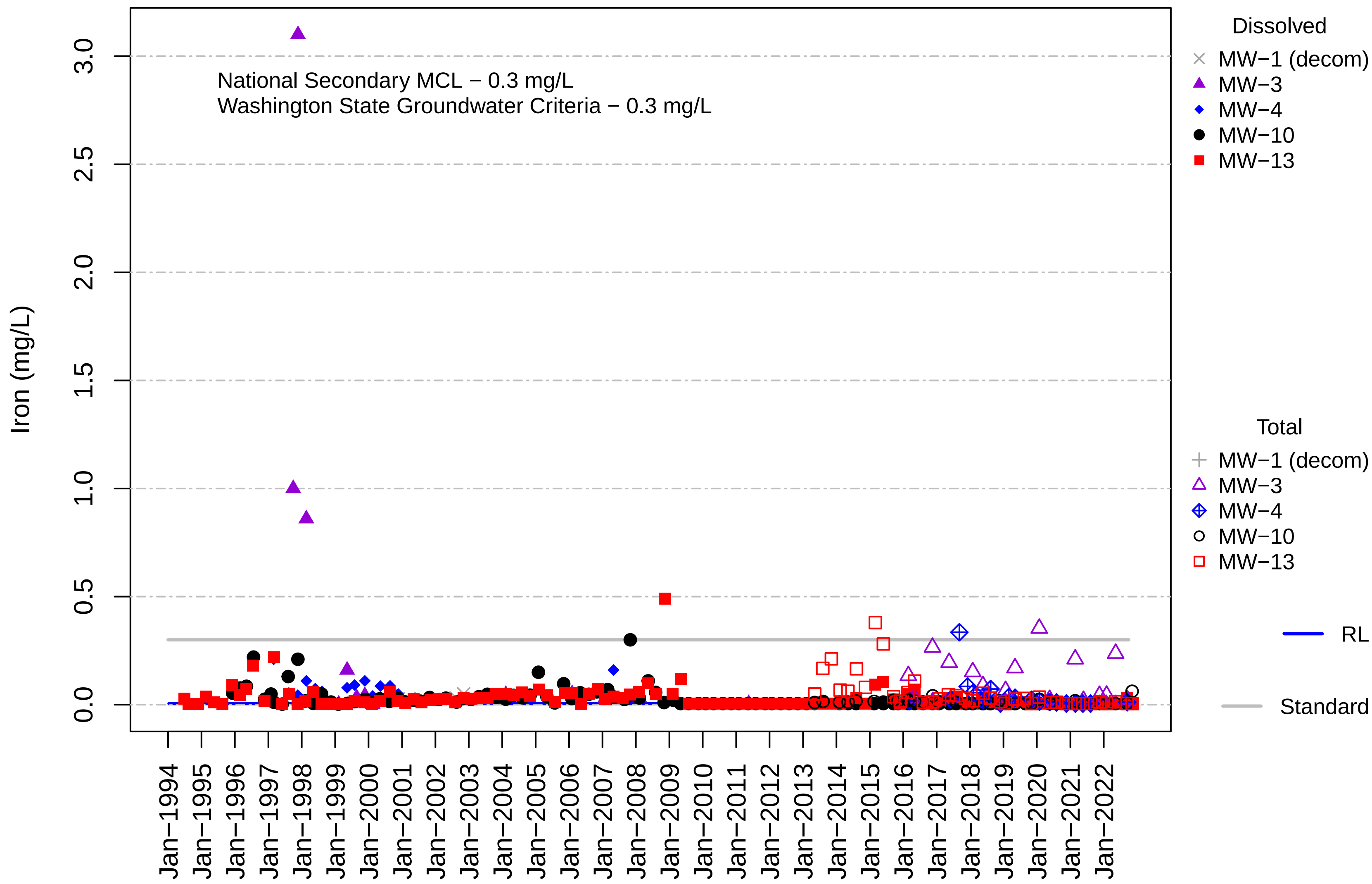


Figure C−11B
Channel Cc1
Iron

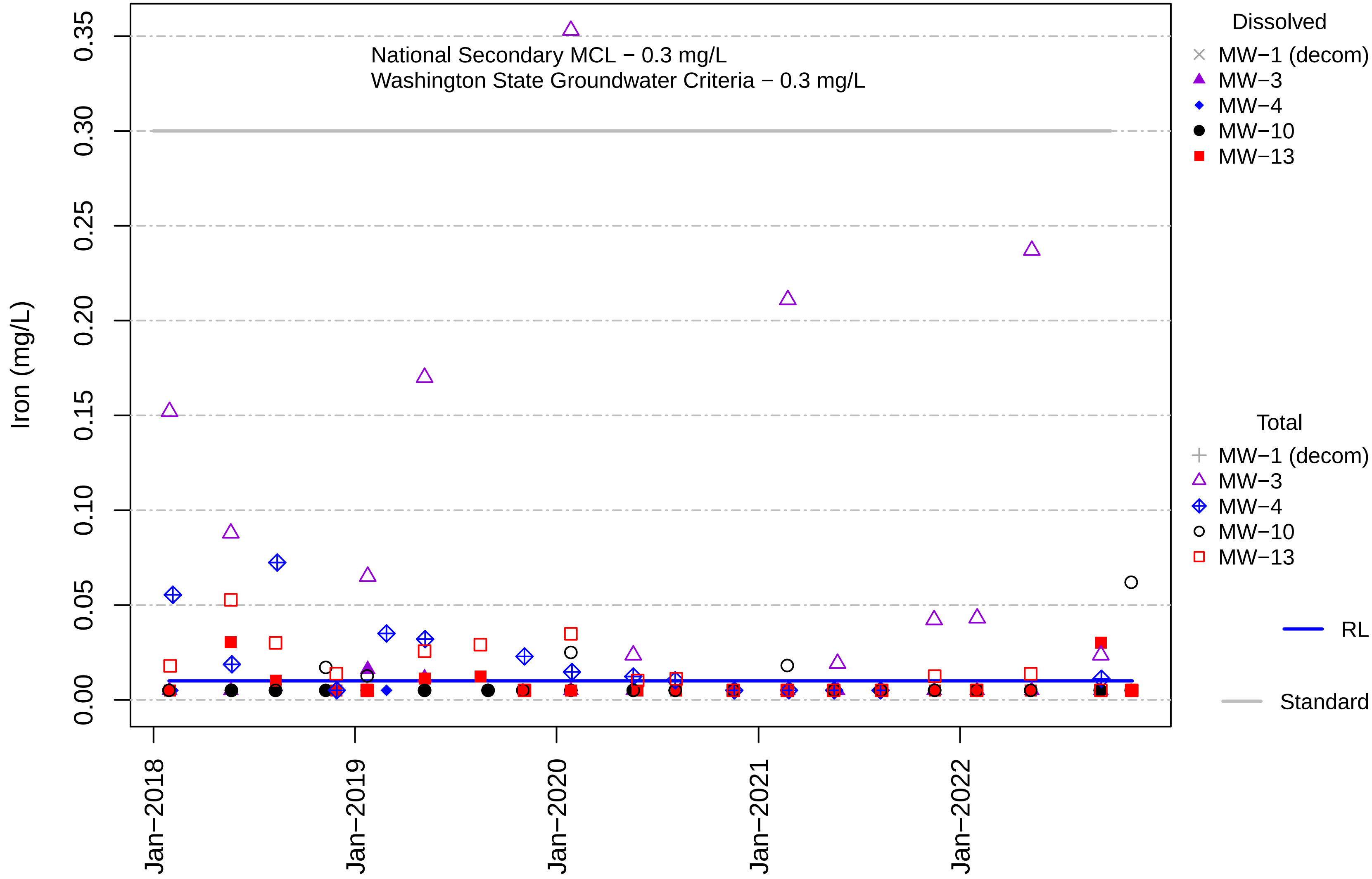


Figure C−12A
Channel Cc1
Magnesium

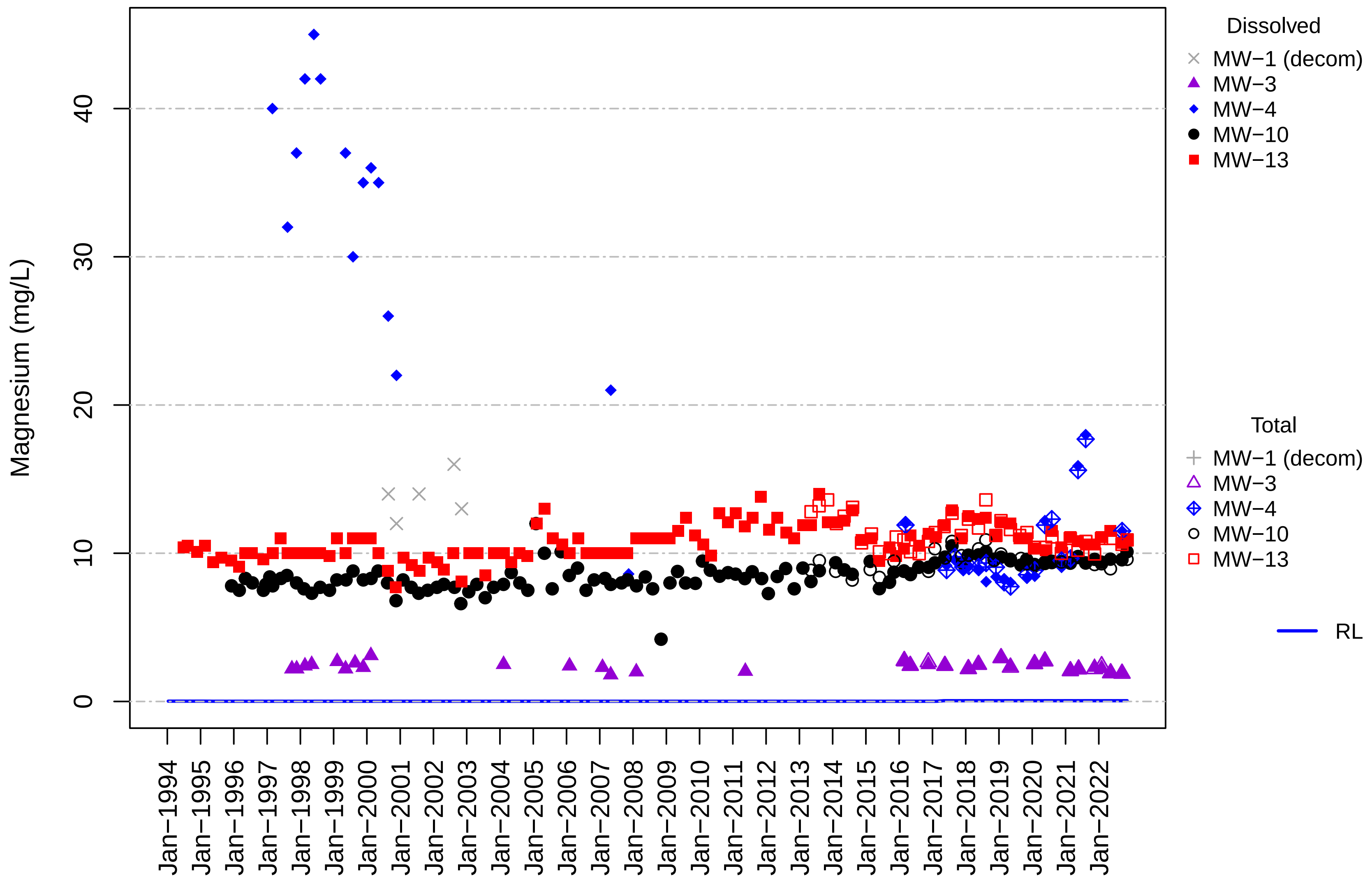


Figure C−12B
Channel Cc1
Magnesium

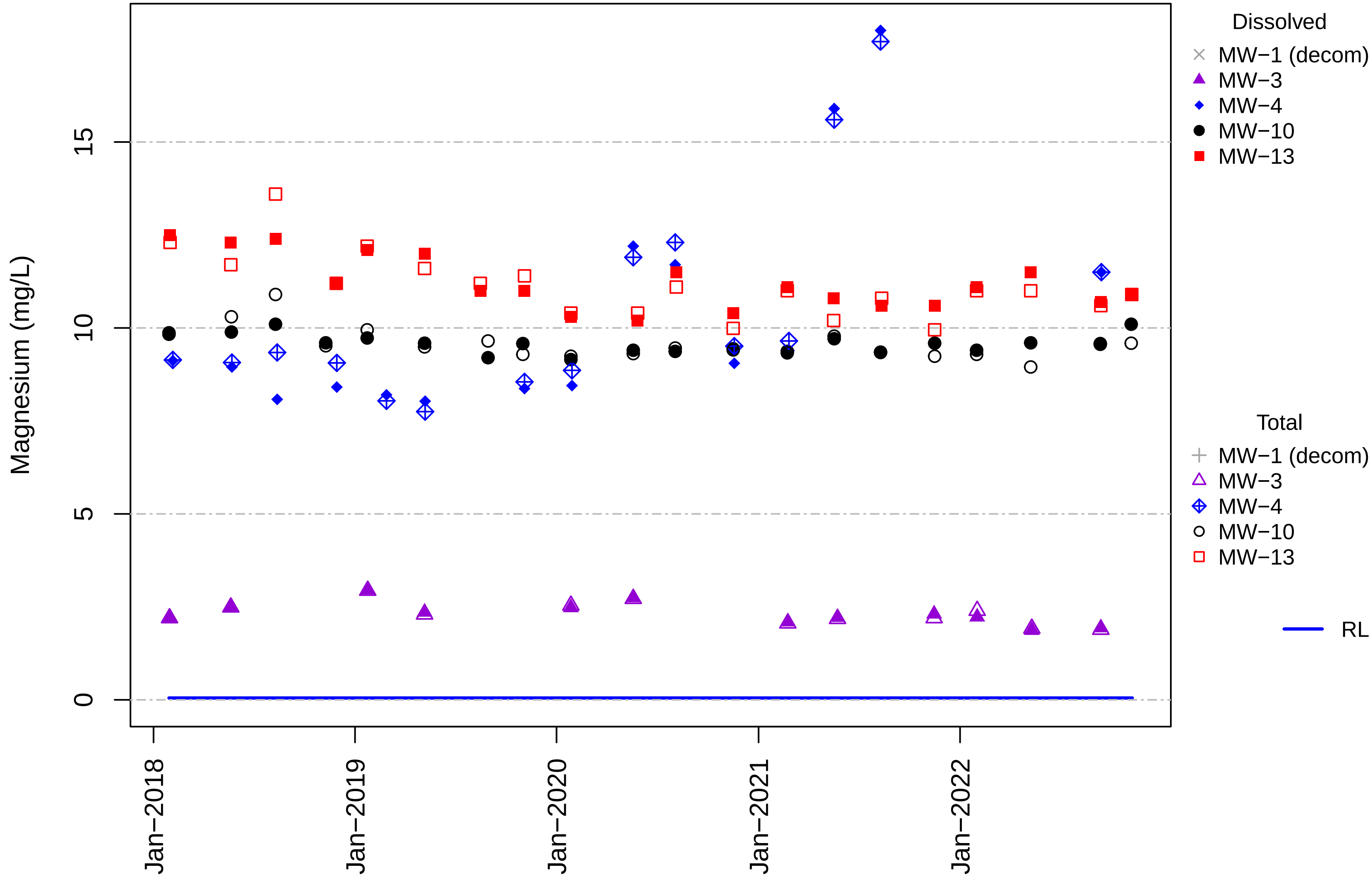


Figure C−13A
Channel Cc1
Manganese

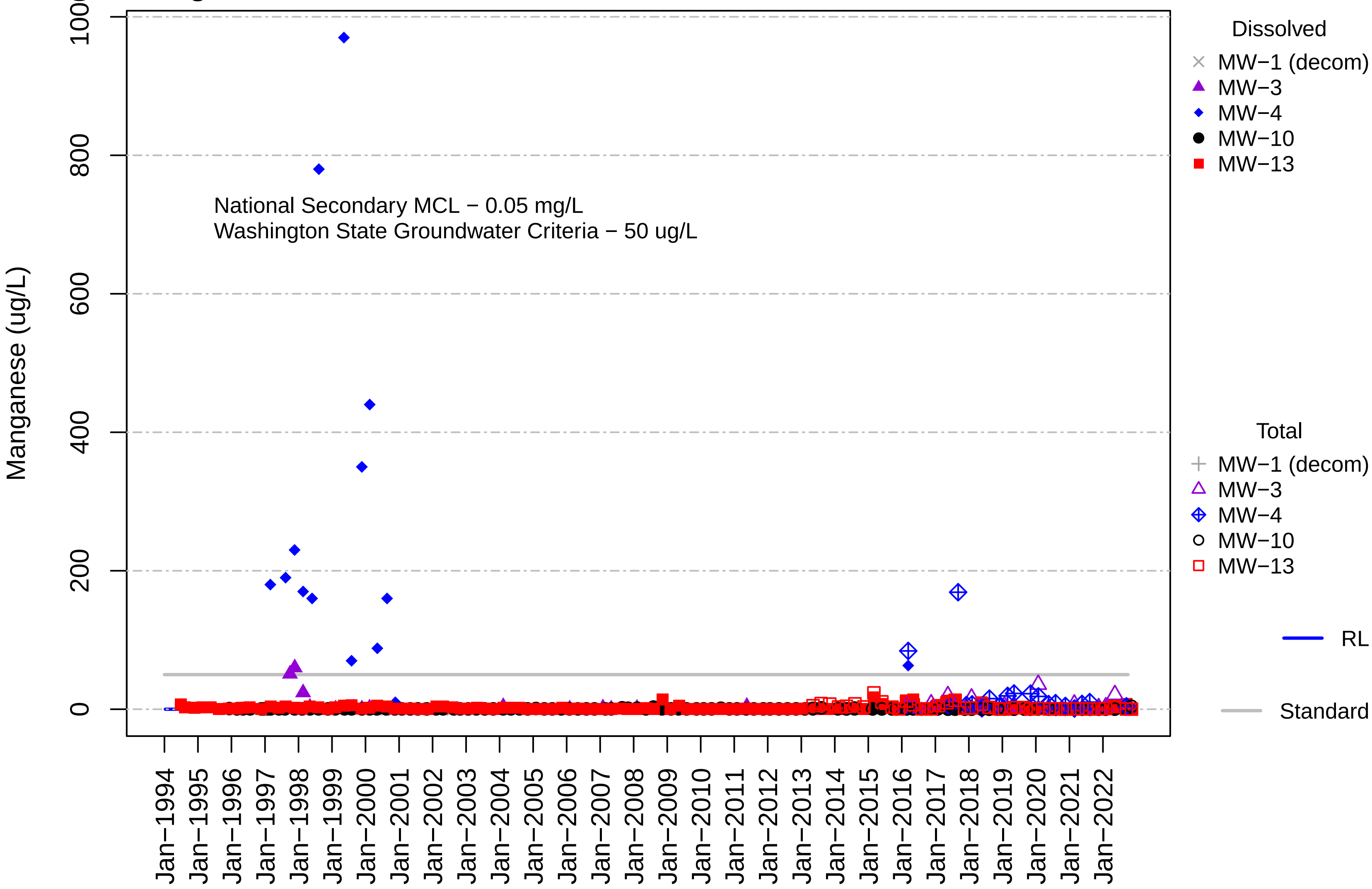


Figure C−13B
Channel Cc1
Manganese

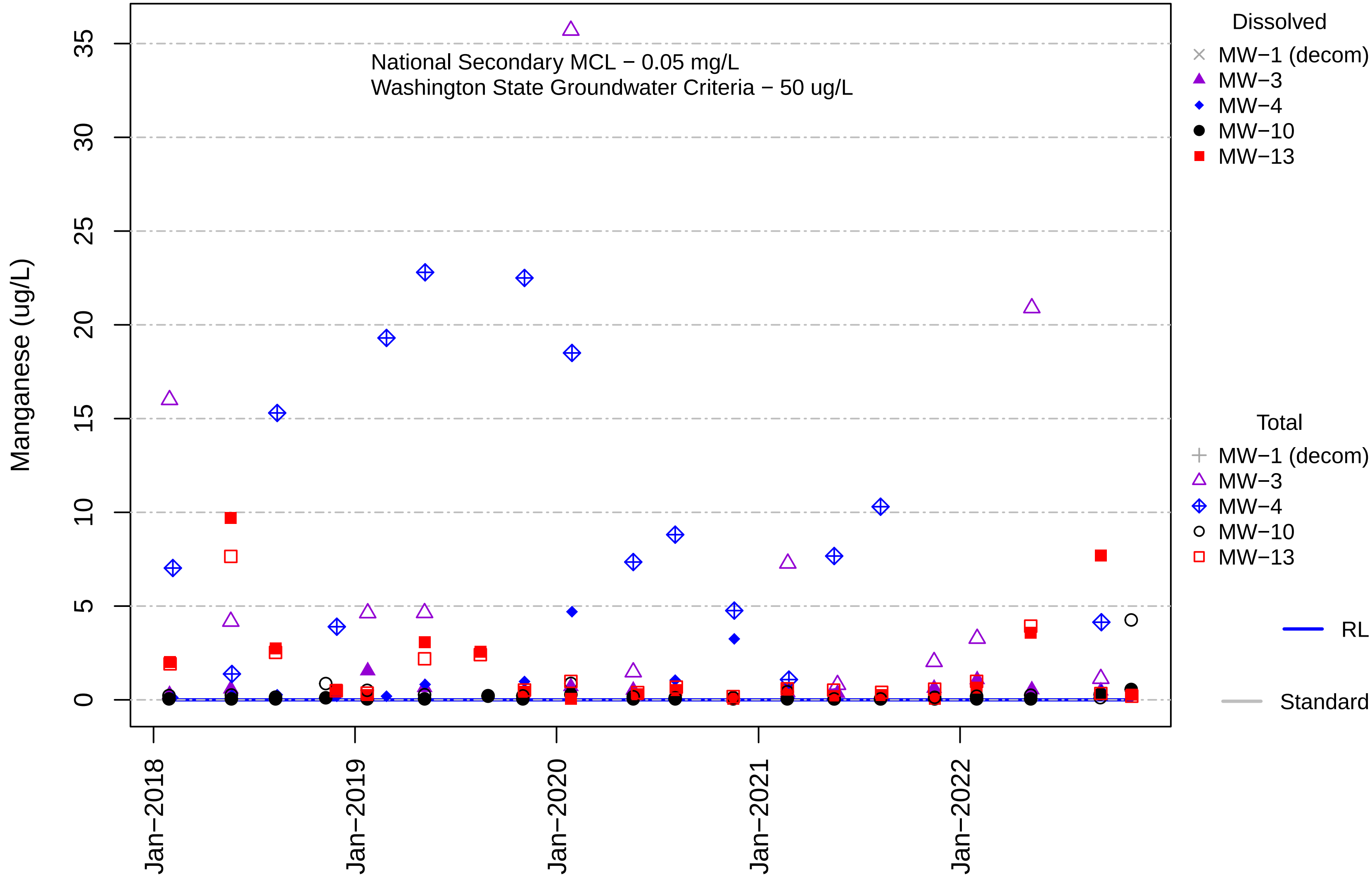
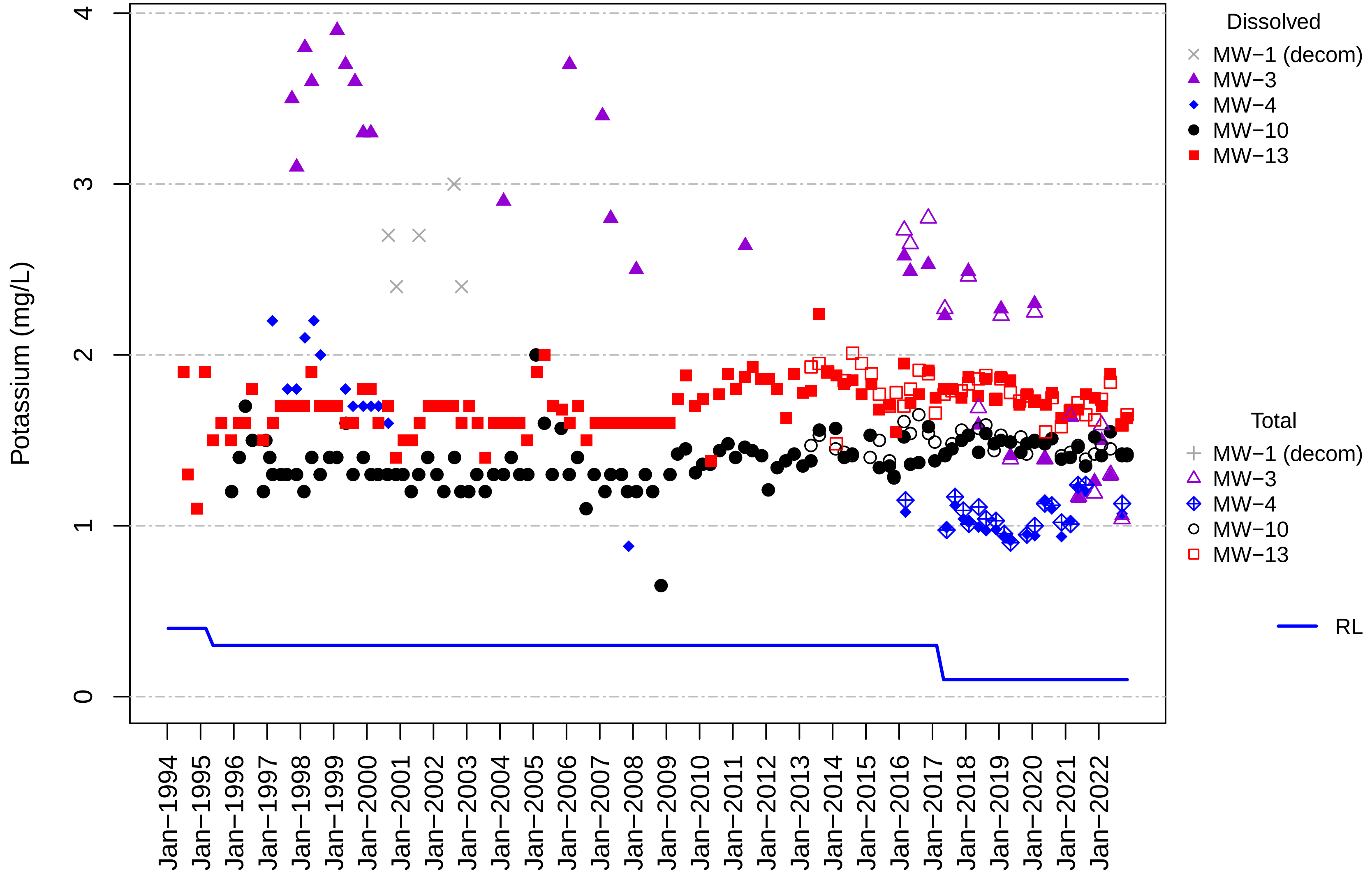


Figure C−14A
Channel Cc1
Potassium



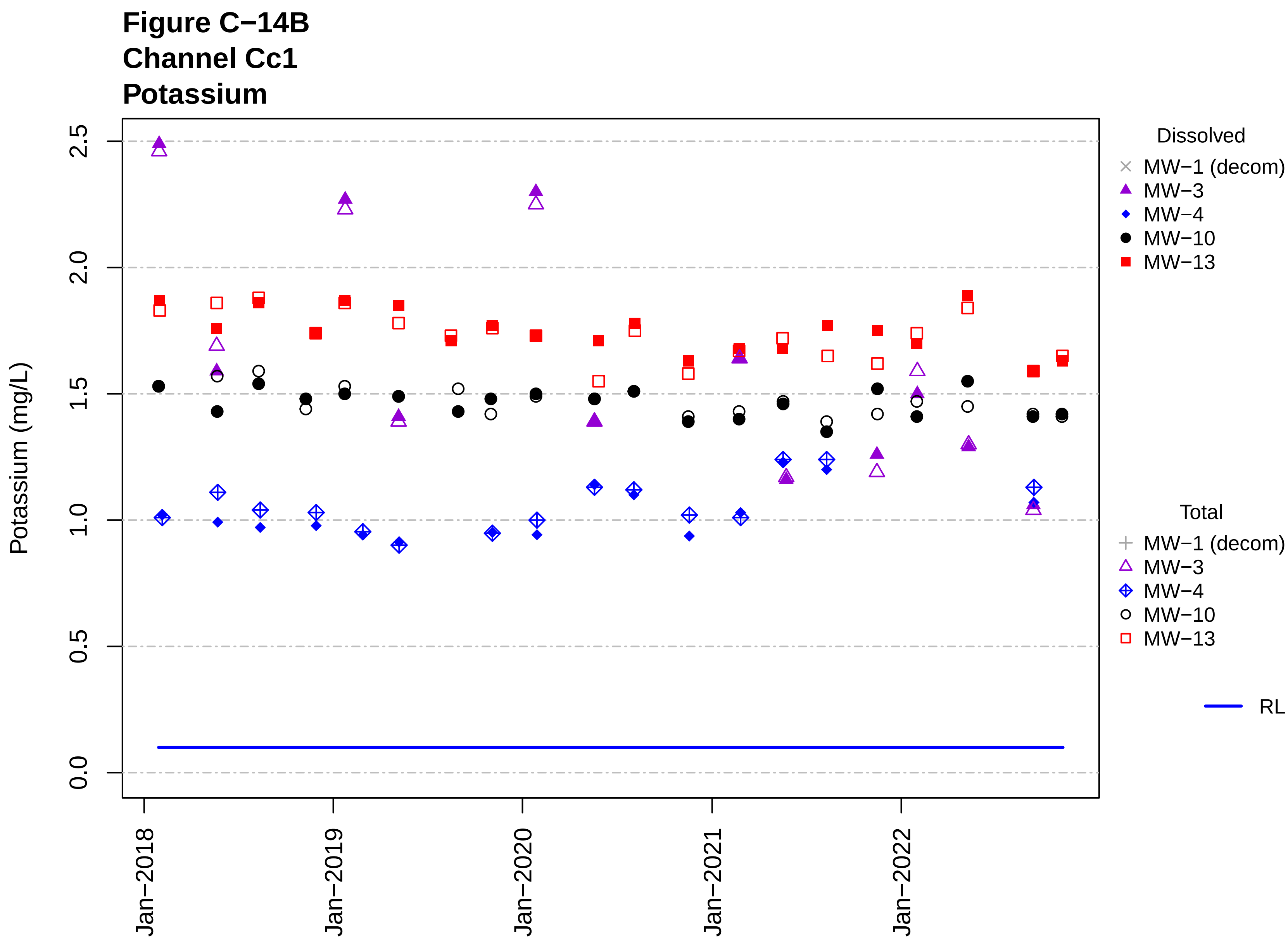


Figure C−14B
Channel Cc1
Potassium
Potassium (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
Total
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

Figure C−15A
Channel Cc1
Sodium

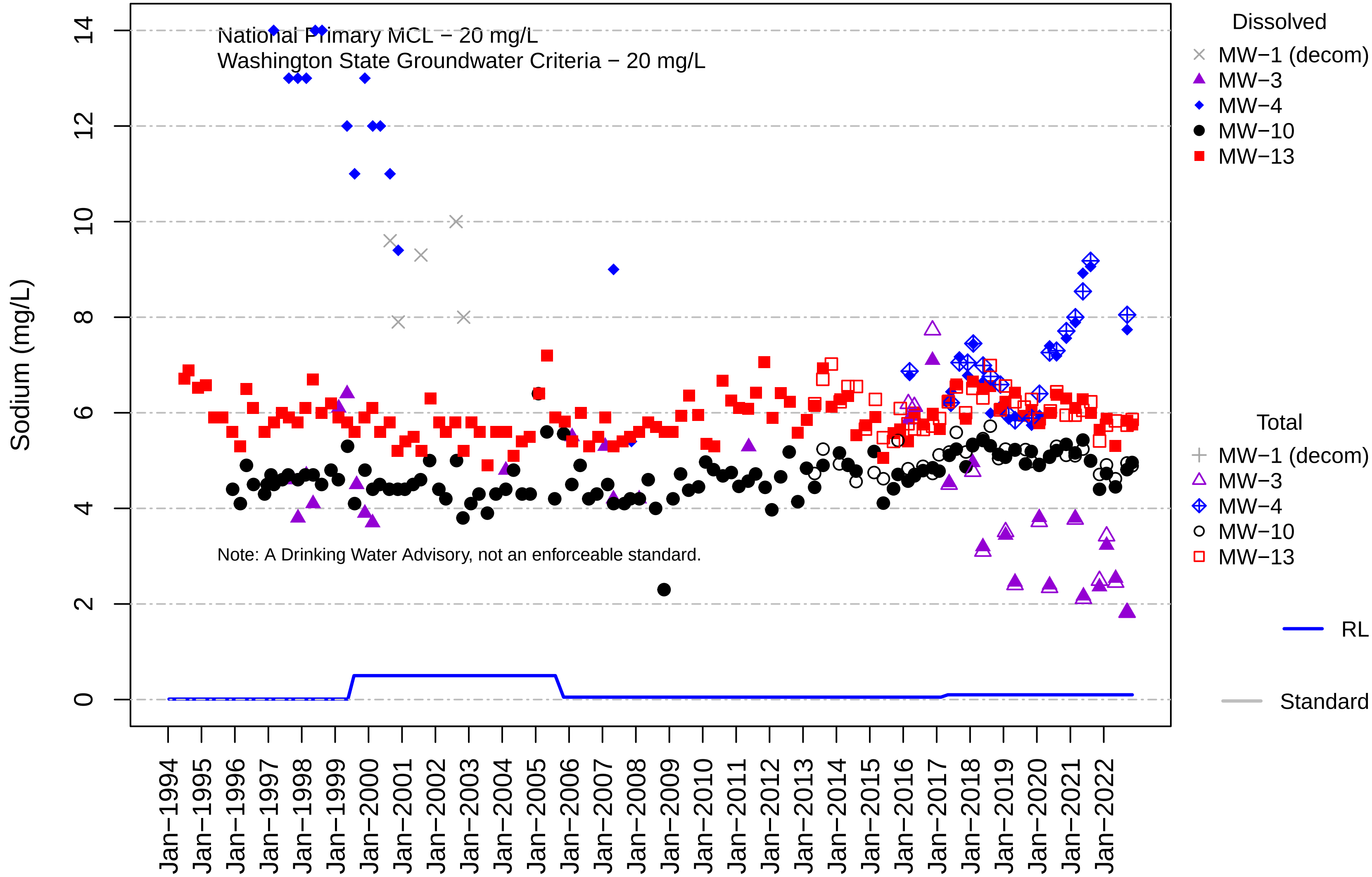


Figure C−15B
Channel Cc1
Sodium

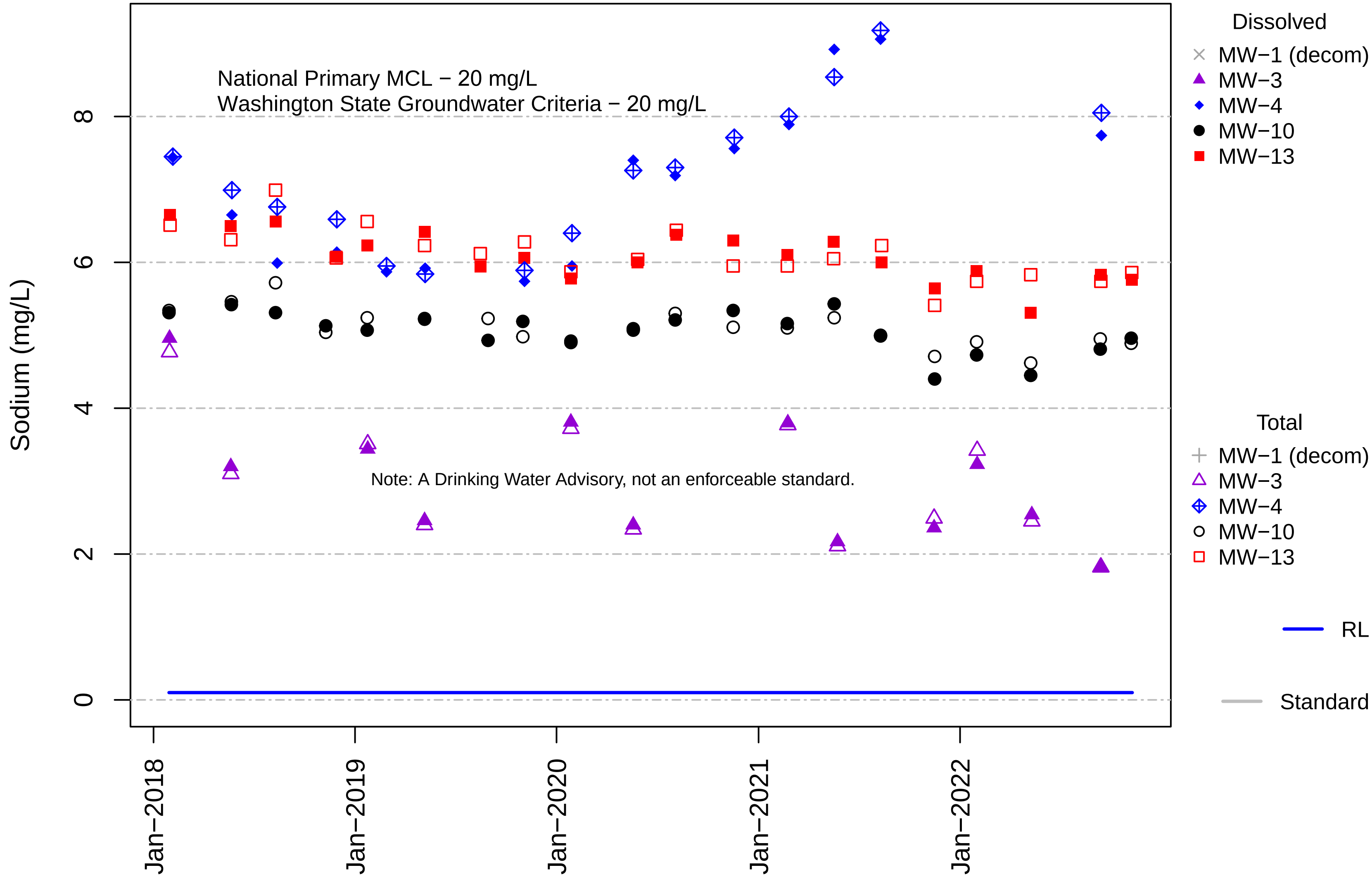


Figure C−16A
Channel Cc1
1,1−Dichloroethane

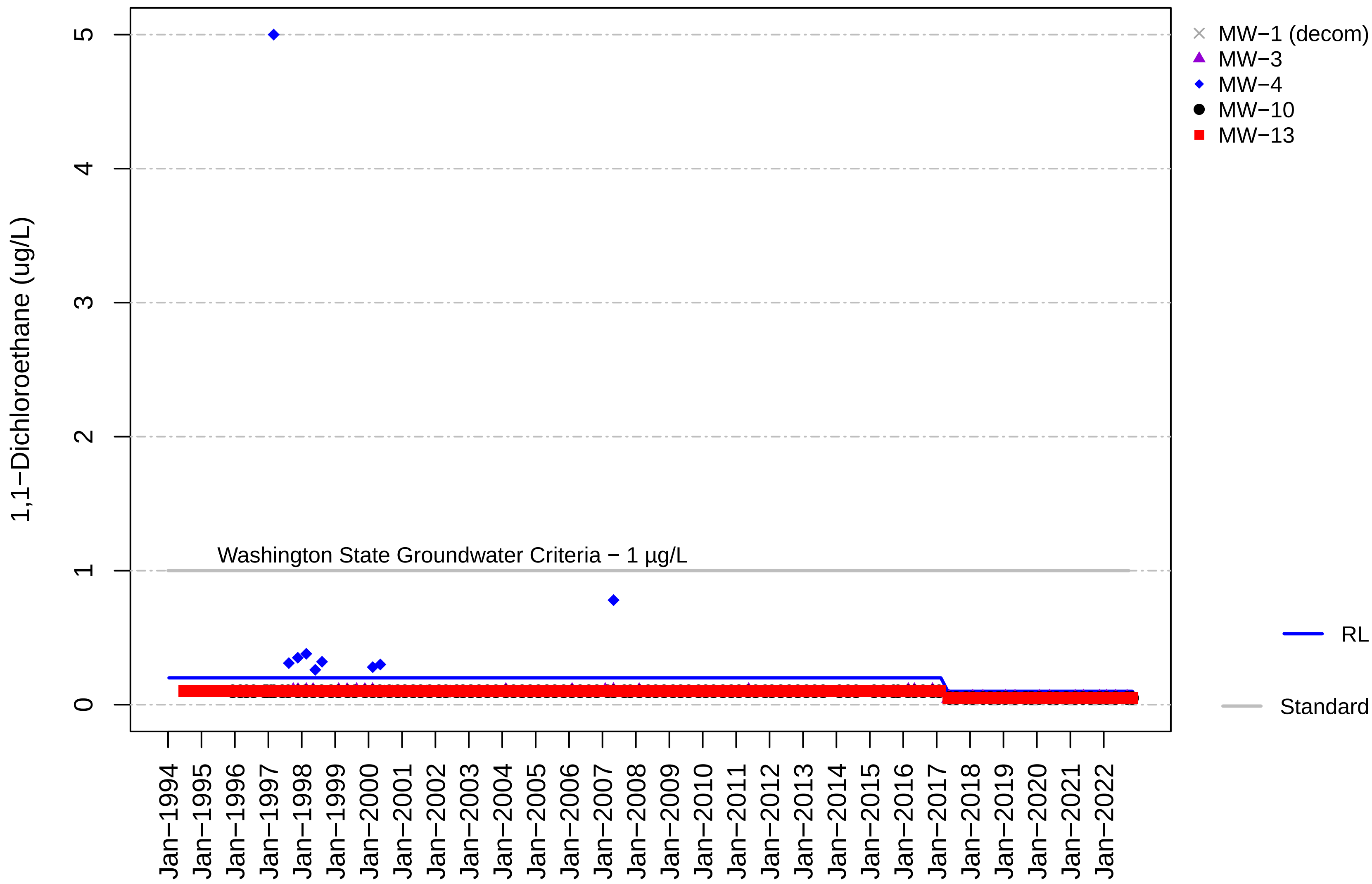


Figure C−16B
Channel Cc1
1,1−Dichloroethane

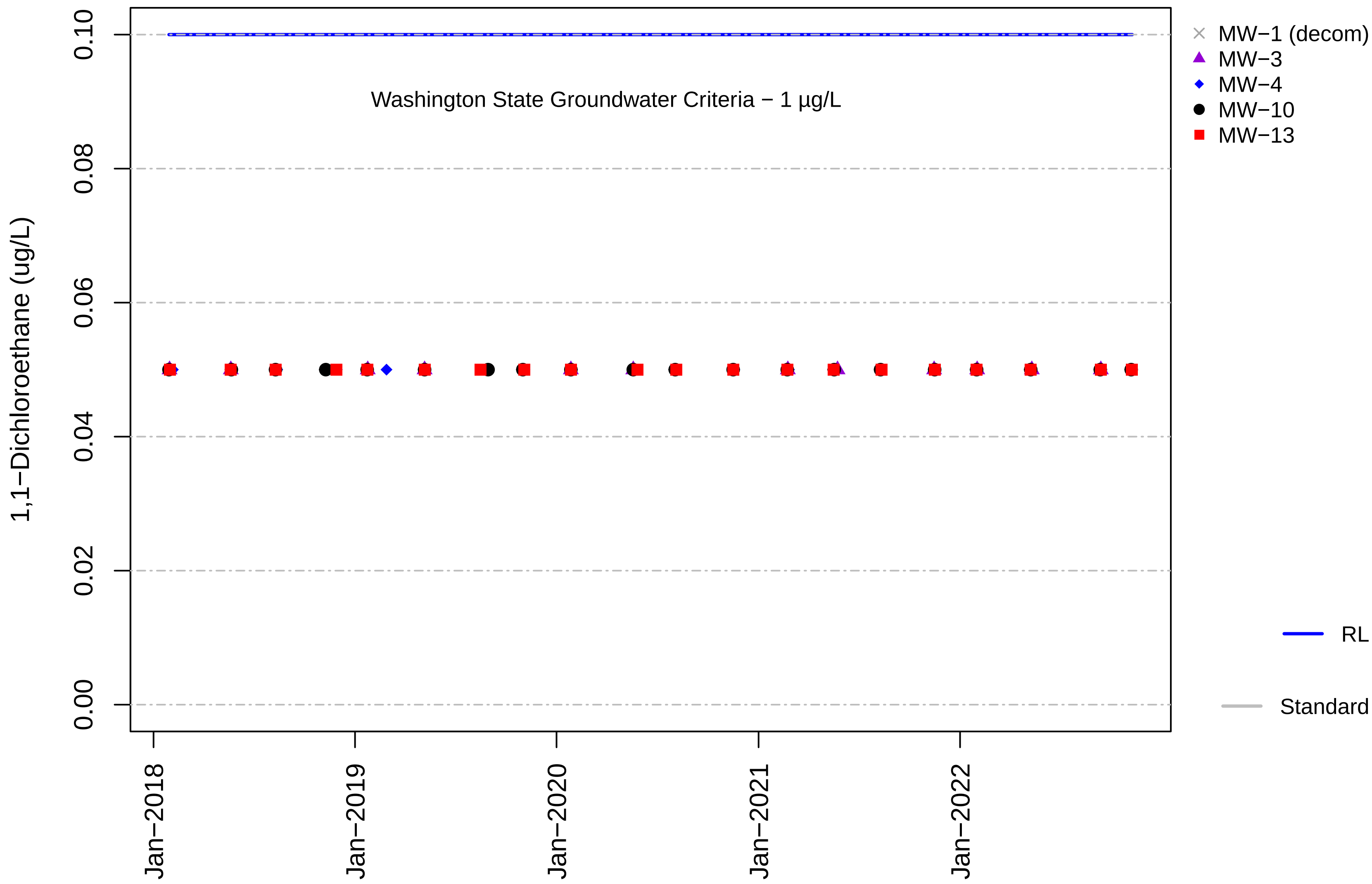


Figure C−17A
Channel Cc1
1,2−Dichloropropane

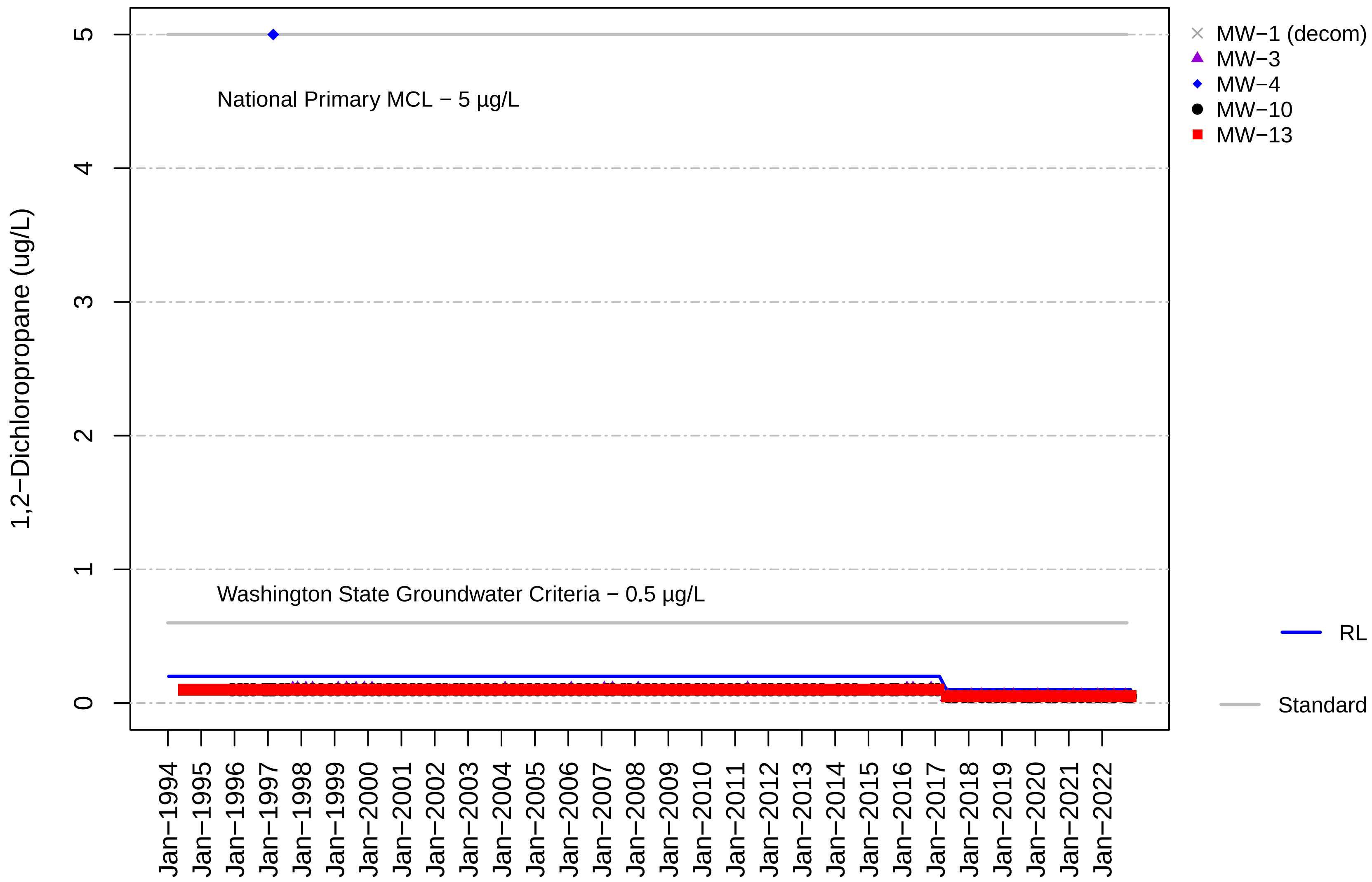


Figure C−17B
Channel Cc1
1,2−Dichloropropane

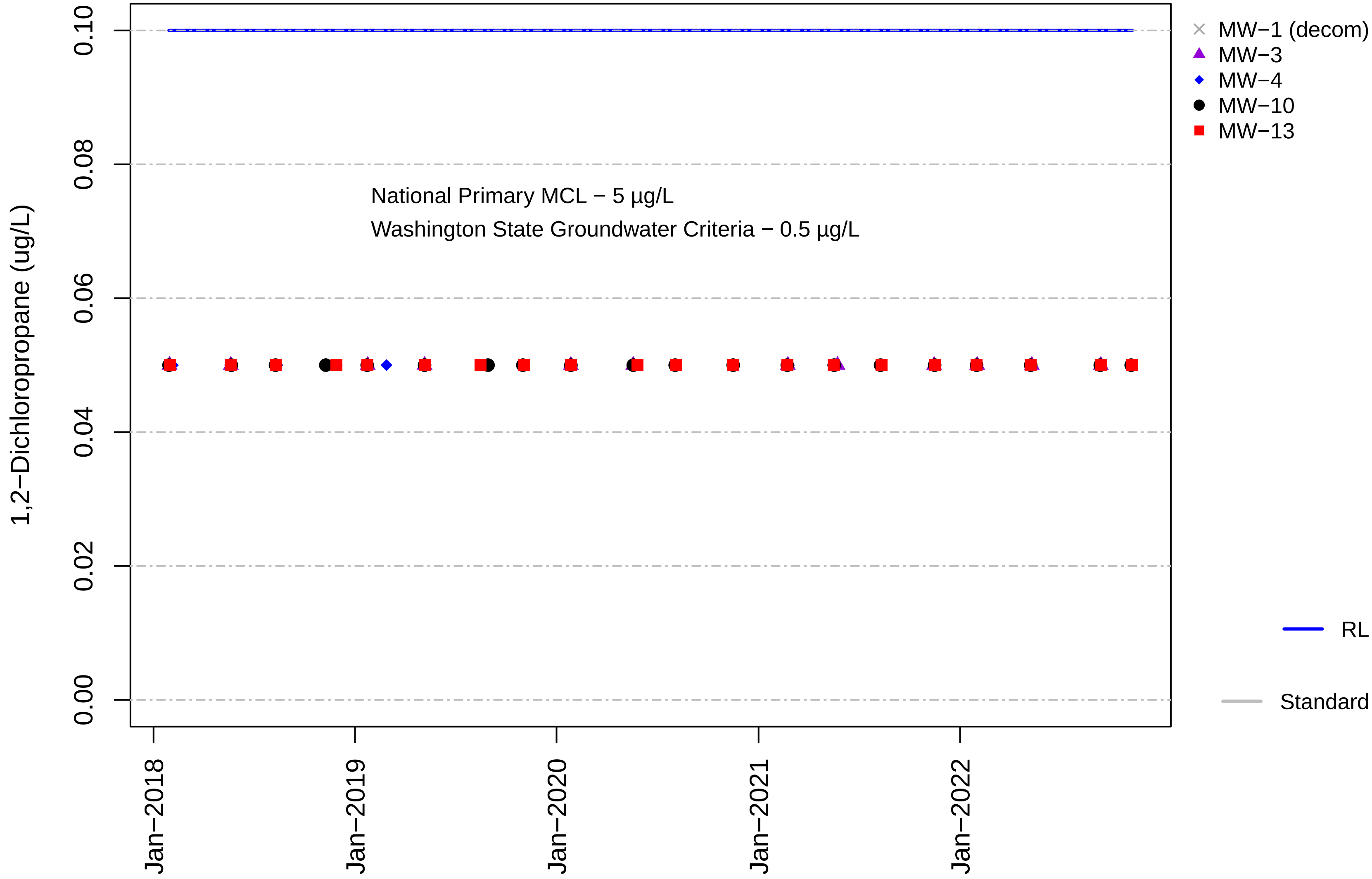


Figure C−18A
Channel Cc1
Benzene

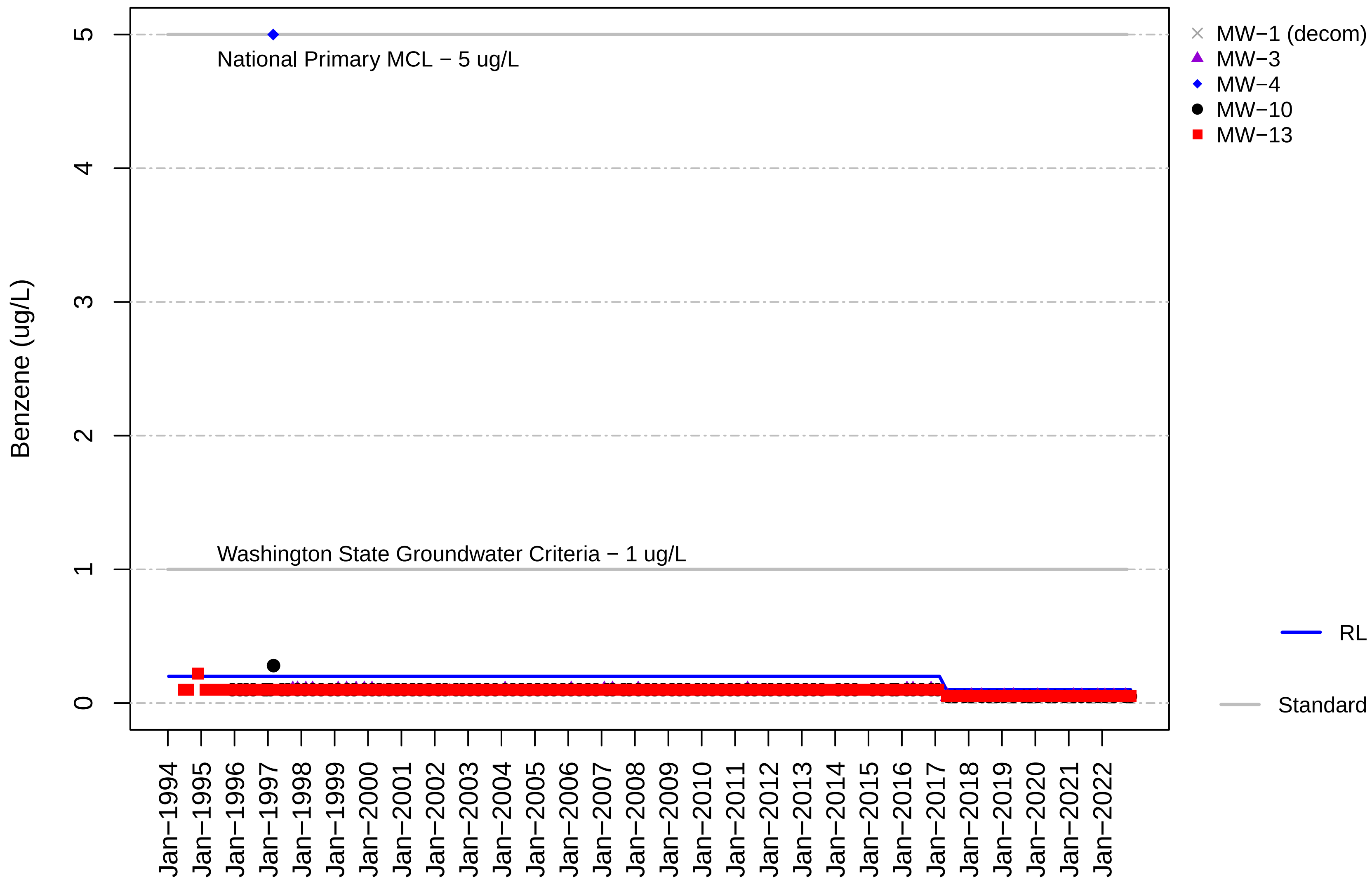
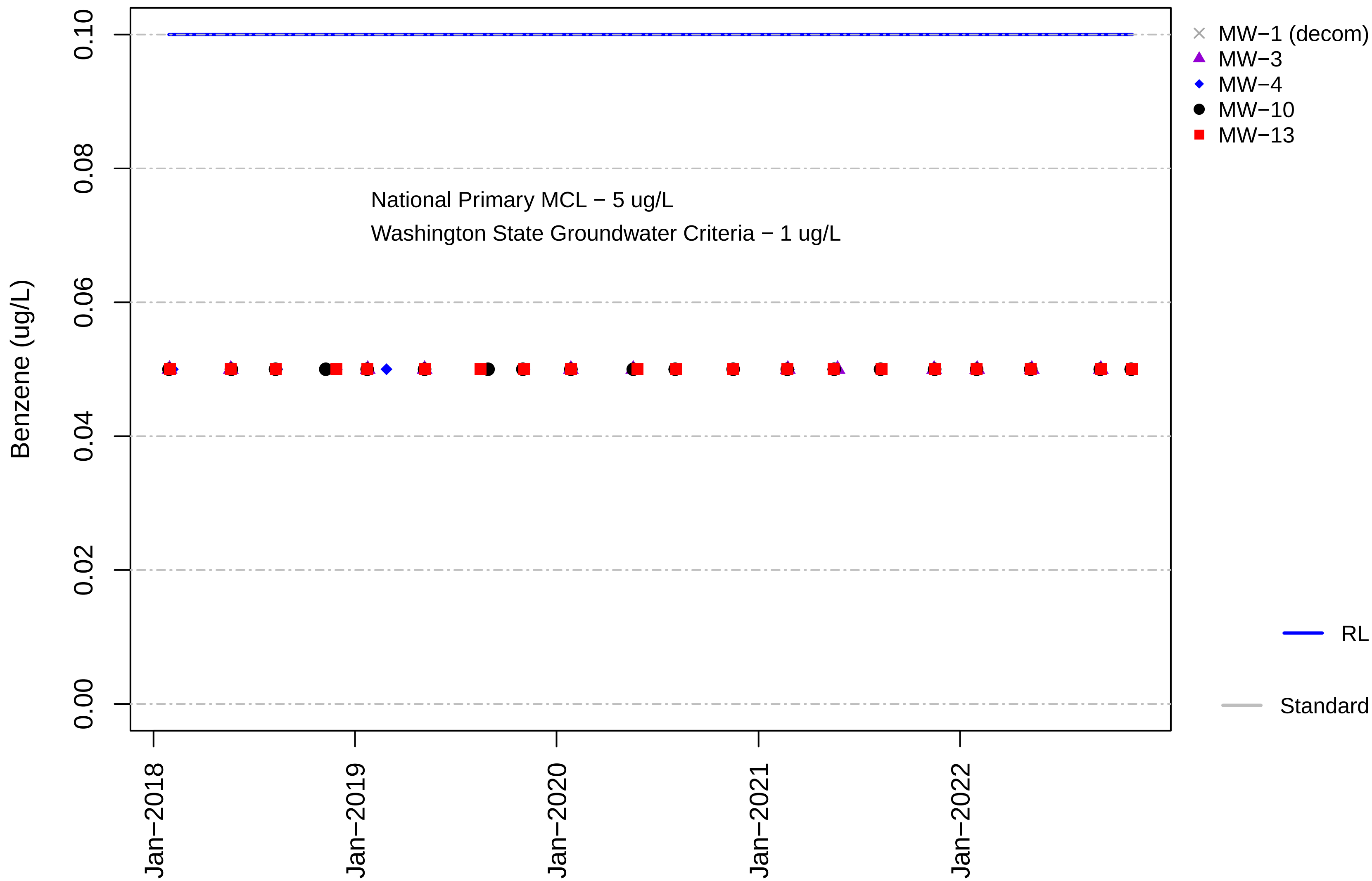


Figure C−18B
Channel Cc1
Benzene



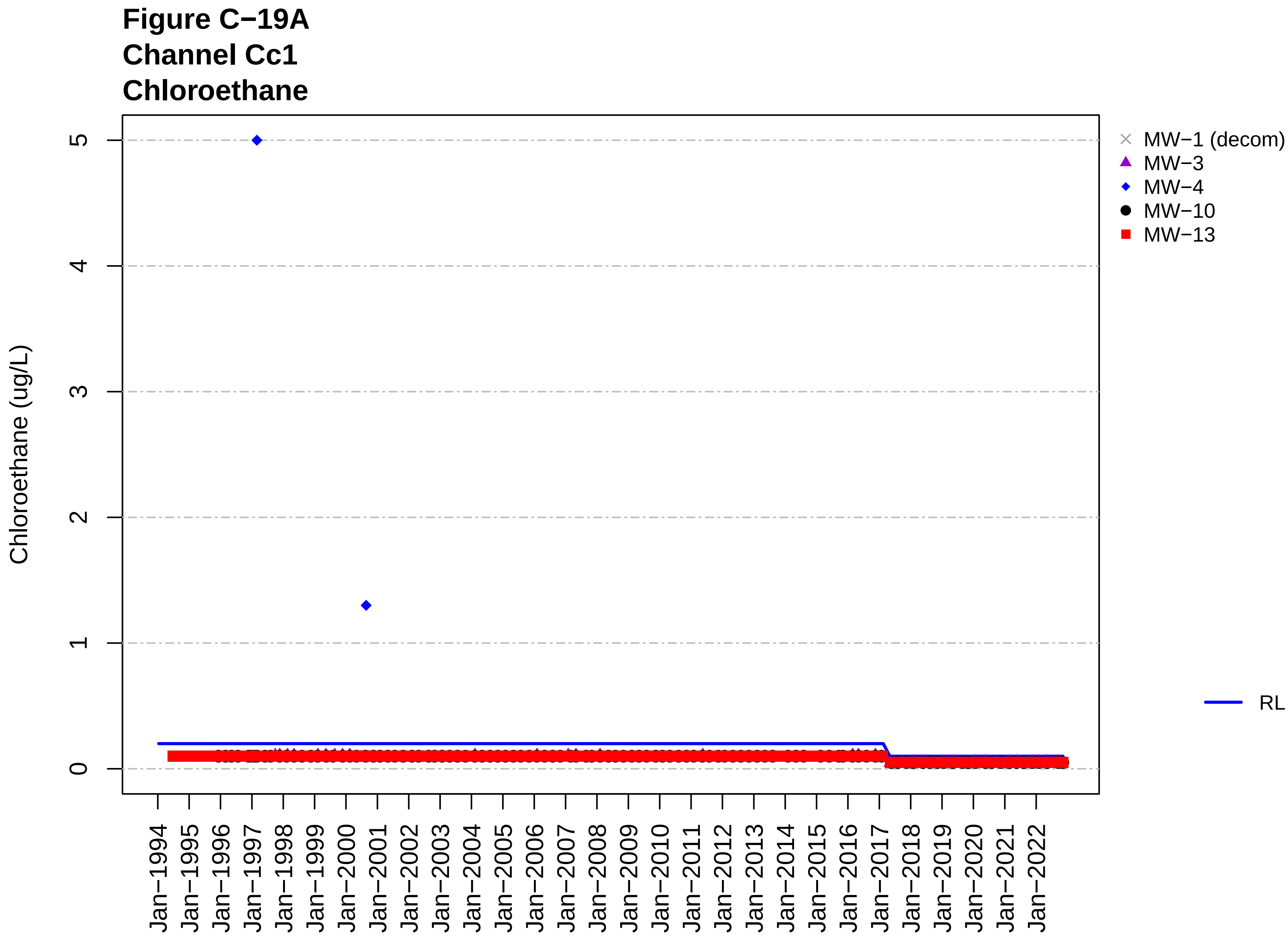


Figure C−19A
Channel Cc1
Chloroethane
Chloroethane (ug/L)
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

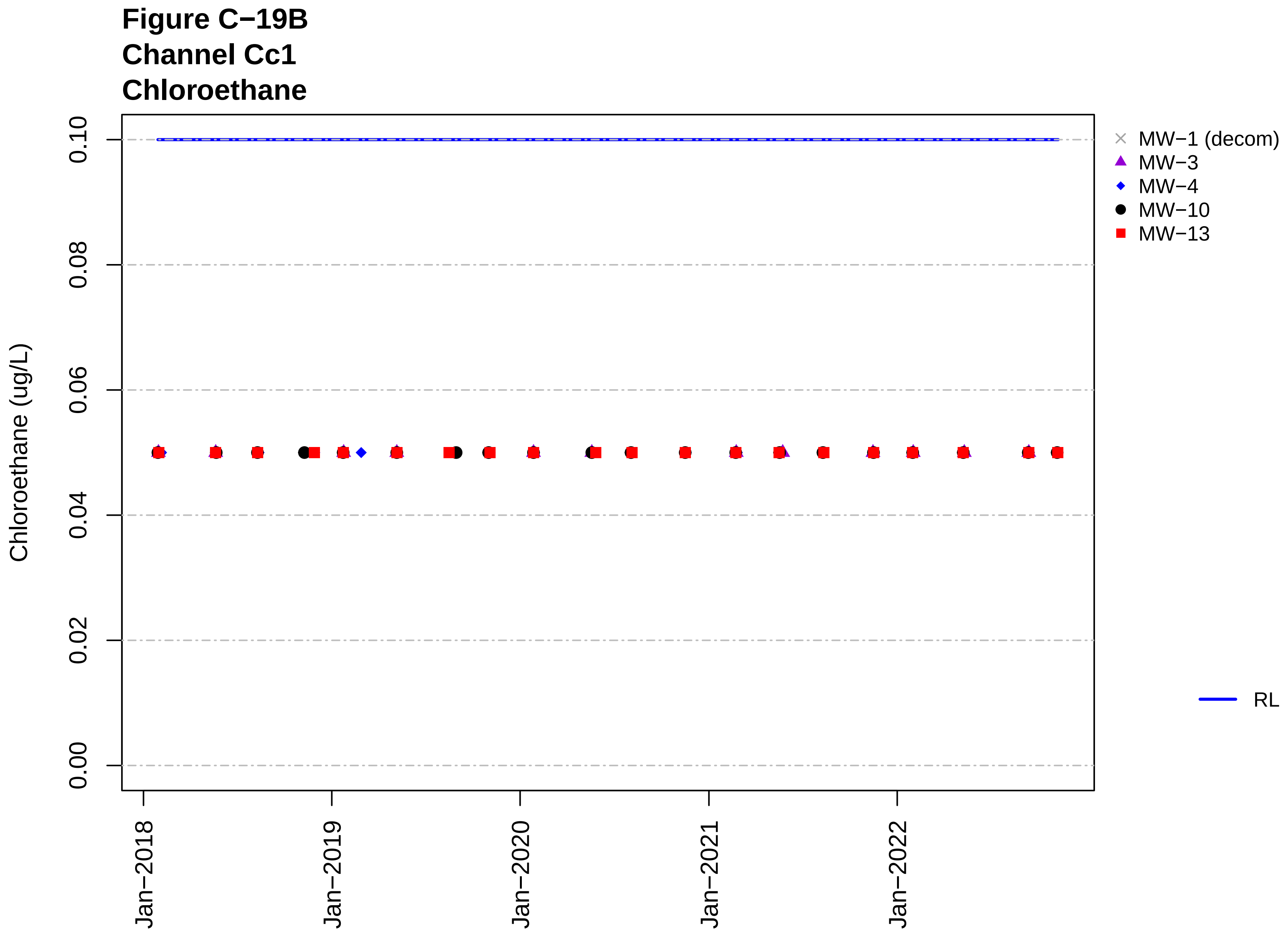


Figure C−19B
Channel Cc1
Chloroethane
Chloroethane (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL

Figure C−20A
Channel Cc1
cis−1,2−Dichloroethene

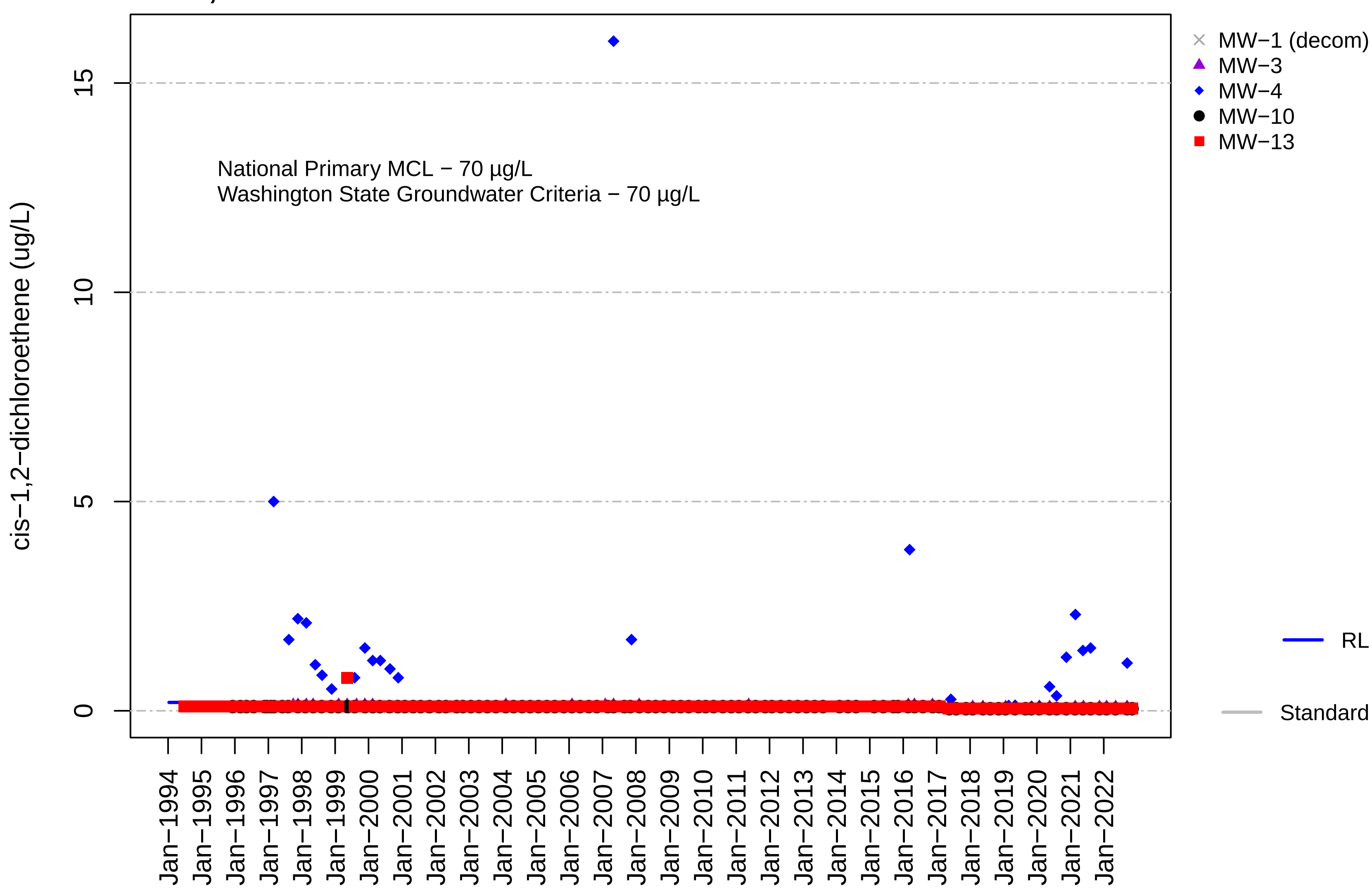


Figure C−20B
Channel Cc1
cis−1,2−Dichloroethene

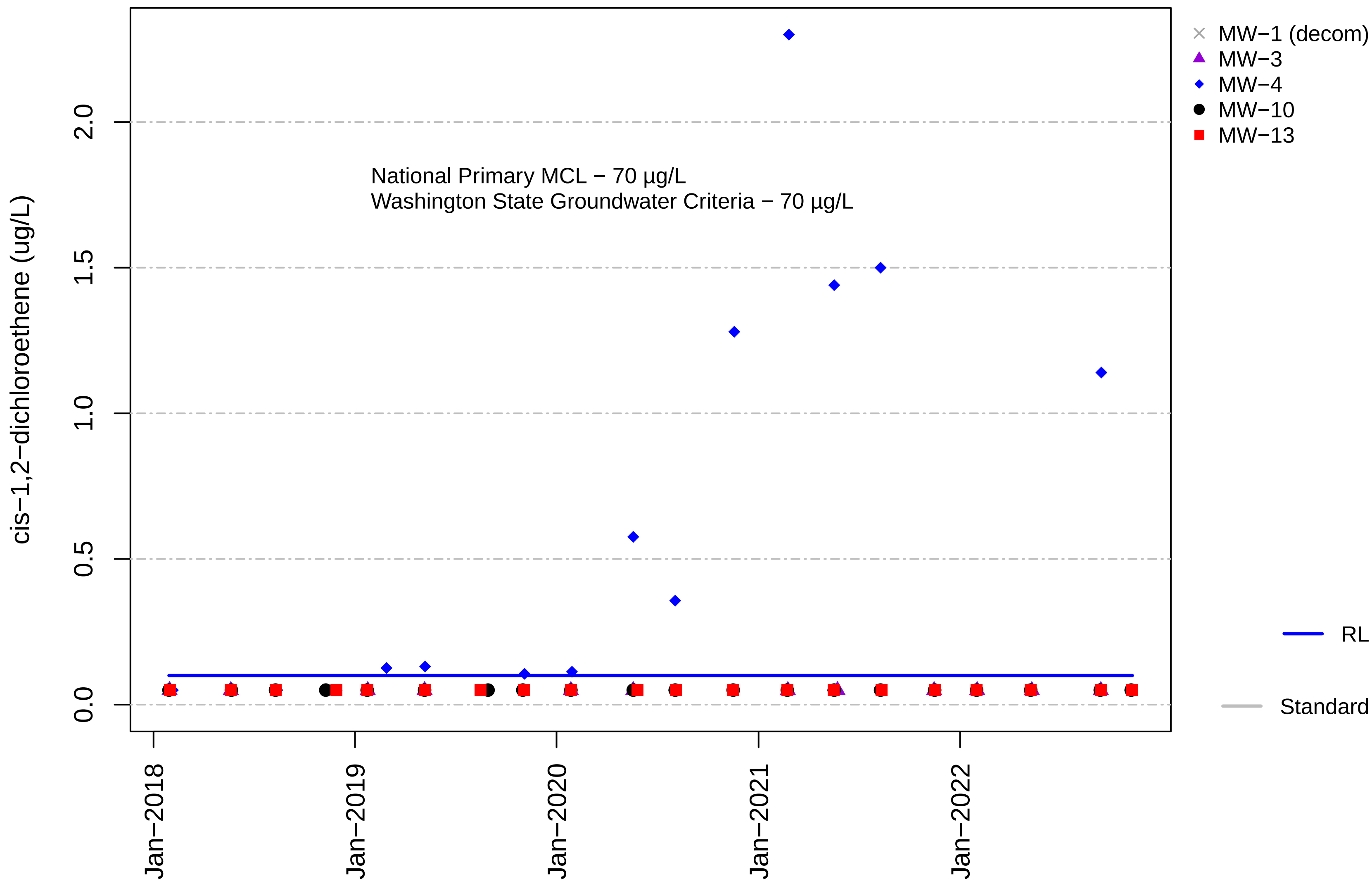


Figure C−21A
Channel Cc1
Dichlorodifluoromethane

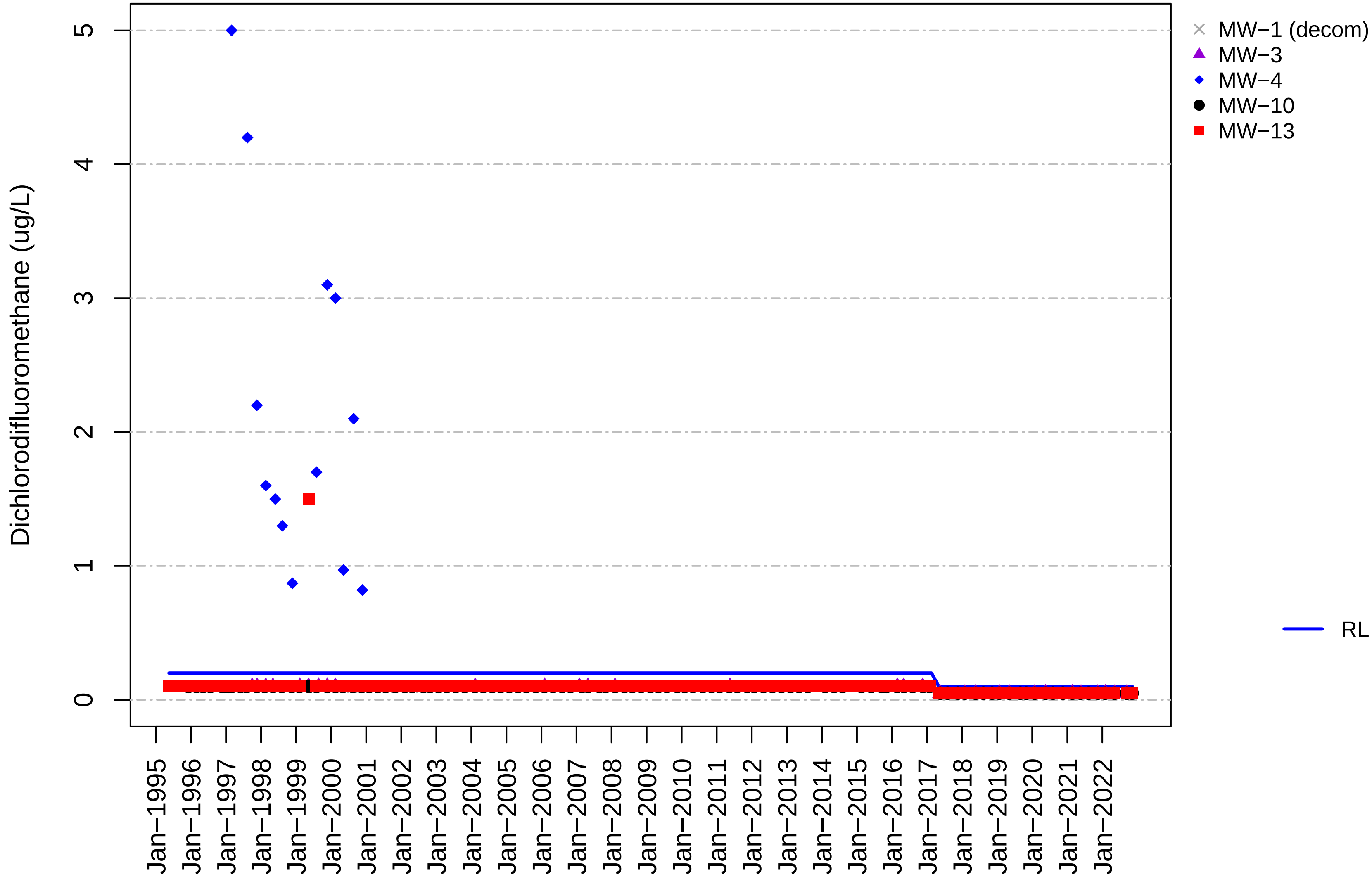


Figure C−21B
Channel Cc1
Dichlorodifluoromethane

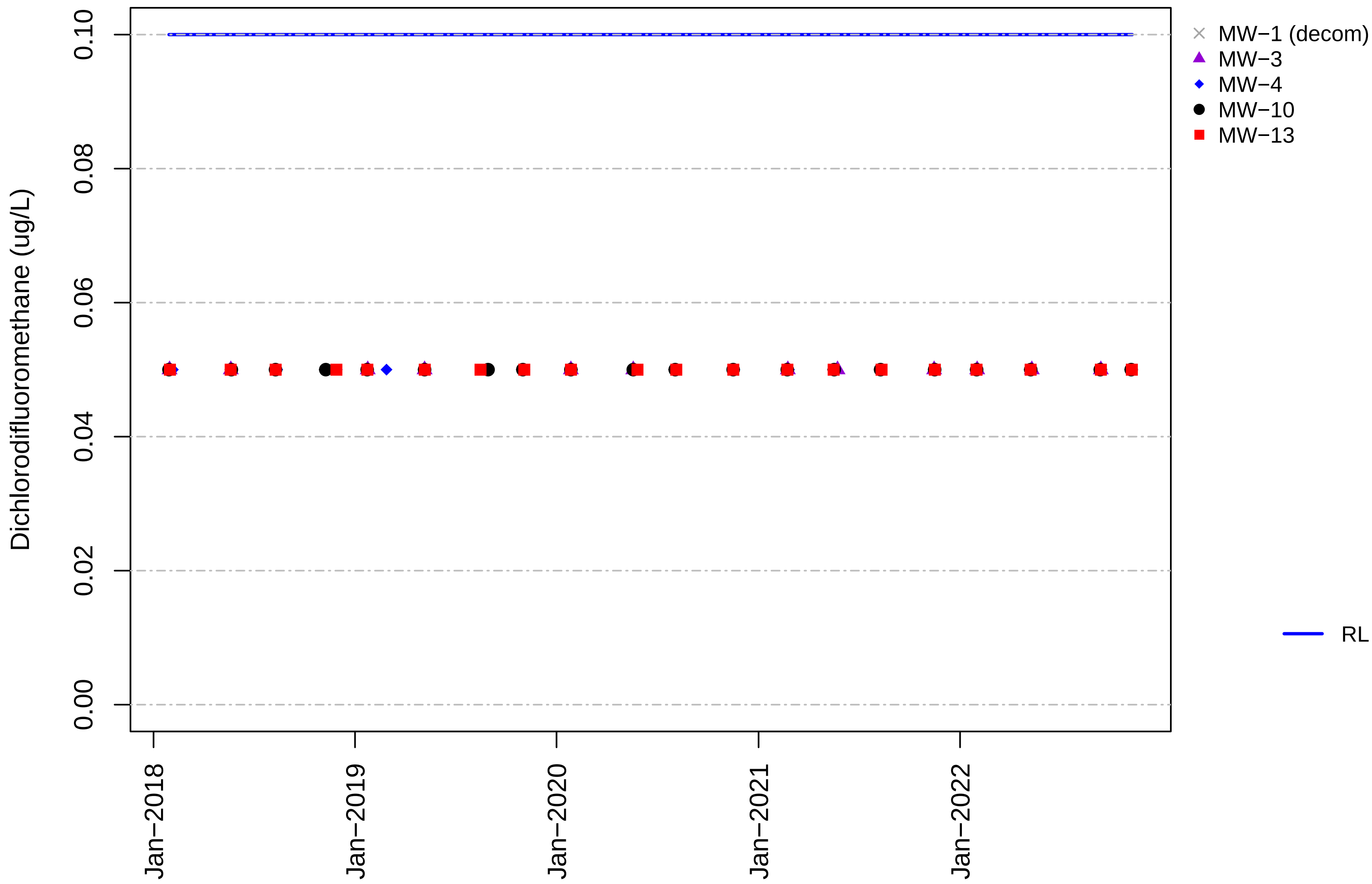
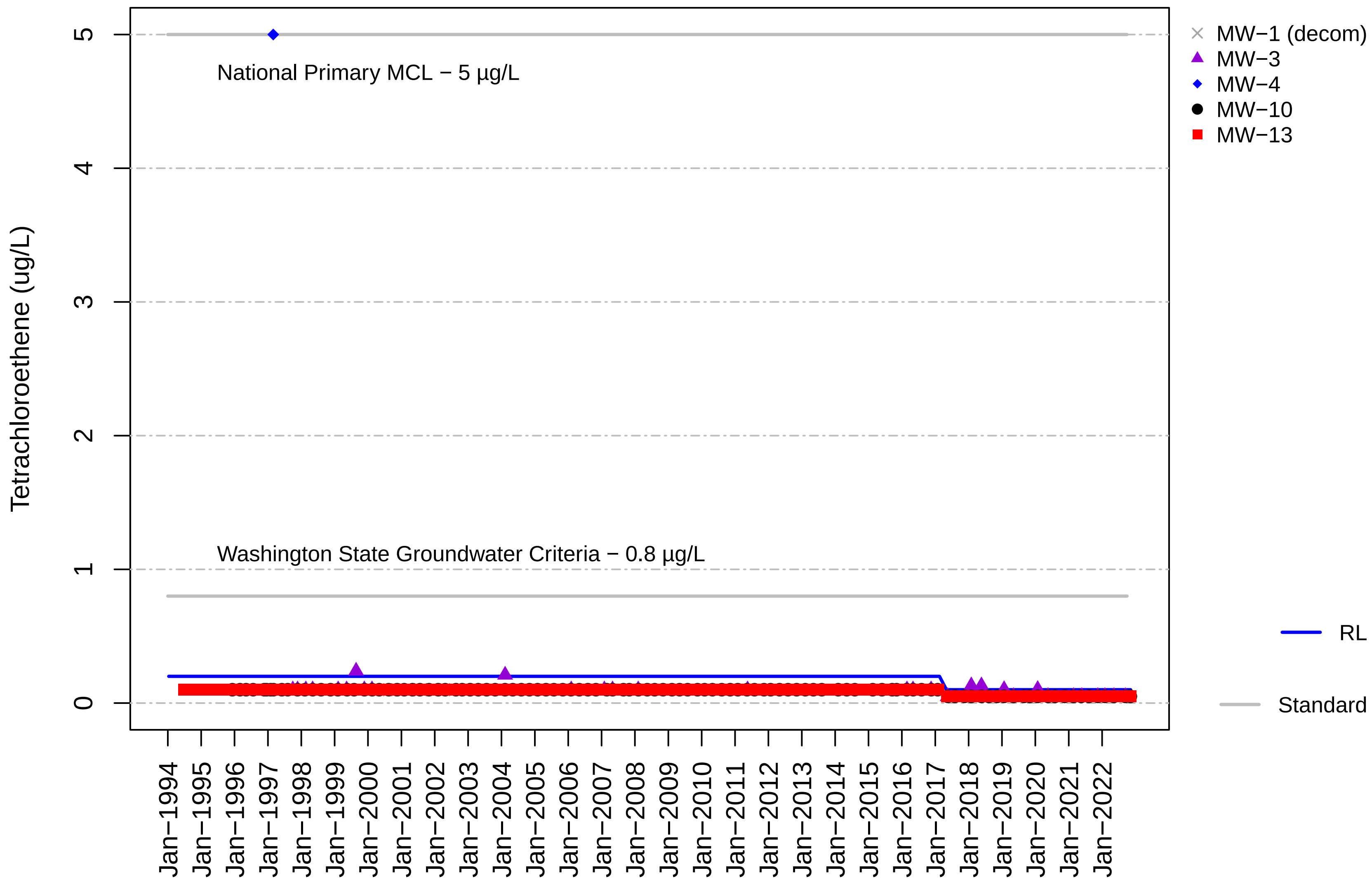


Figure C−22A
Channel Cc1
Tetrachloroethene



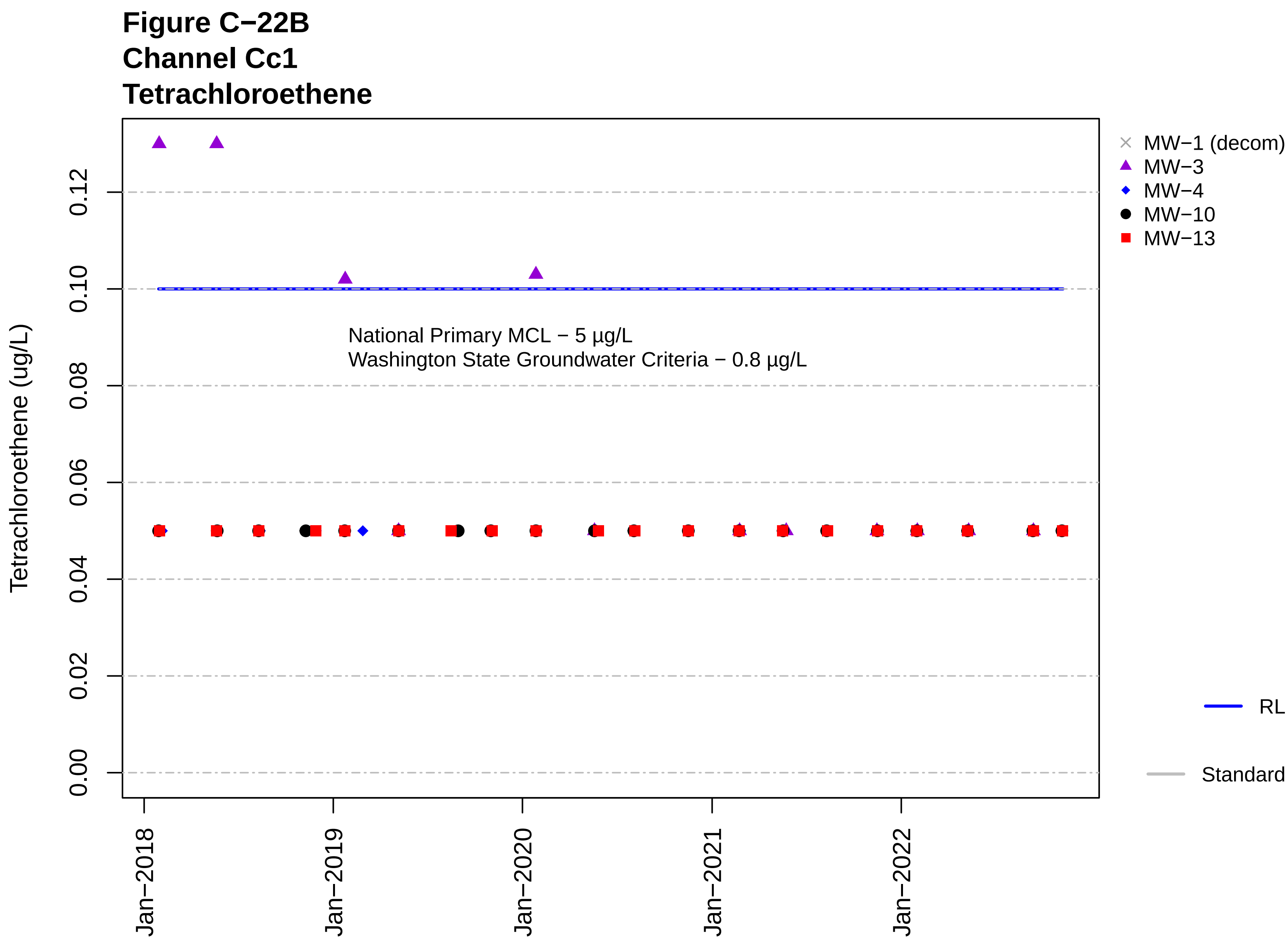


Figure C−22B
Channel Cc1
Tetrachloroethene
Tetrachloroethene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard

Figure C−23A
Channel Cc1
Toluene

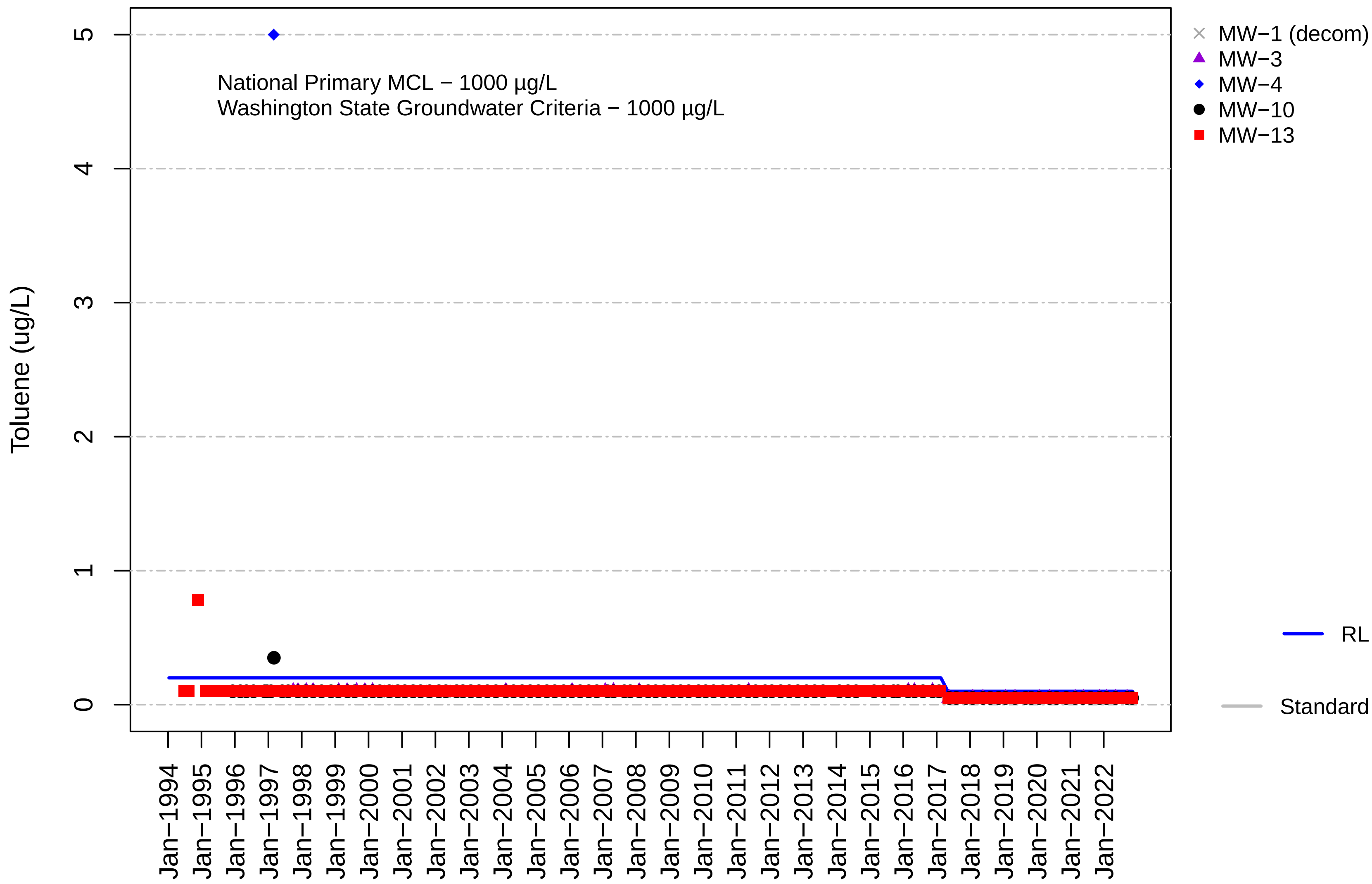


Figure C−23B
Channel Cc1
Toluene

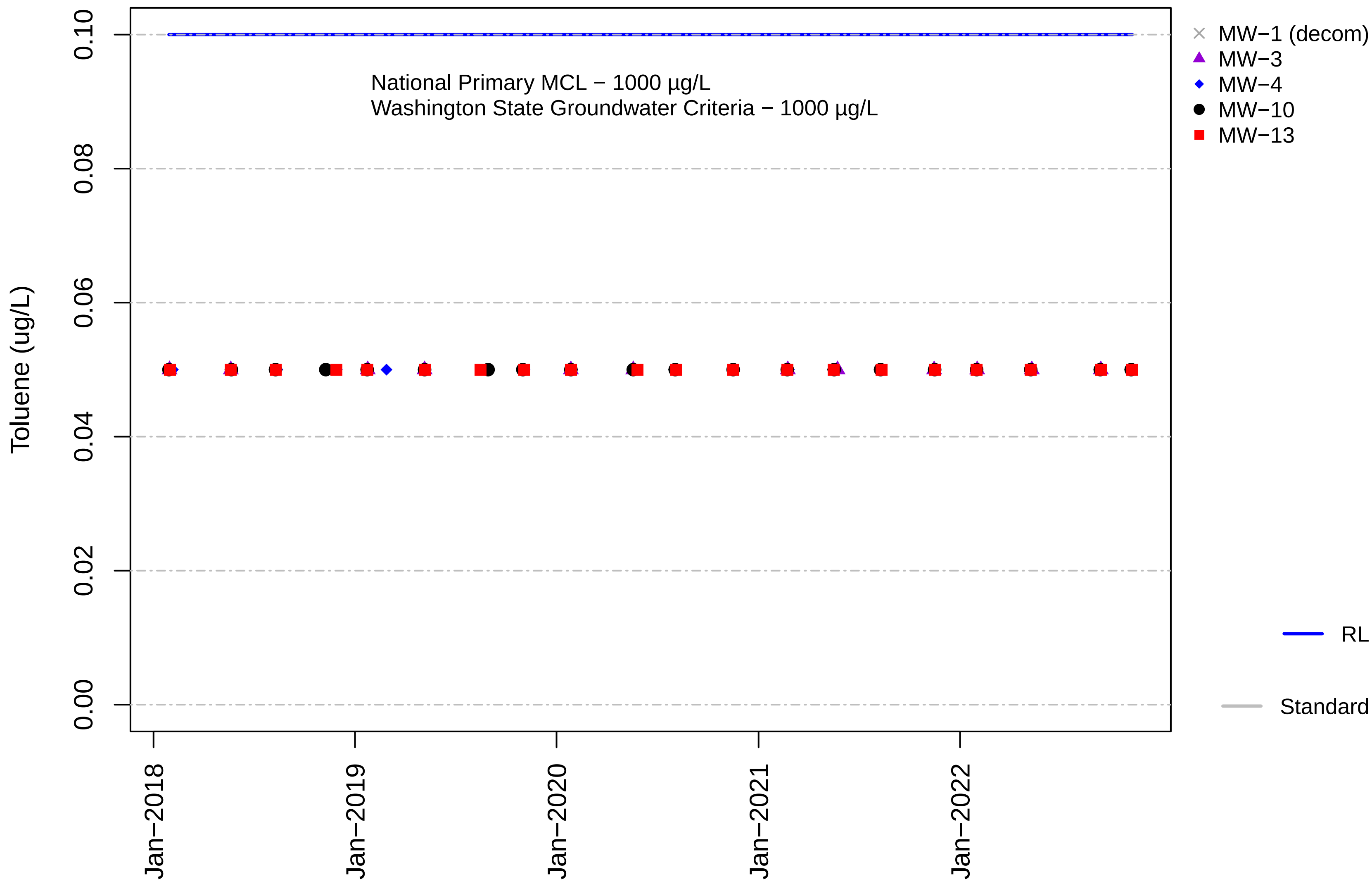


Figure C−24A
Channel Cc1
Trans−1,2−Dichloroethene

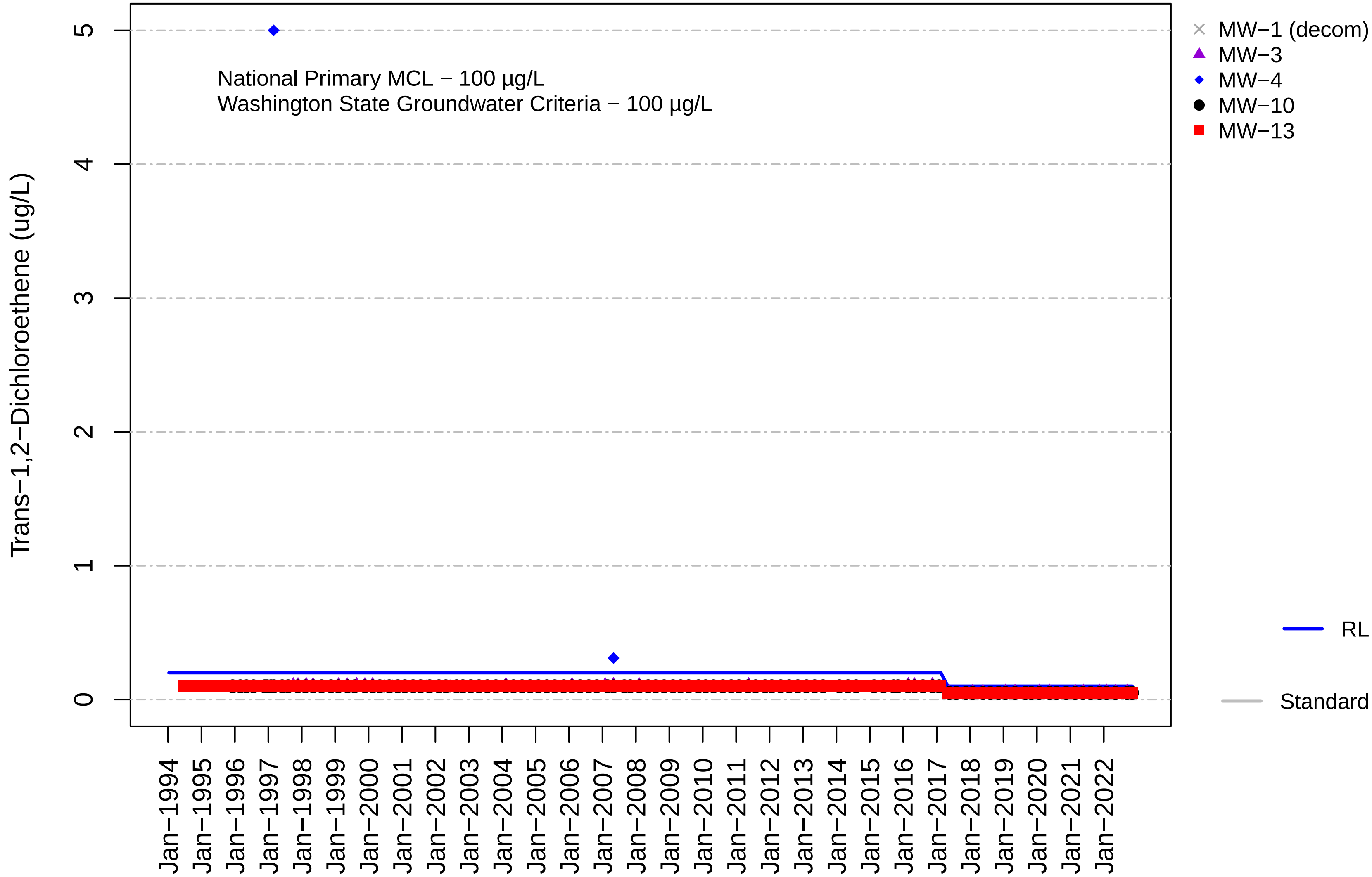
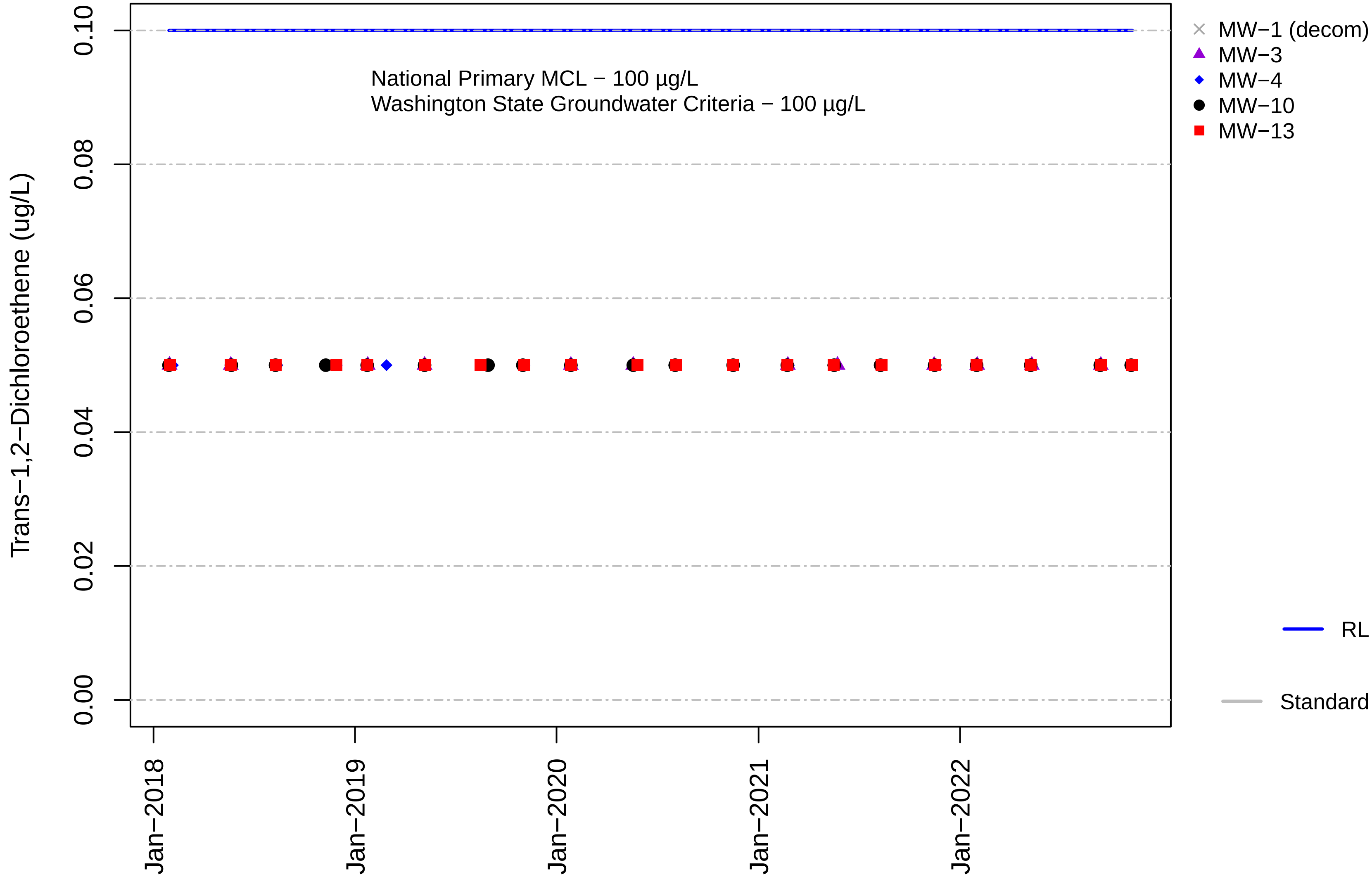


Figure C−24B
Channel Cc1
Trans−1,2−Dichloroethene



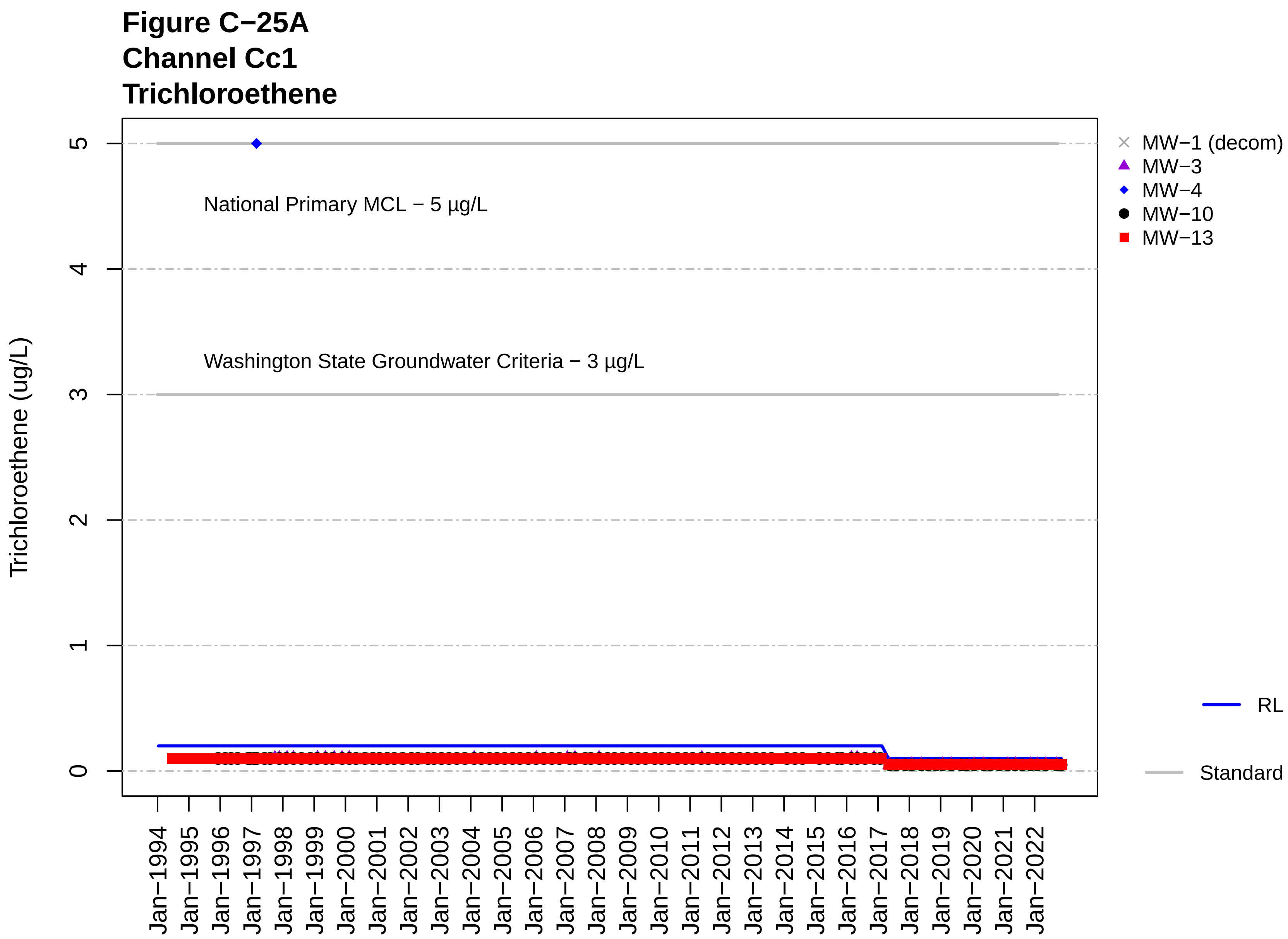


Figure C−25A
Channel Cc1
Trichloroethene
Trichloroethene (ug/L)
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 3 µg/L
MW−1 (decom)
MW−3
MW−4
MW−10
MW−13
RL
Standard
0
1
2
3
4
5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
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
Jan−2022

Figure C−25B
Channel Cc1
Trichloroethene

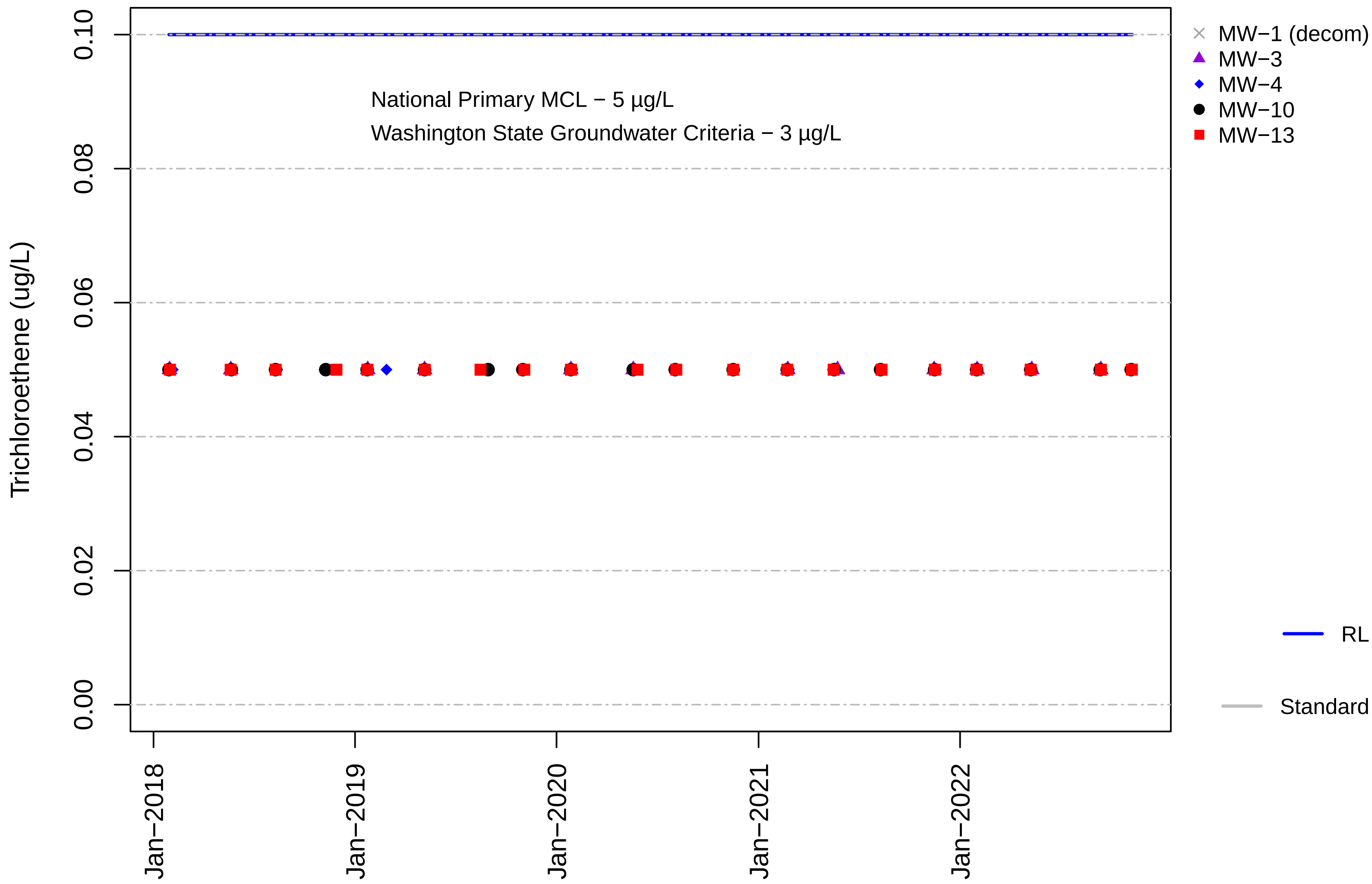


Figure C−26A
Channel Cc1
Trichlorofluoromethane

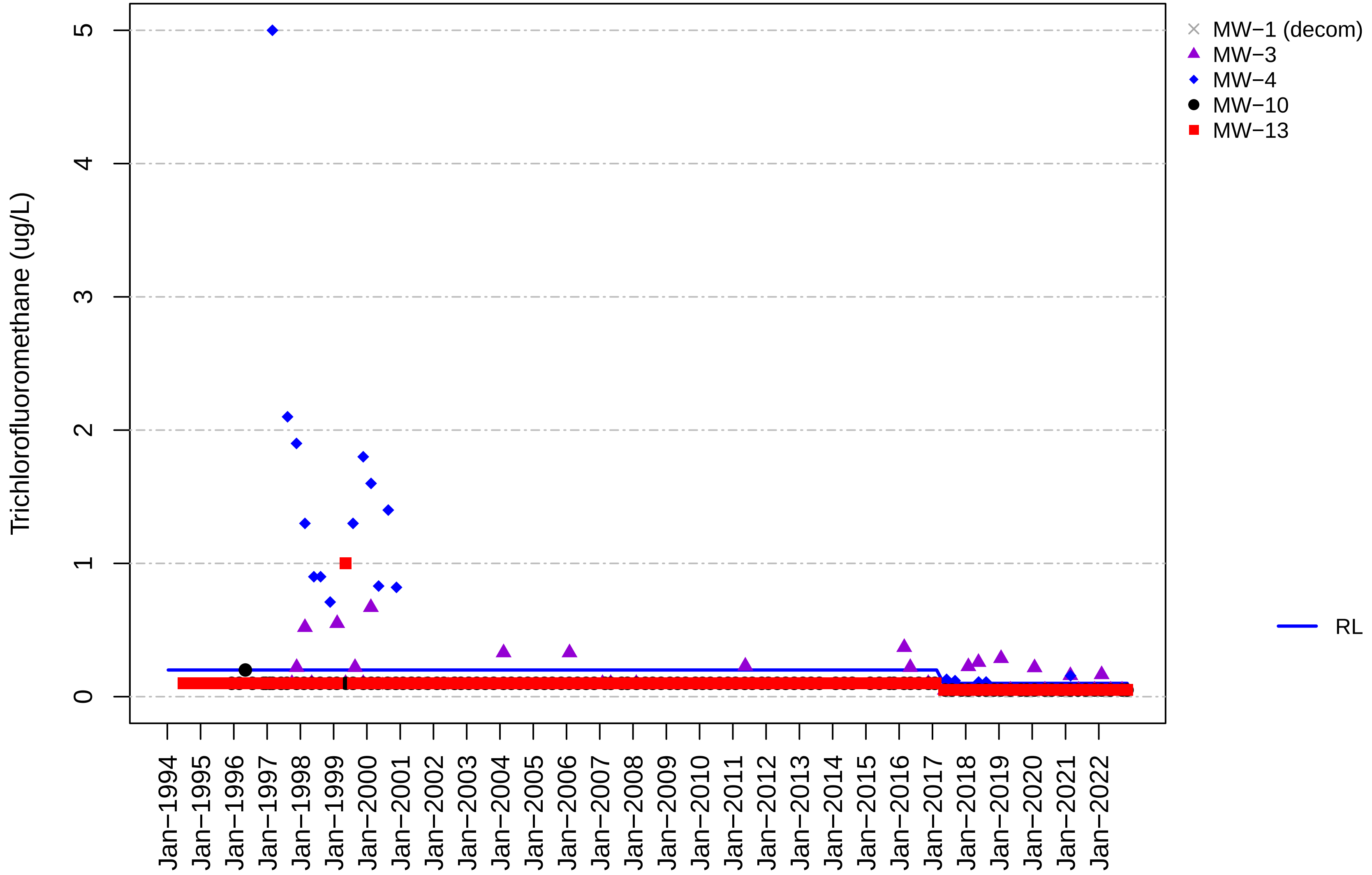


Figure C−26B
Channel Cc1
Trichlorofluoromethane

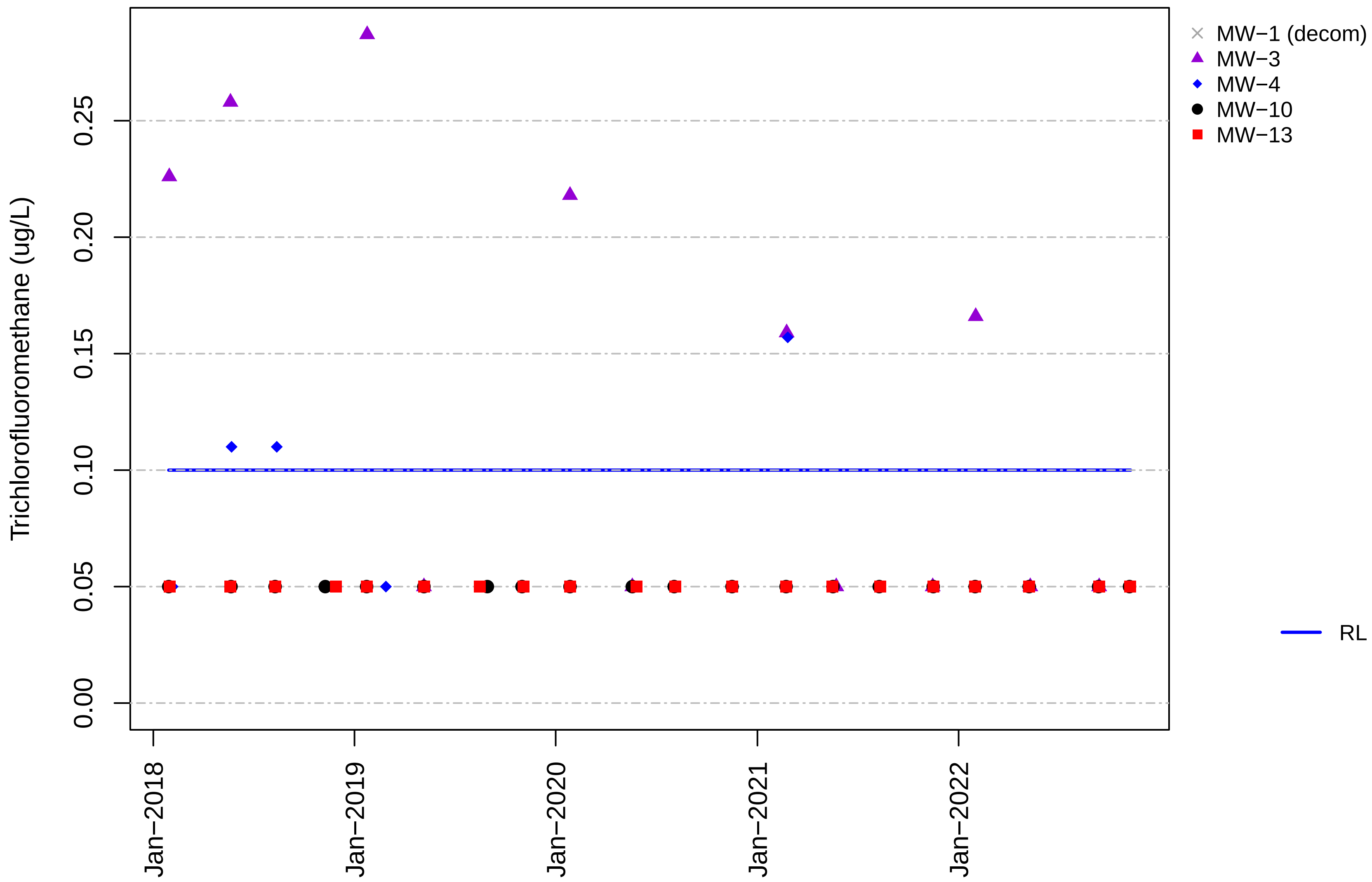


Figure C−27A
Channel Cc1
Vinyl chloride

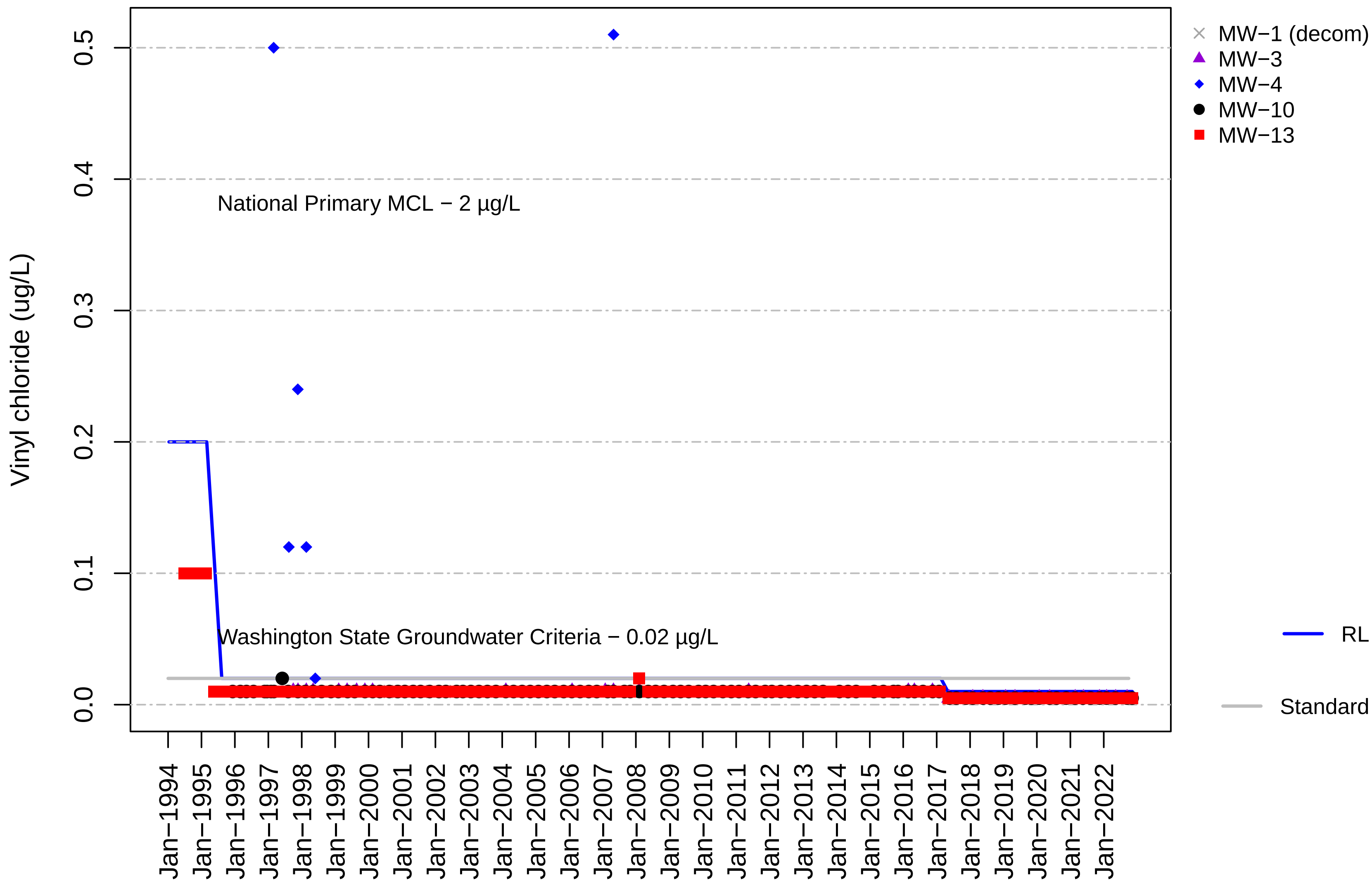
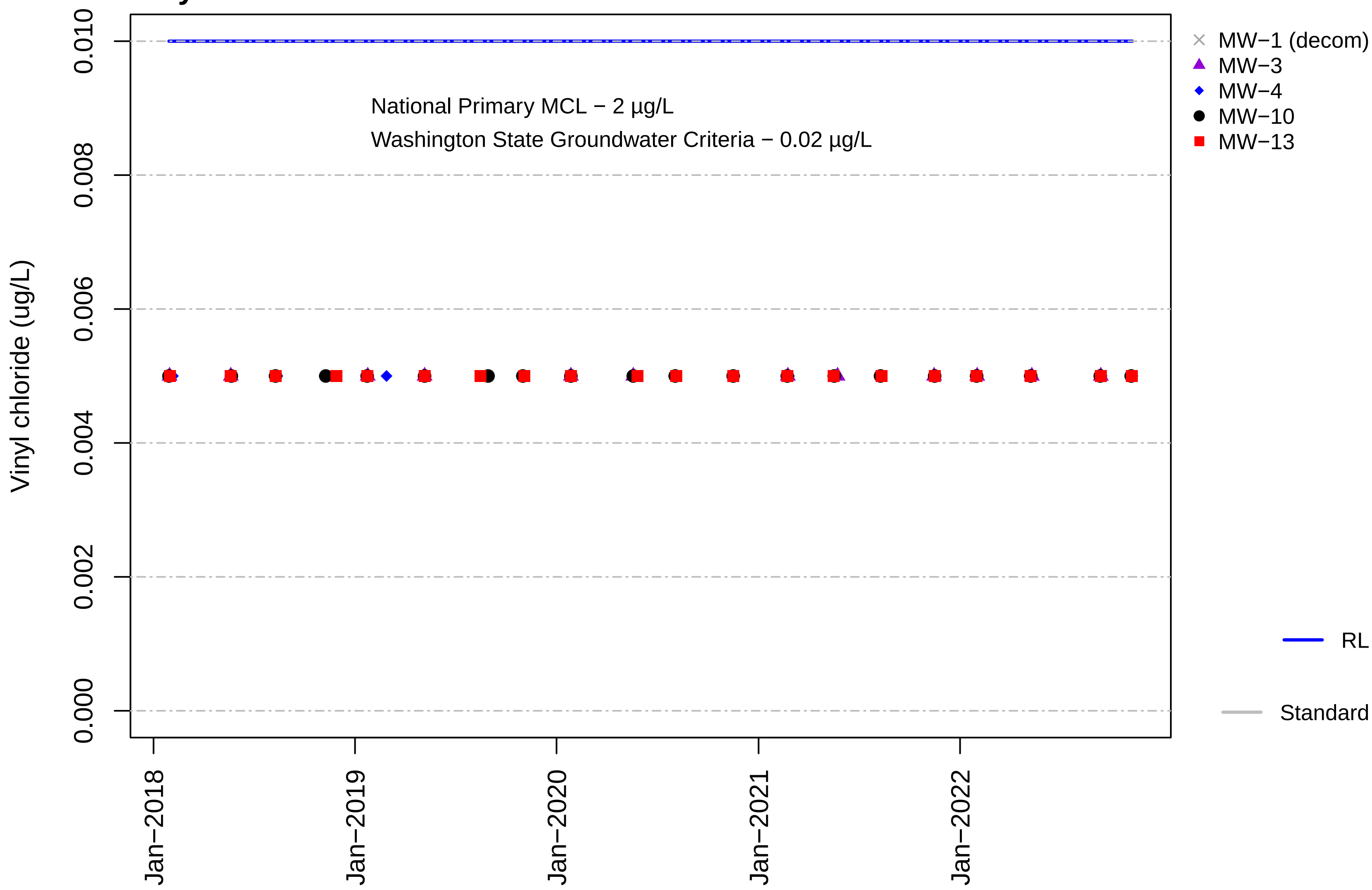


Figure C−27B
Channel Cc1
Vinyl chloride



Appendix D

Time Concentration Plots for
Groundwater in Channel Cc2

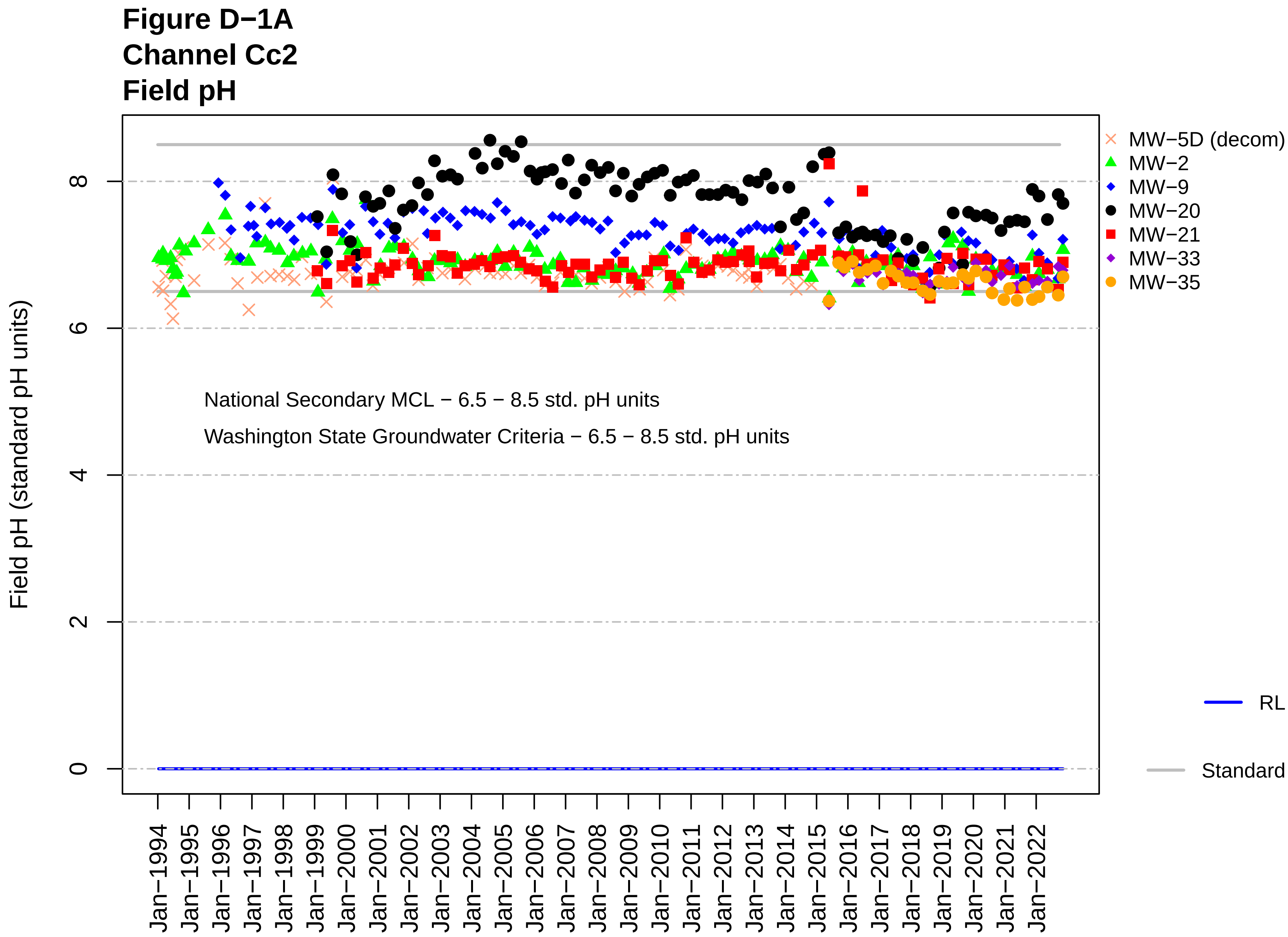


Figure D−1A
Channel Cc2
Field pH
Field pH (standard pH units)
0
2
4
6
8
National Secondary MCL − 6.5 − 8.5 std. pH units
Washington State Groundwater Criteria − 6.5 − 8.5 std. pH units
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
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
Jan−2022

Figure D−1B
Channel Cc2
Field pH

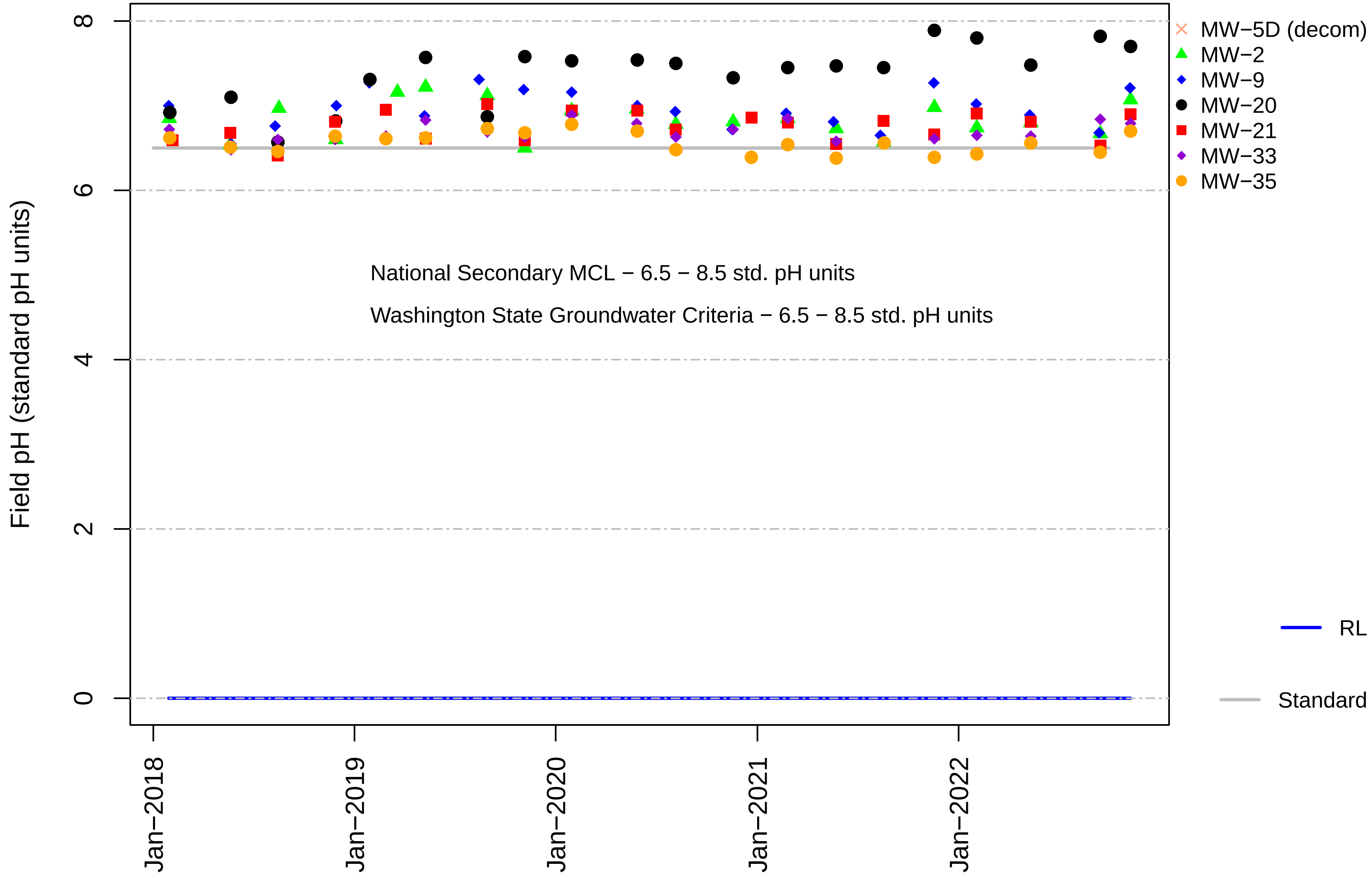


Figure D−2A
Channel Cc2
Field Specific Conductance

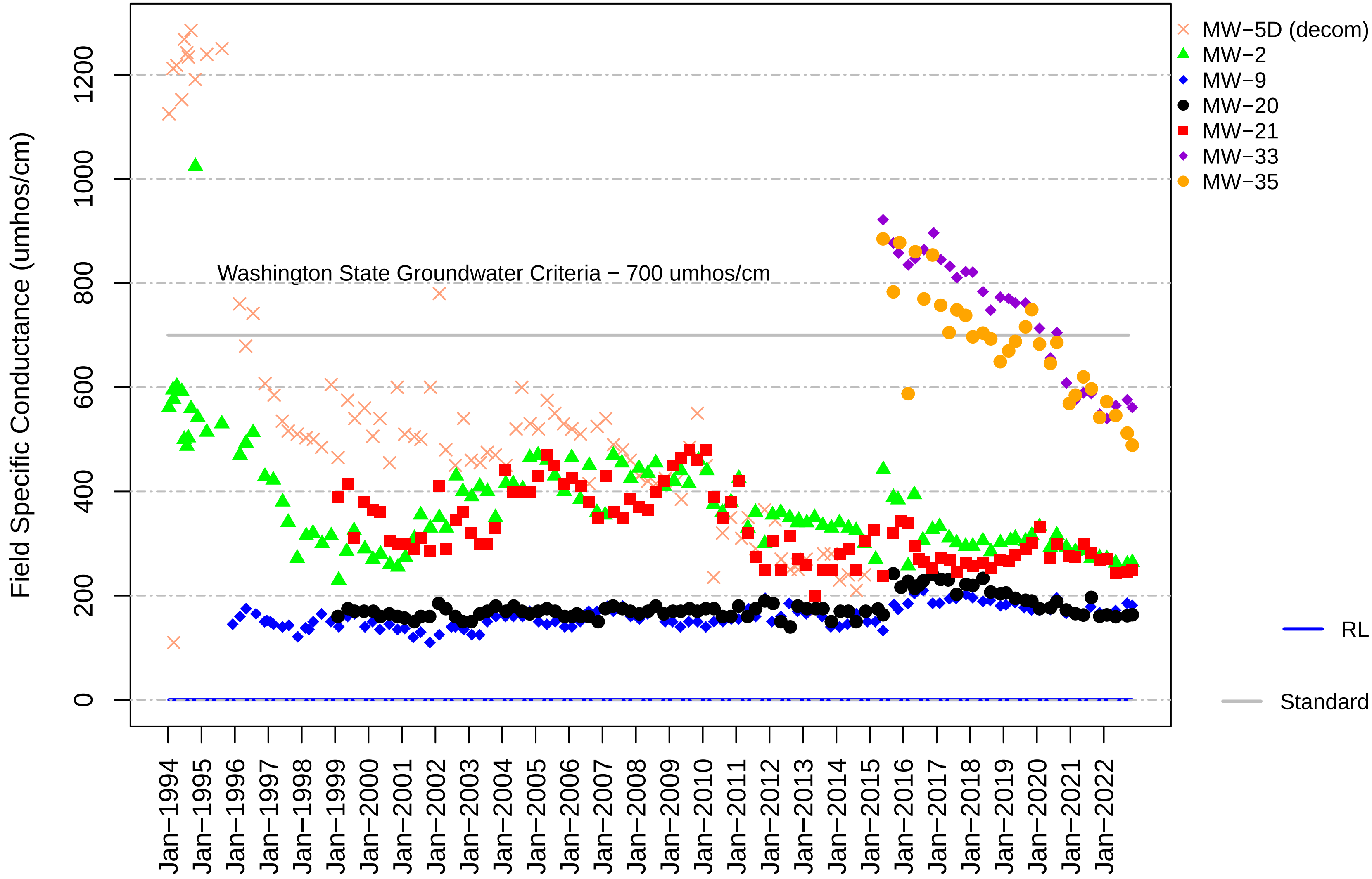


Figure D−2B
Channel Cc2
Field Specific Conductance

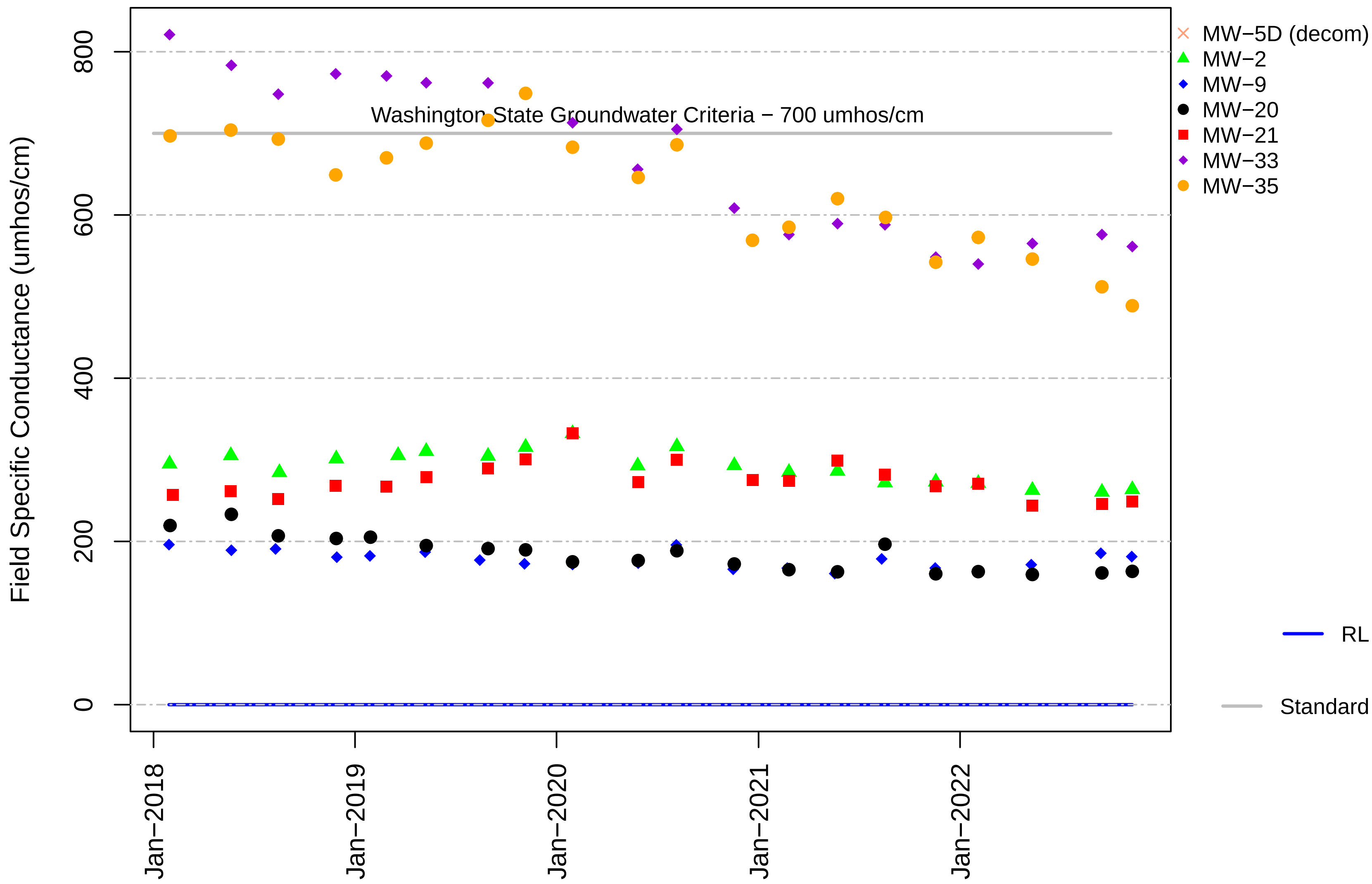


Figure D-3A
Channel Cc2
Alkalinity

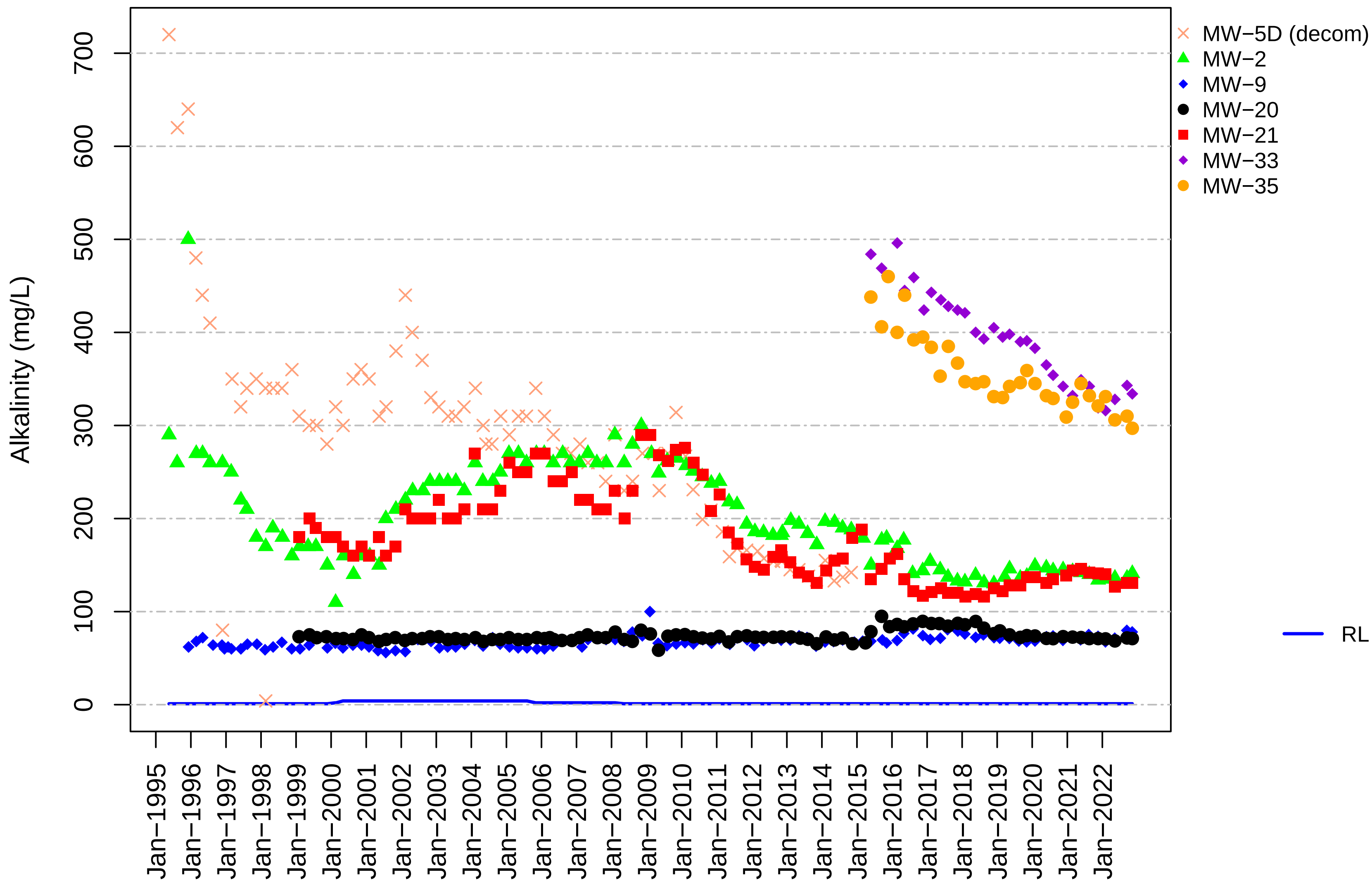


Figure D−3B
Channel Cc2
Alkalinity

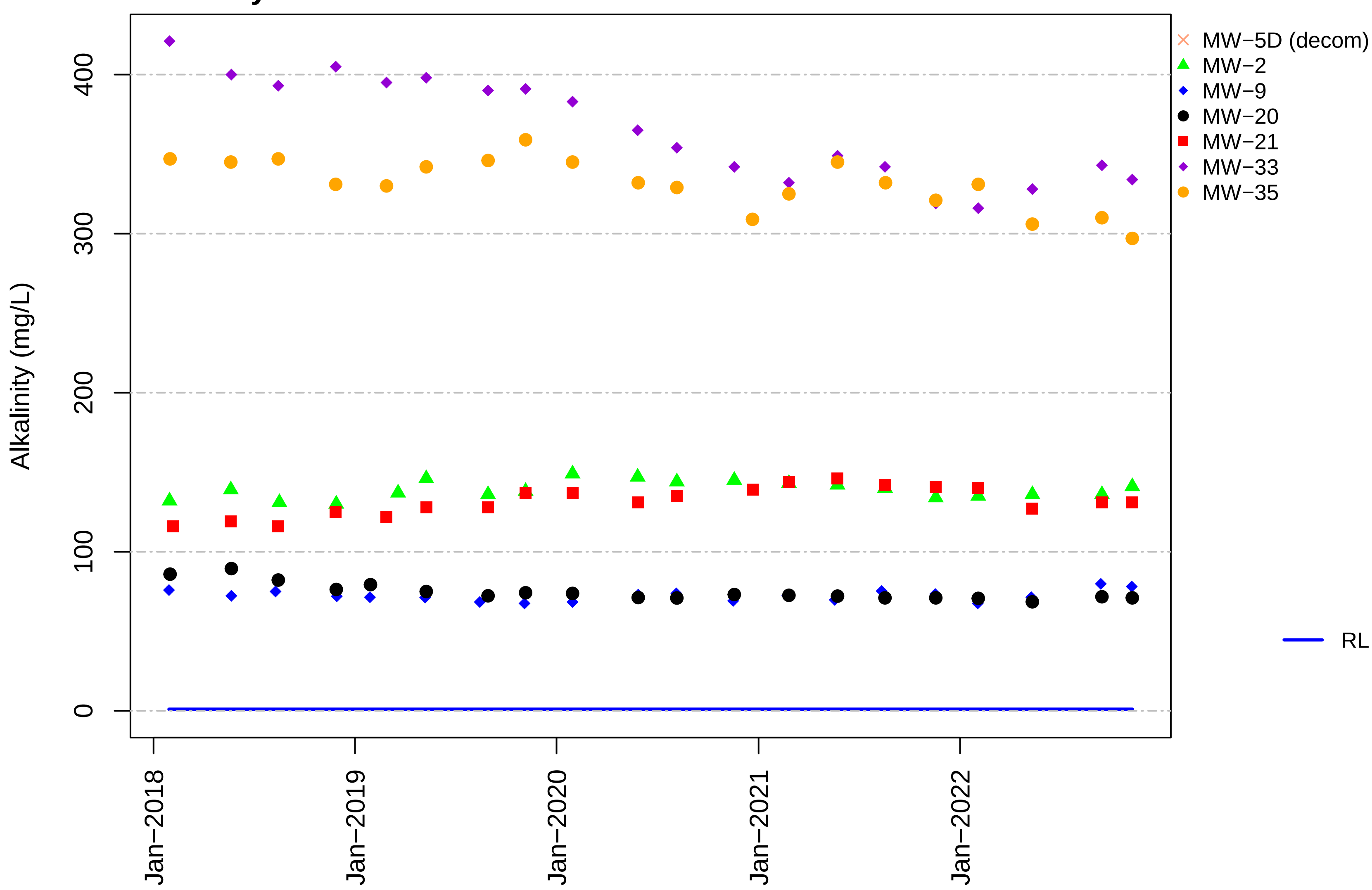


Figure D−4A
Channel Cc2
Ammonia

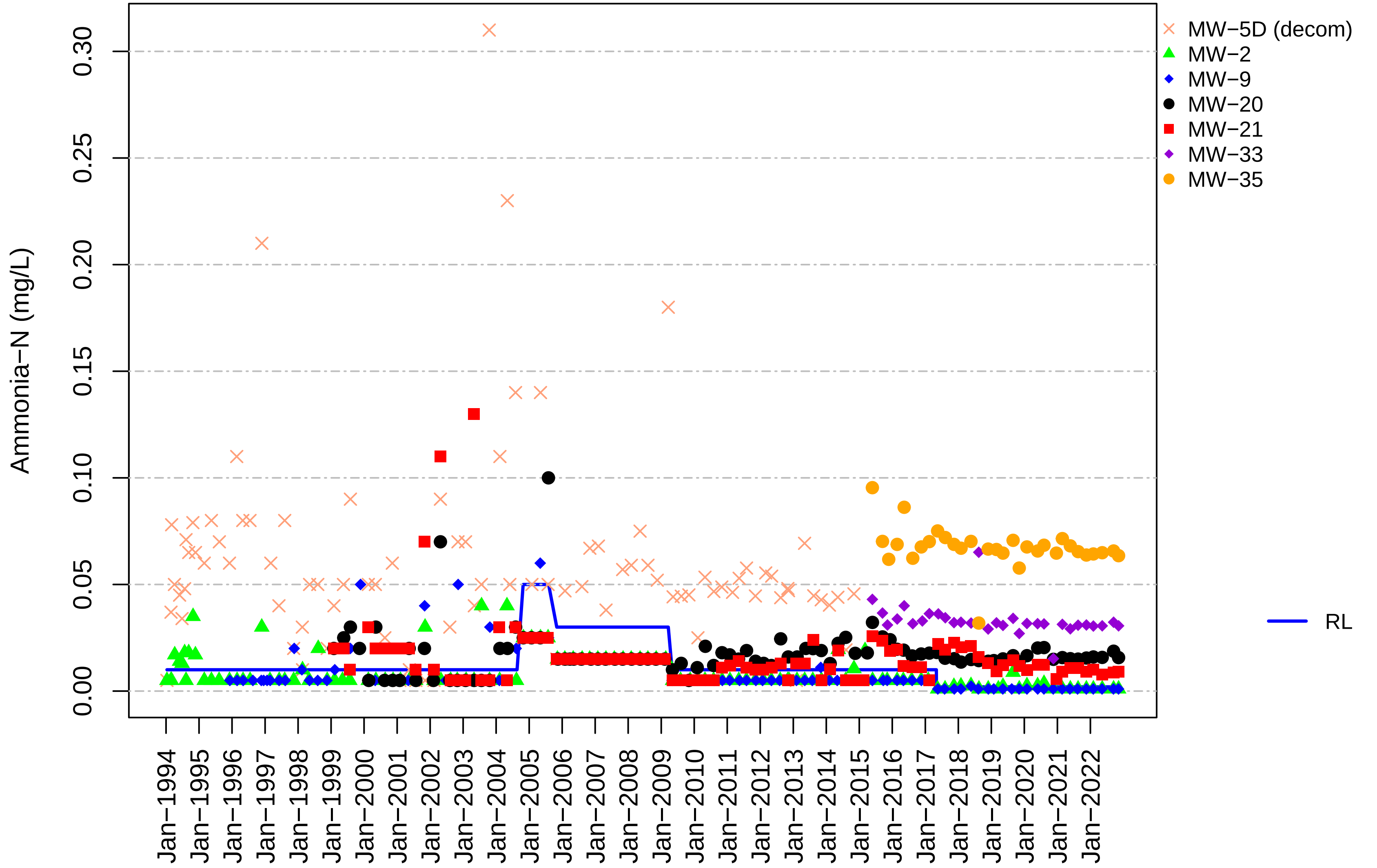


Figure D−4B
Channel Cc2
Ammonia

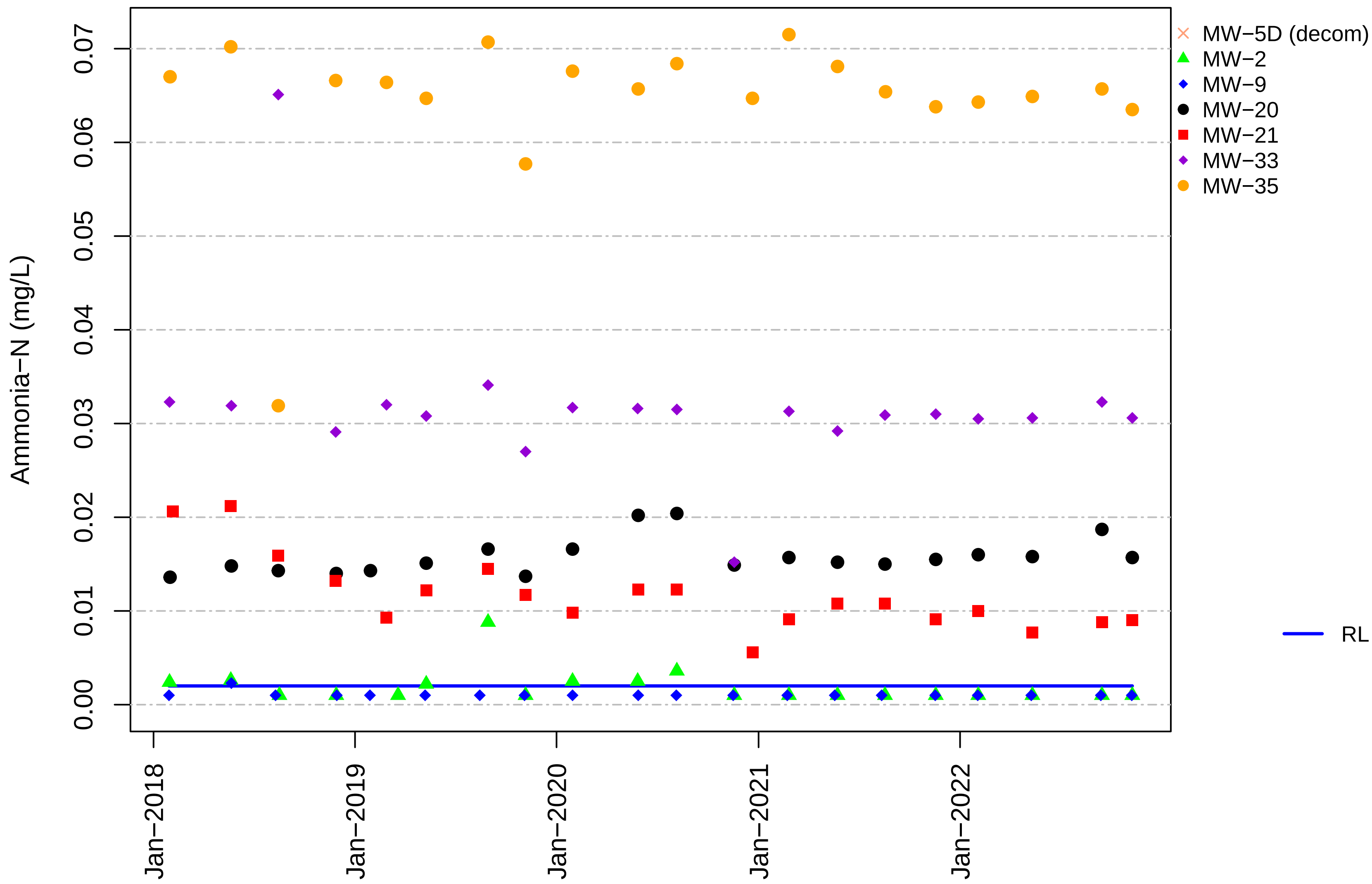


Figure D−5A
Channel Cc2
Chloride

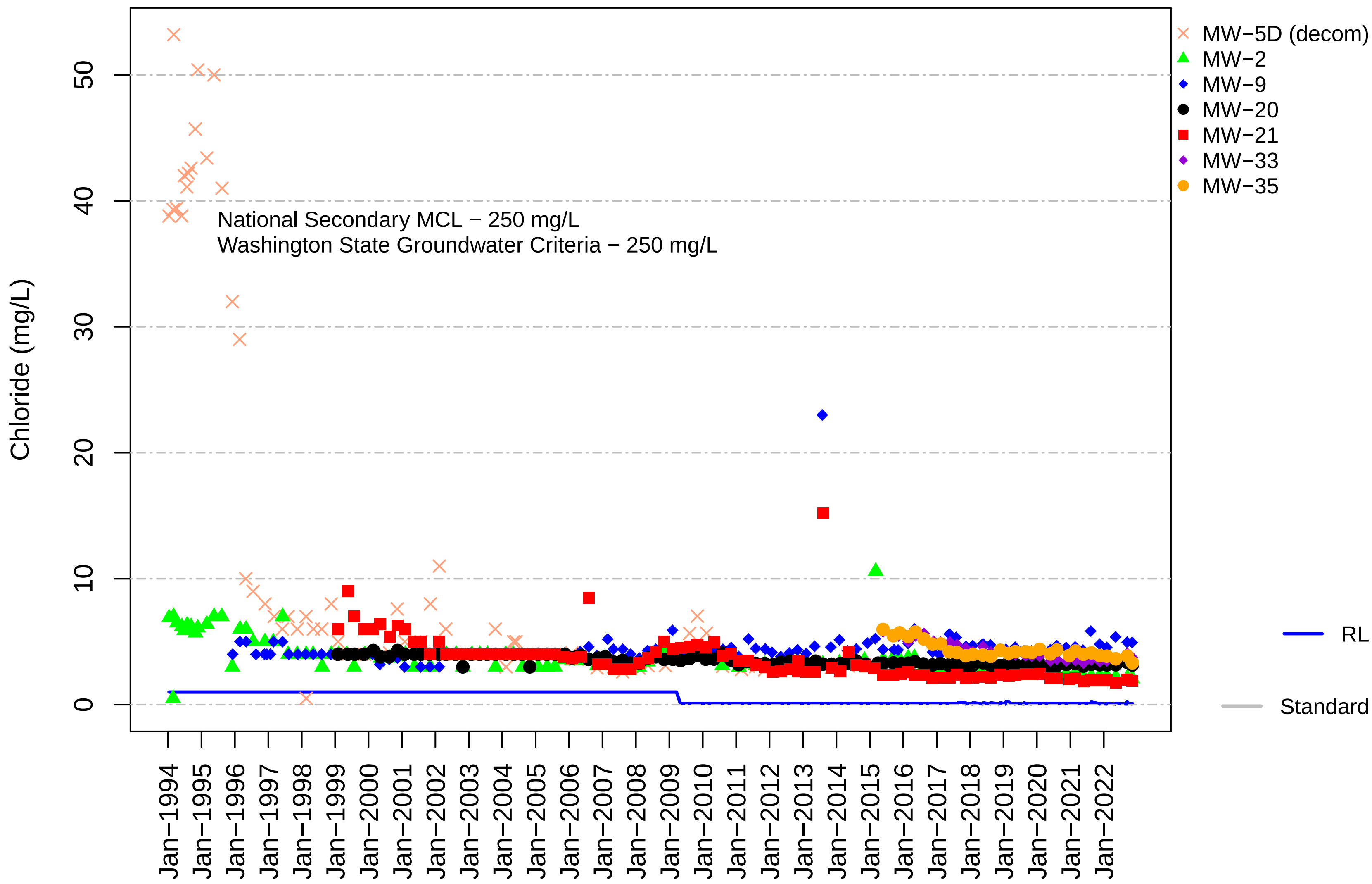
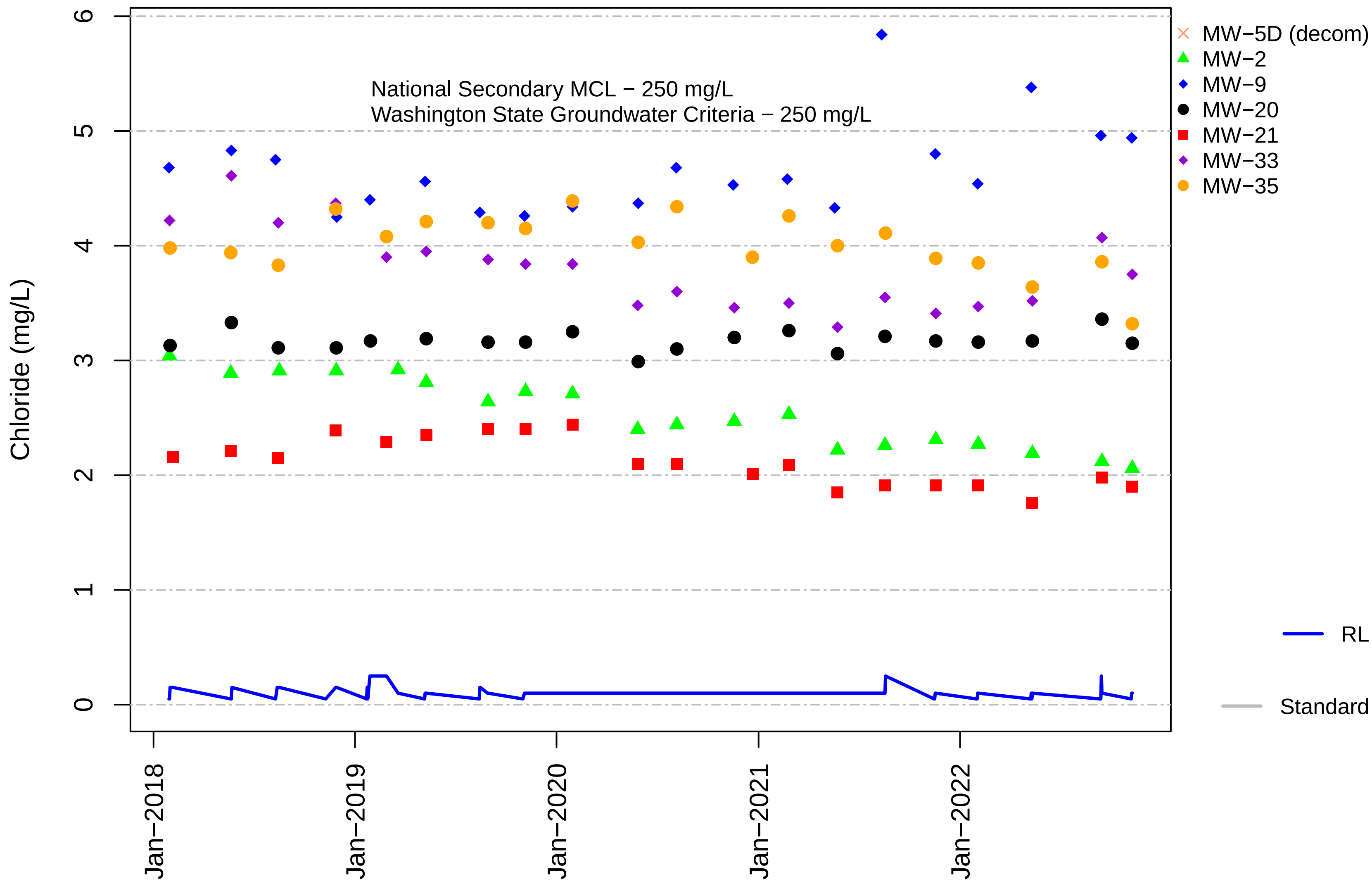


Figure D−5B
Channel Cc2
Chloride



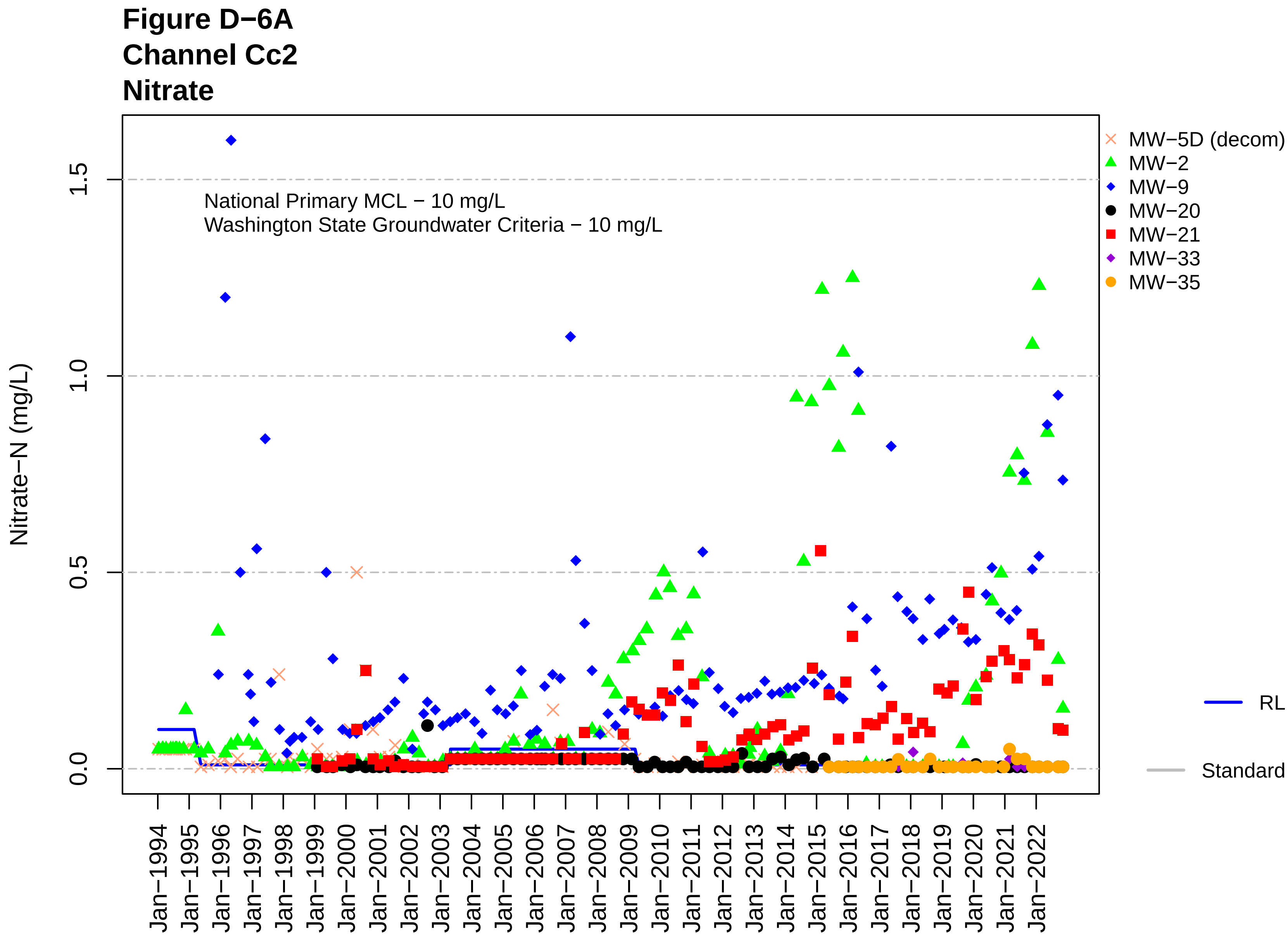


Figure D−6A
Channel Cc2
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0.0
0.5
1.0
1.5
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

Figure D−6B
Channel Cc2
Nitrate

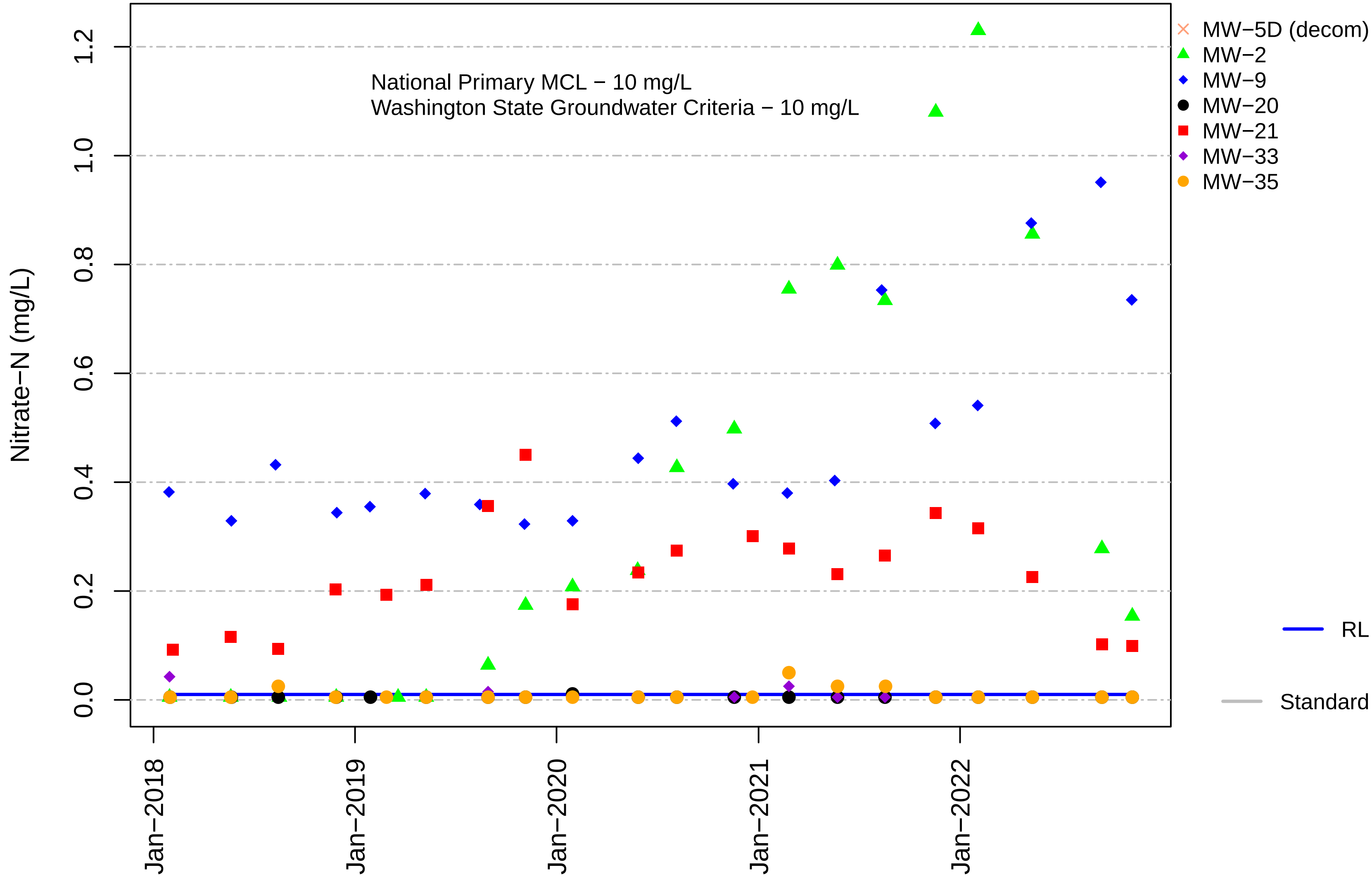


Figure D−7A
Channel Cc2
Sulfate

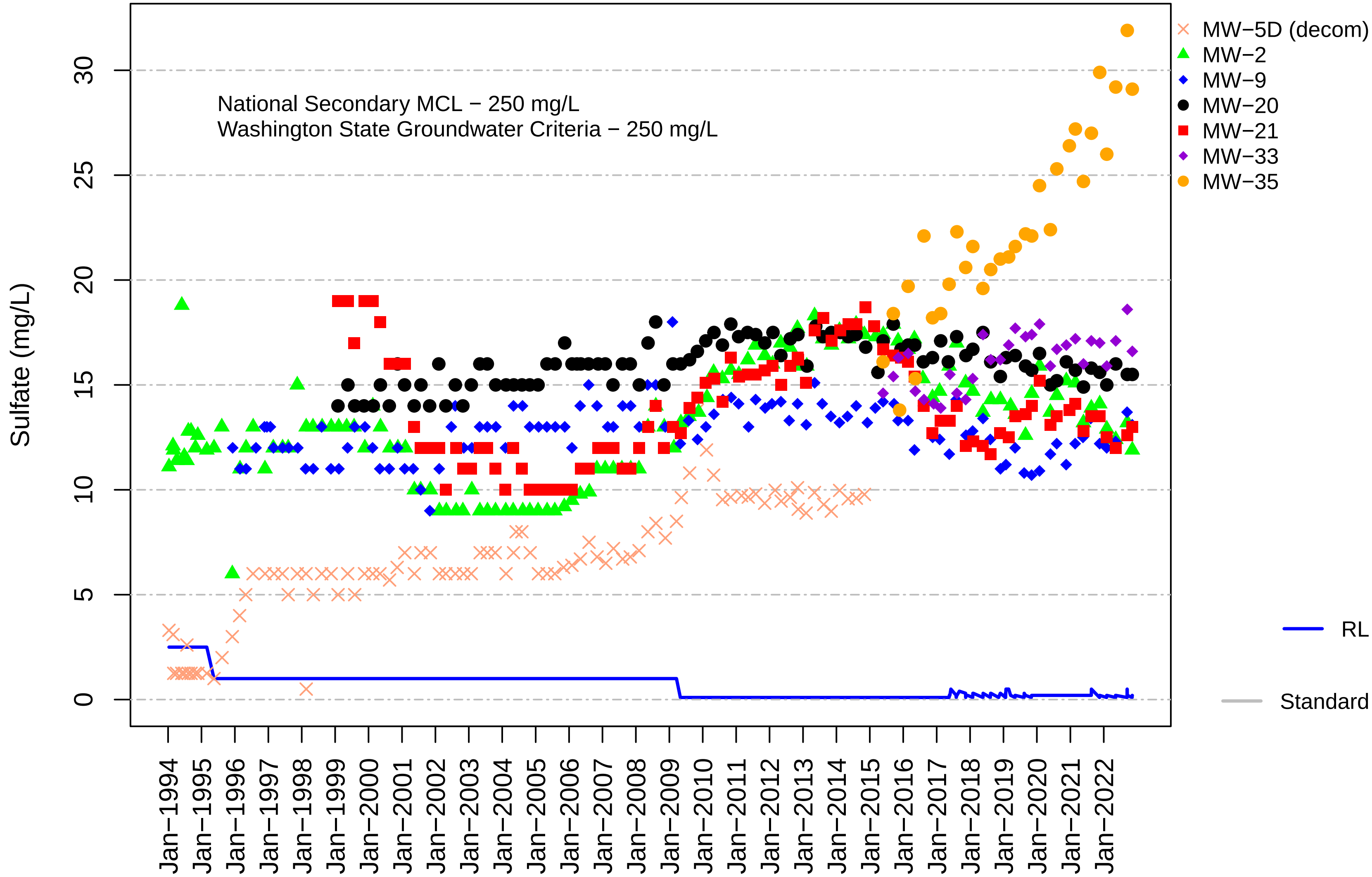


Figure D‑7B
Channel Cc2
Sulfate

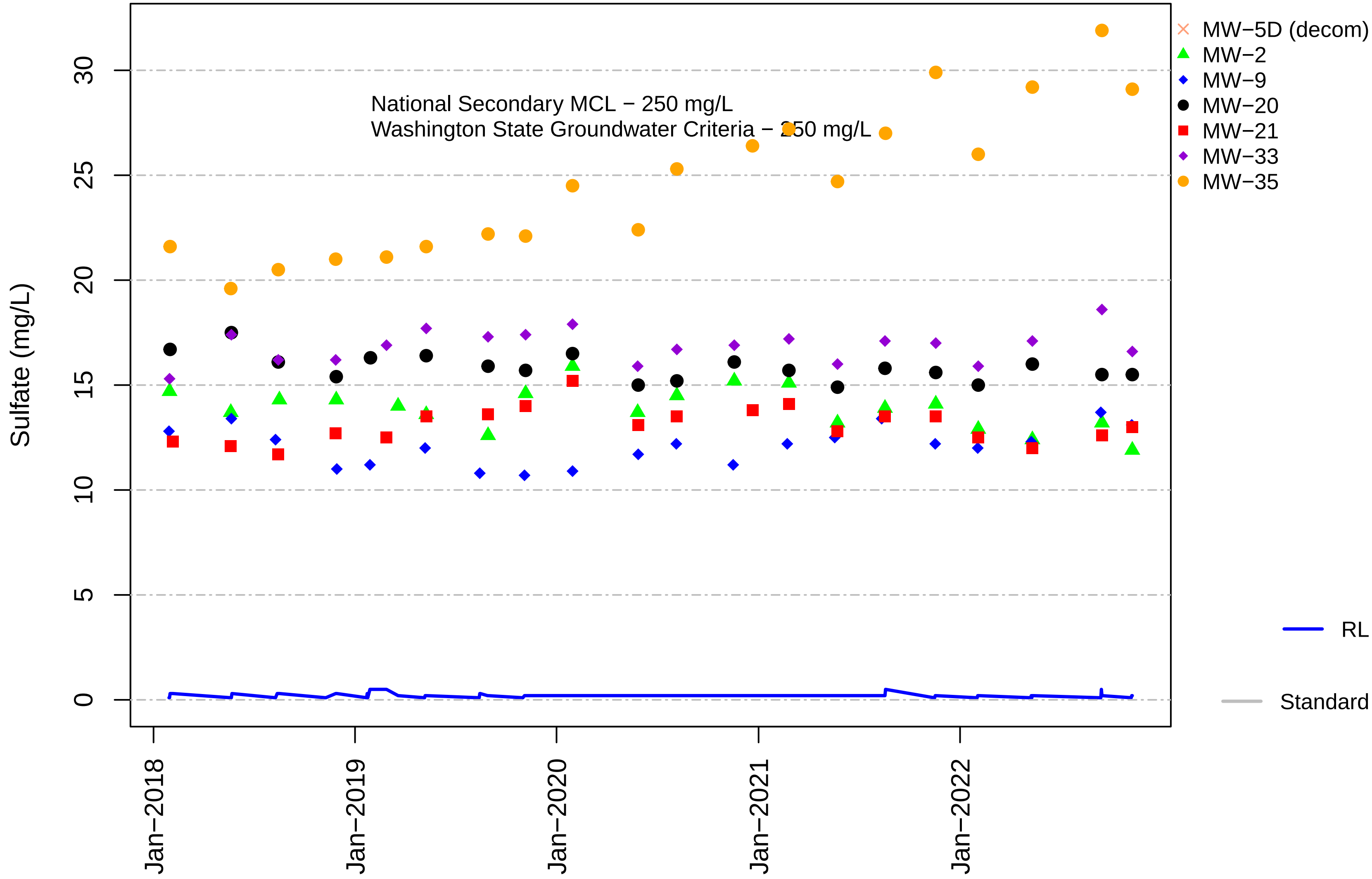


Figure D−8A
Channel Cc2
Total Dissolved Solids

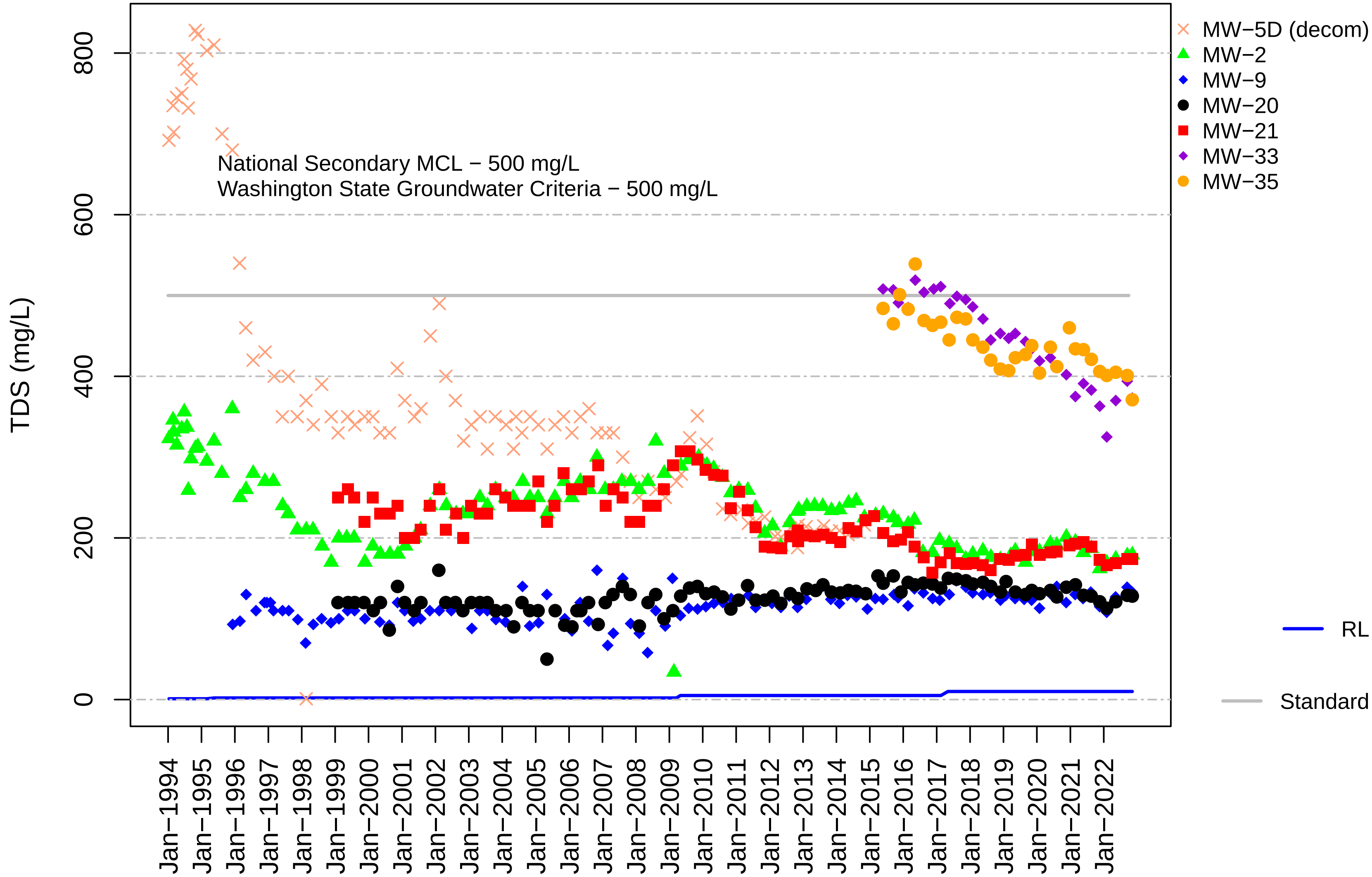


Figure D−8B
Channel Cc2
Total Dissolved Solids

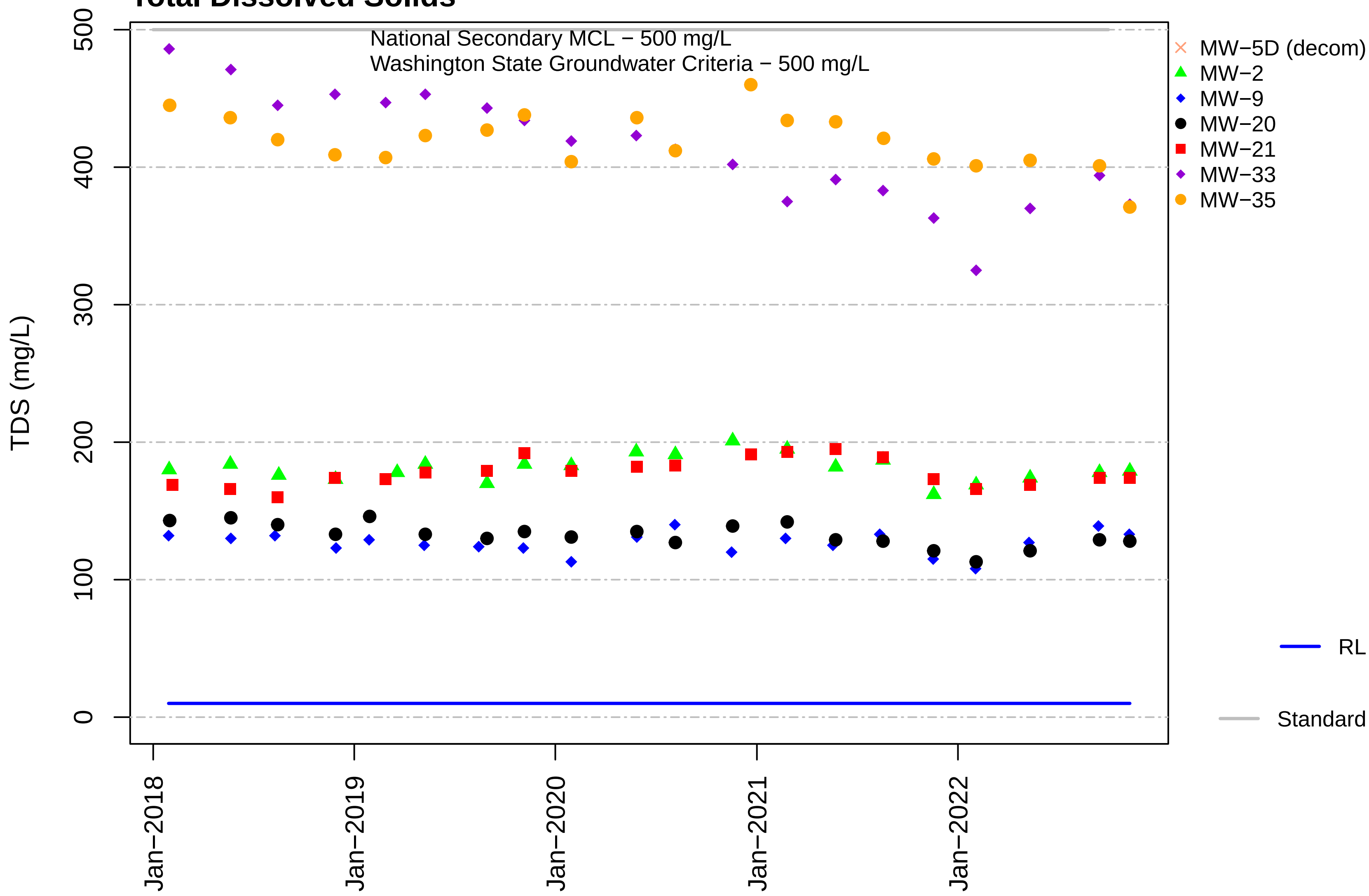


Figure D−9A
Channel Cc2
Arsenic

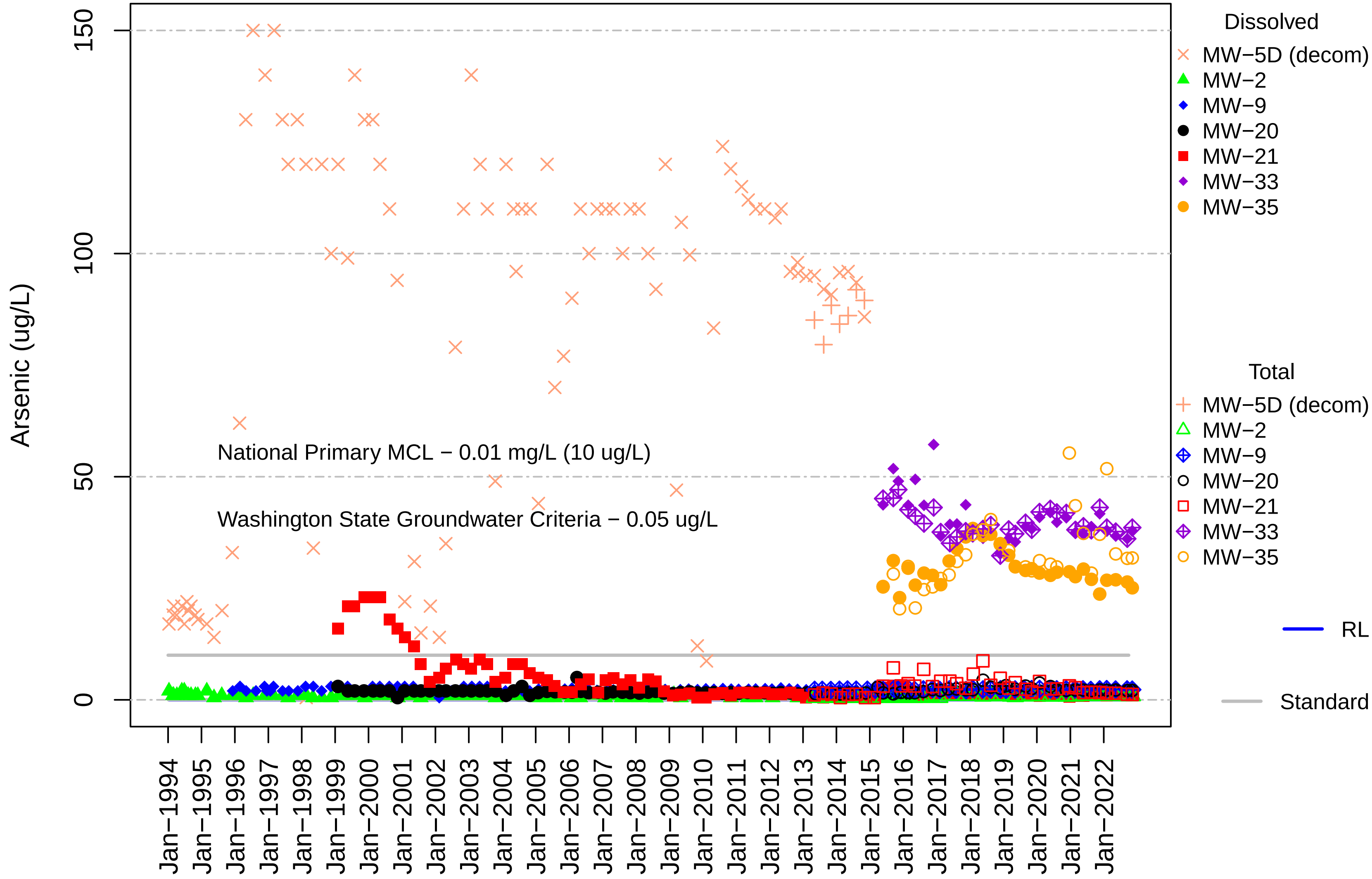


Figure D−9B
Channel Cc2
Arsenic

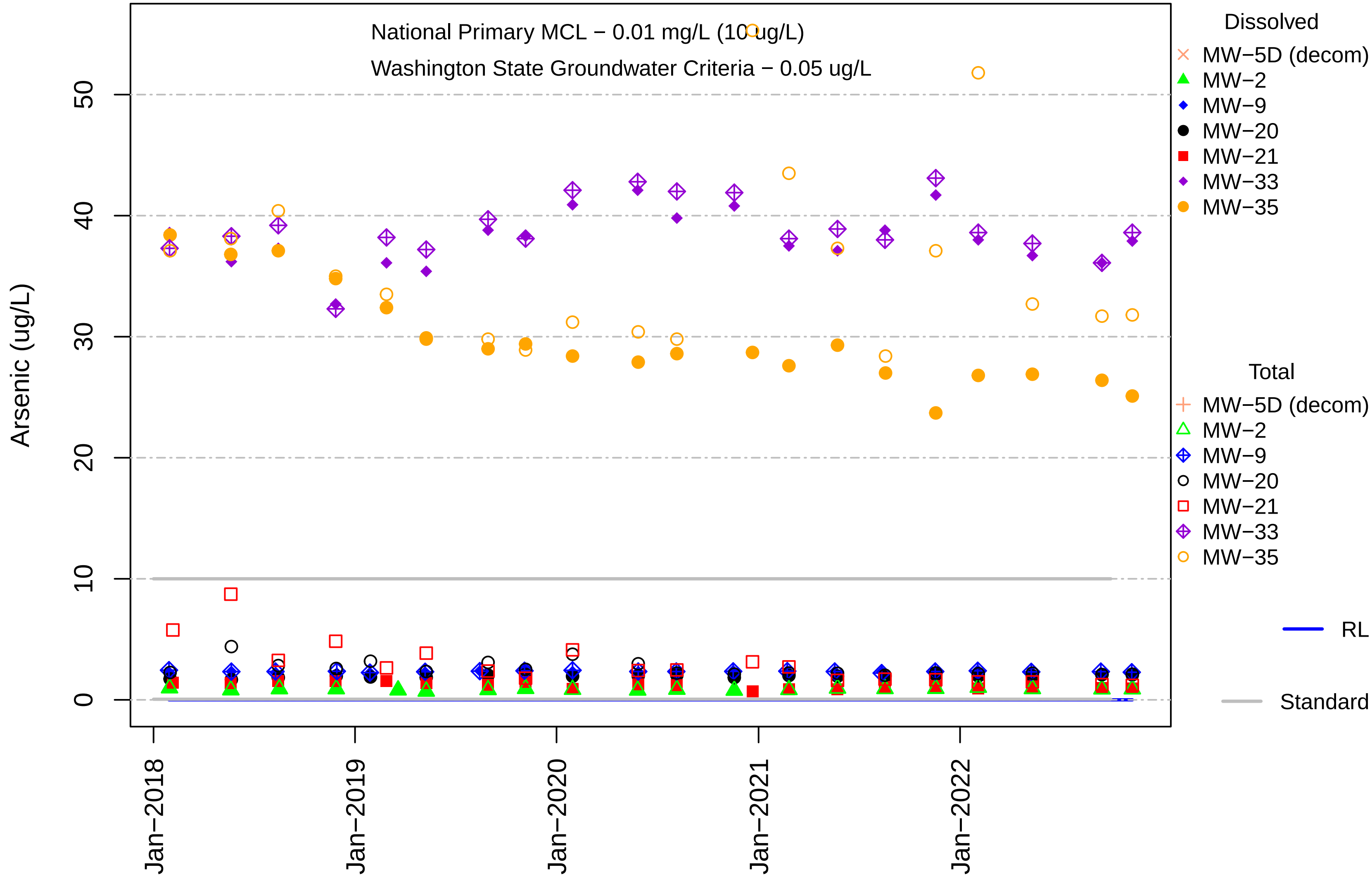


Figure D−10A
Channel Cc2
Calcium

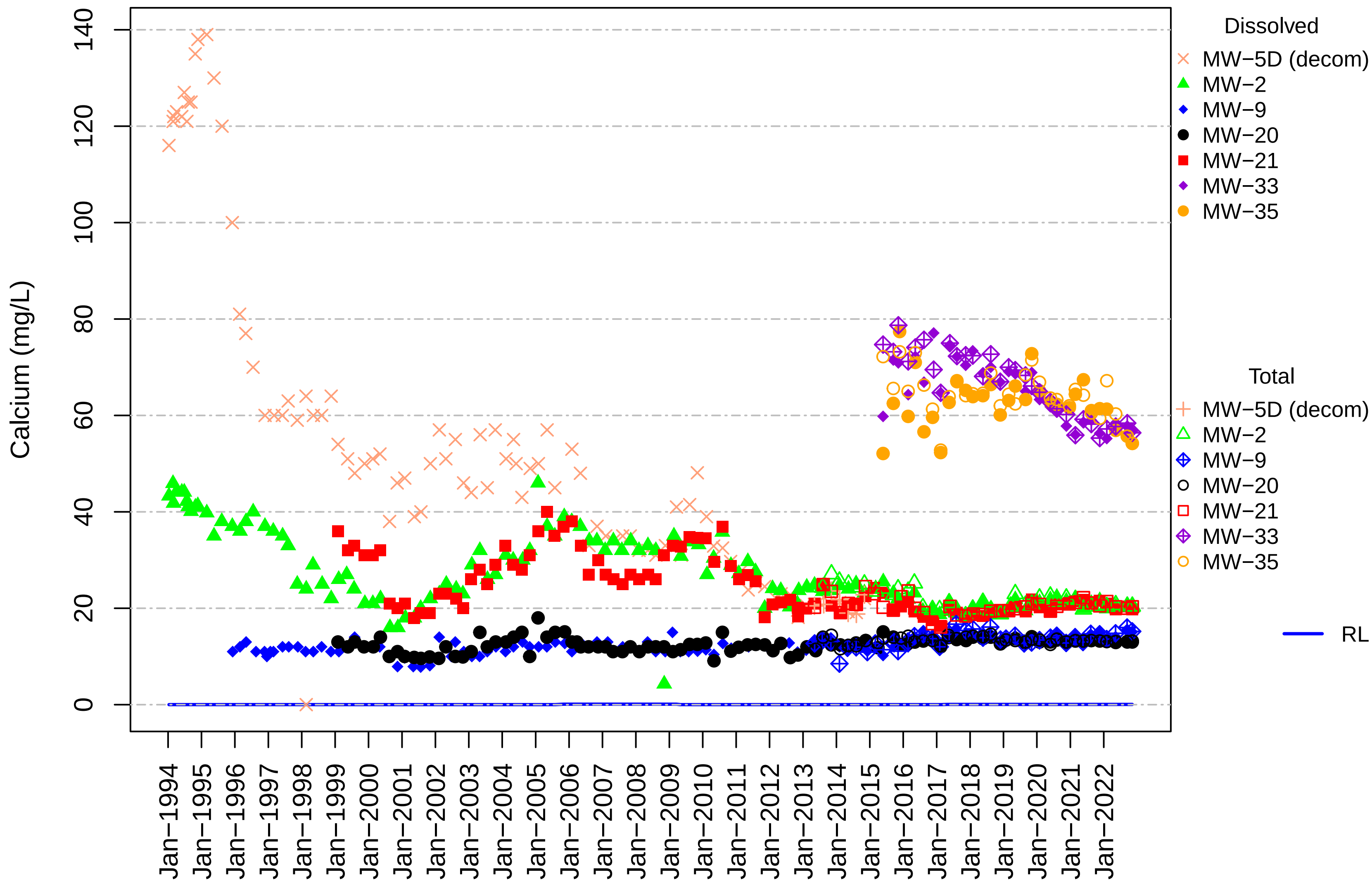


Figure D−10B
Channel Cc2
Calcium

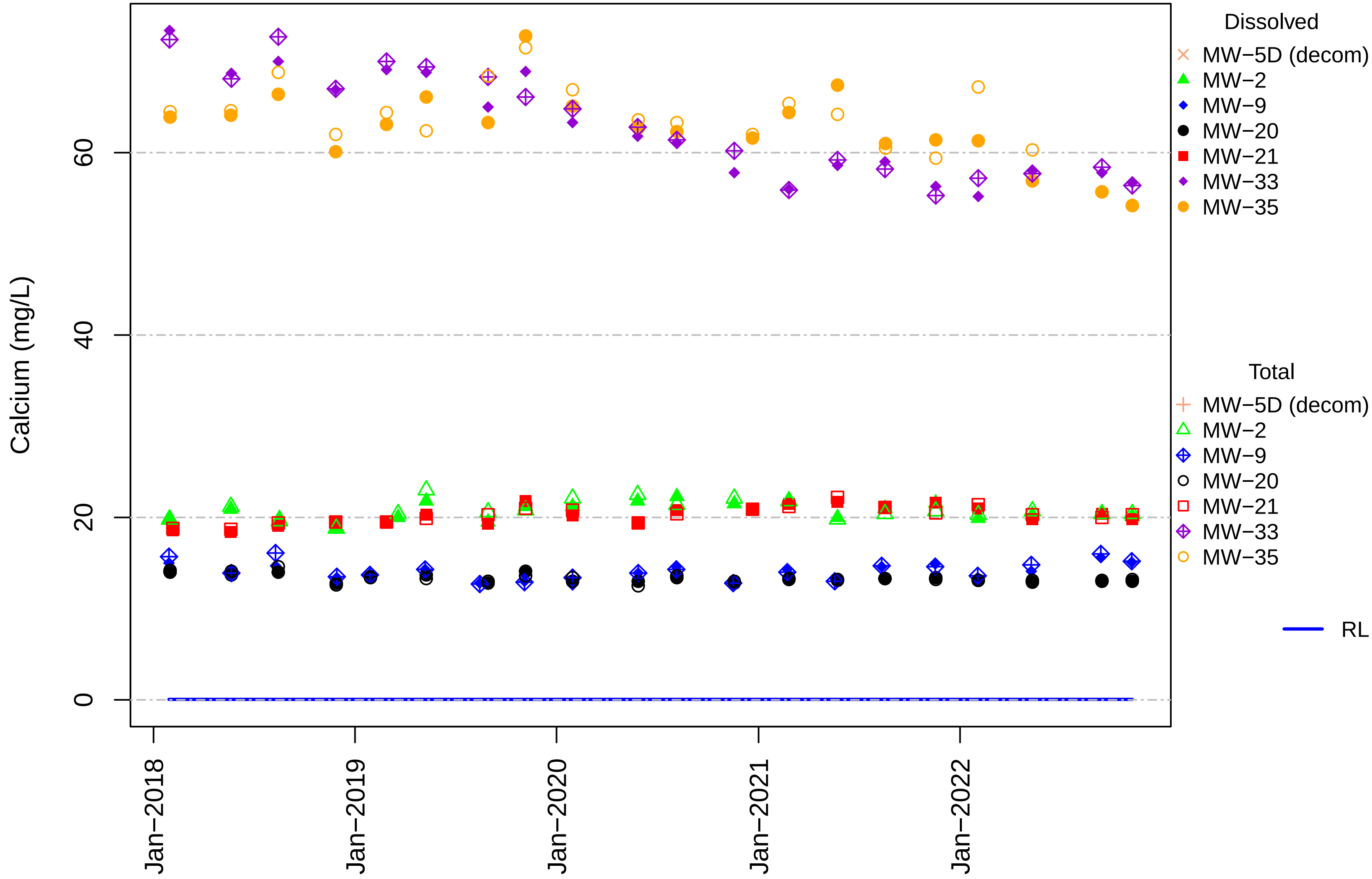


Figure D−11A
Channel Cc2
Iron

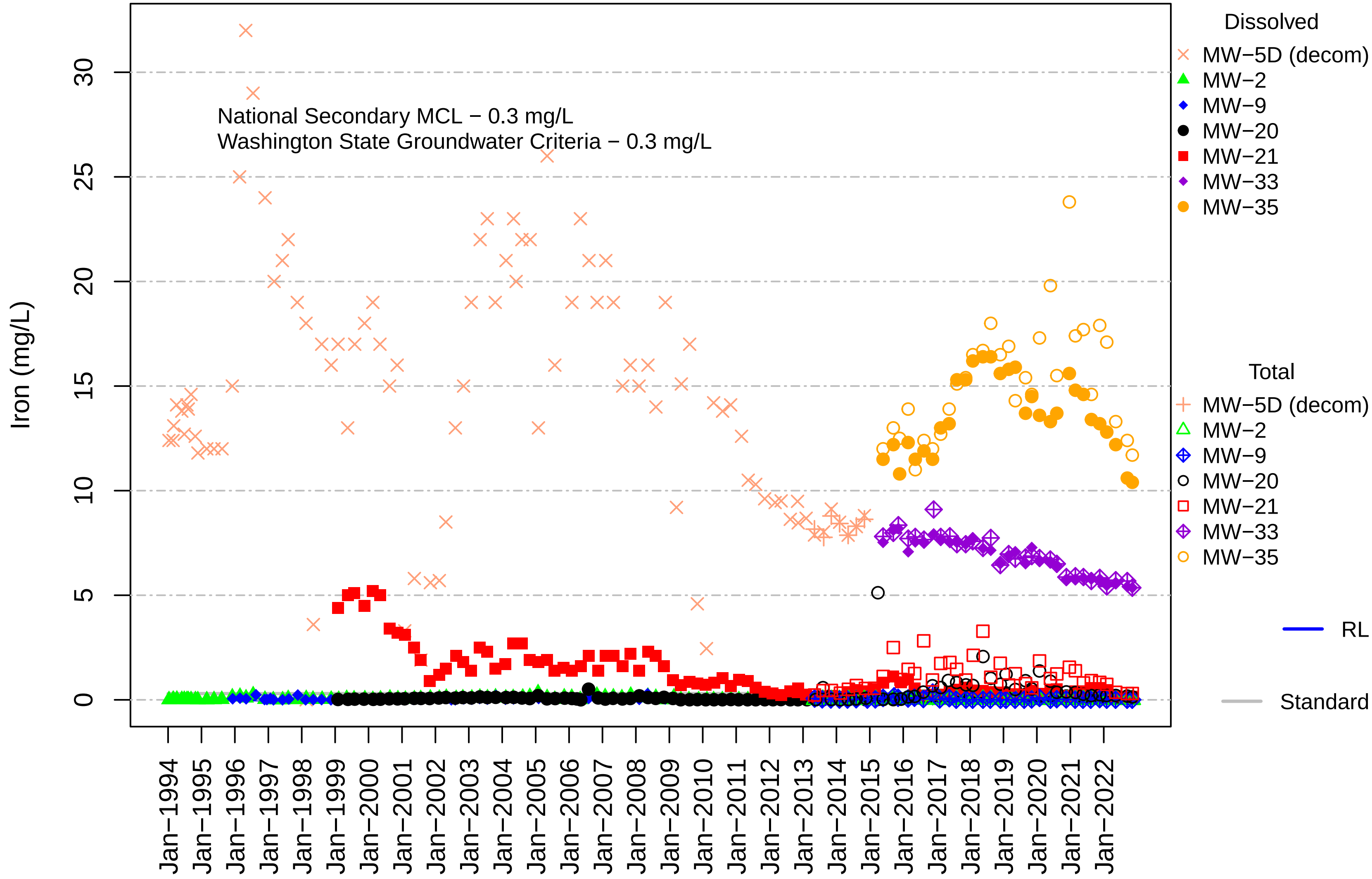
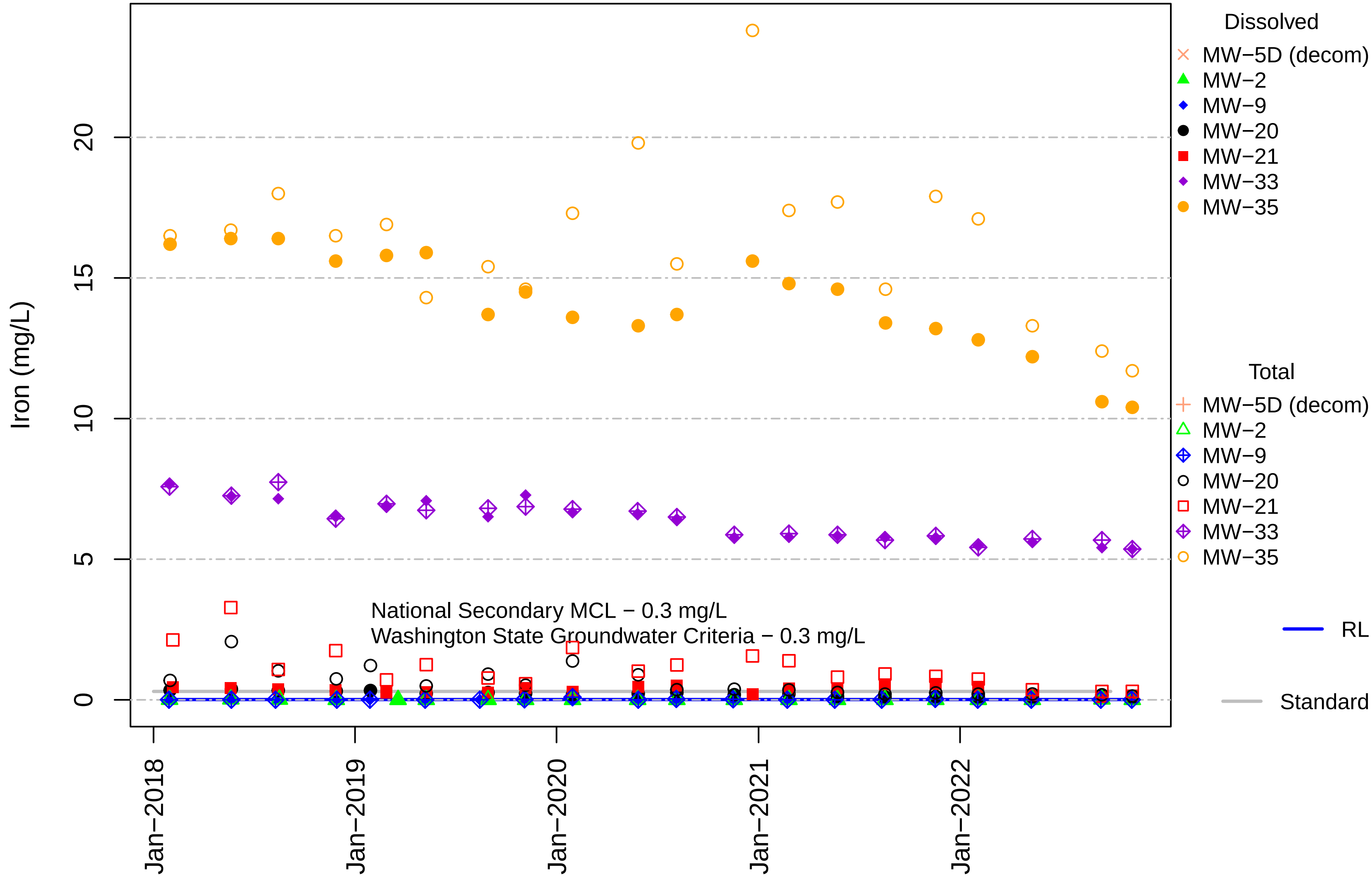


Figure D−11B
Channel Cc2
Iron



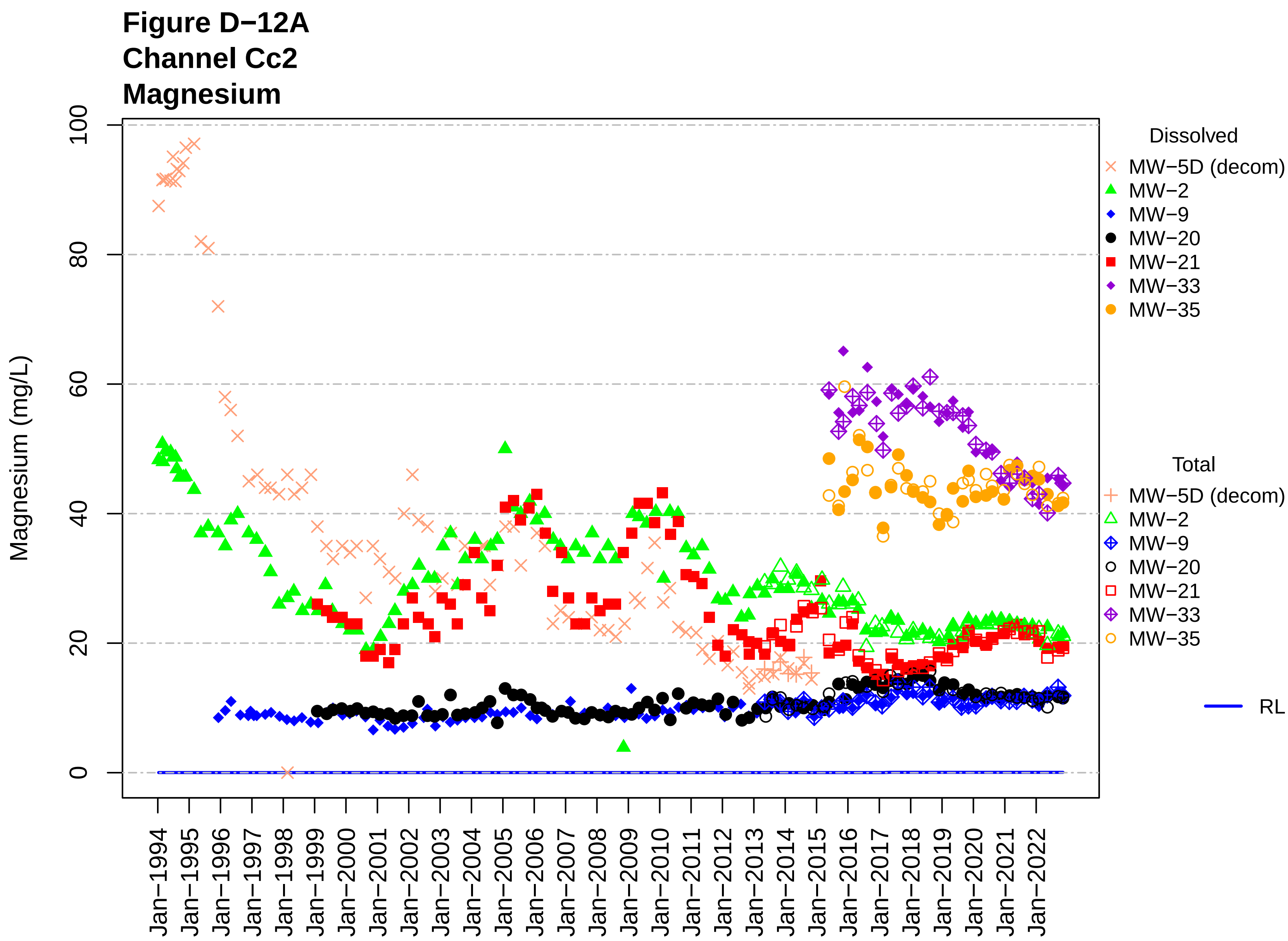


Figure D−12A
Channel Cc2
Magnesium
Magnesium (mg/L)
0
20
40
60
80
100
Jan−1994
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
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

Figure D−12B
Channel Cc2
Magnesium

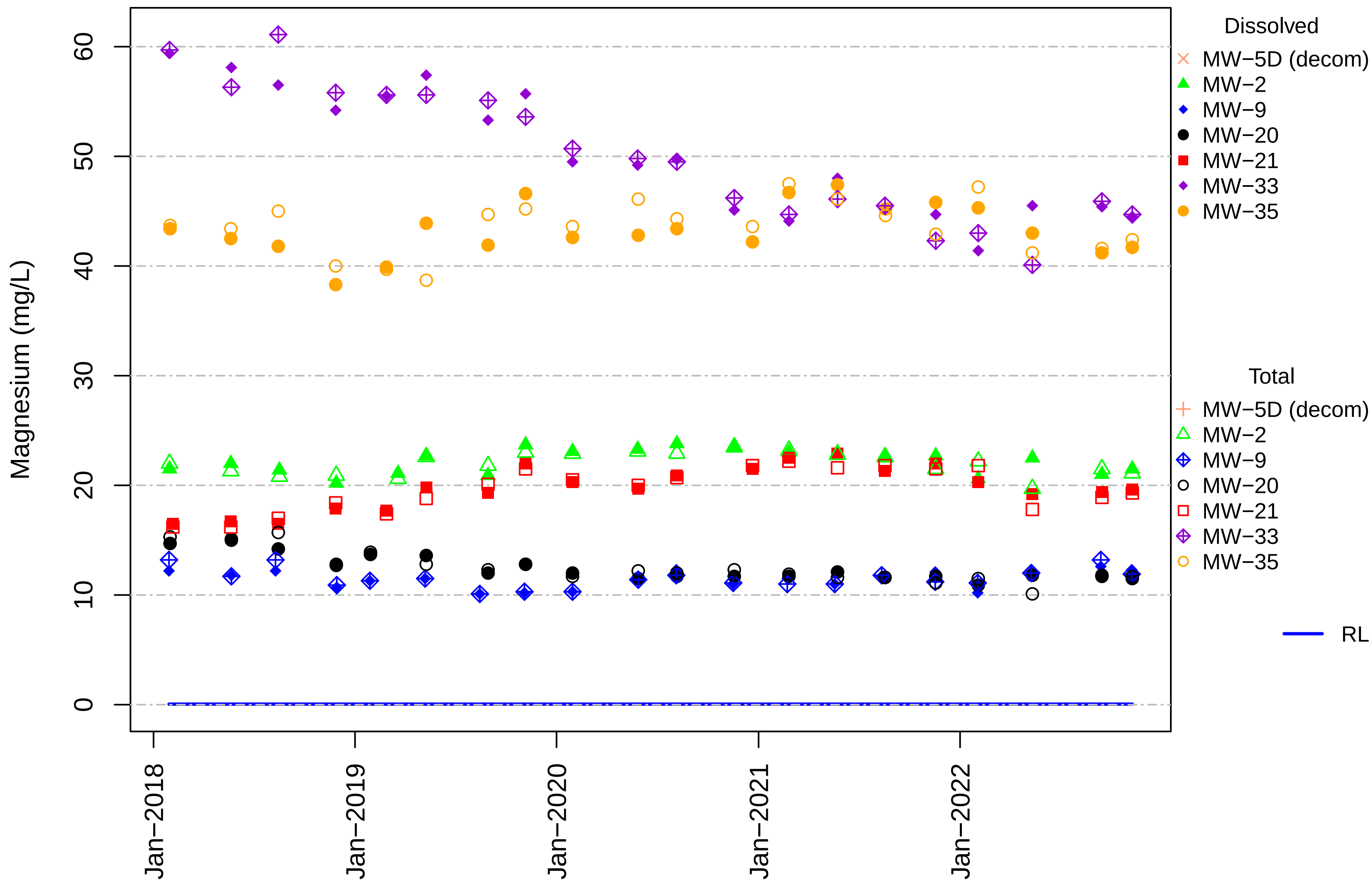


Figure D−13A
Channel Cc2
Manganese

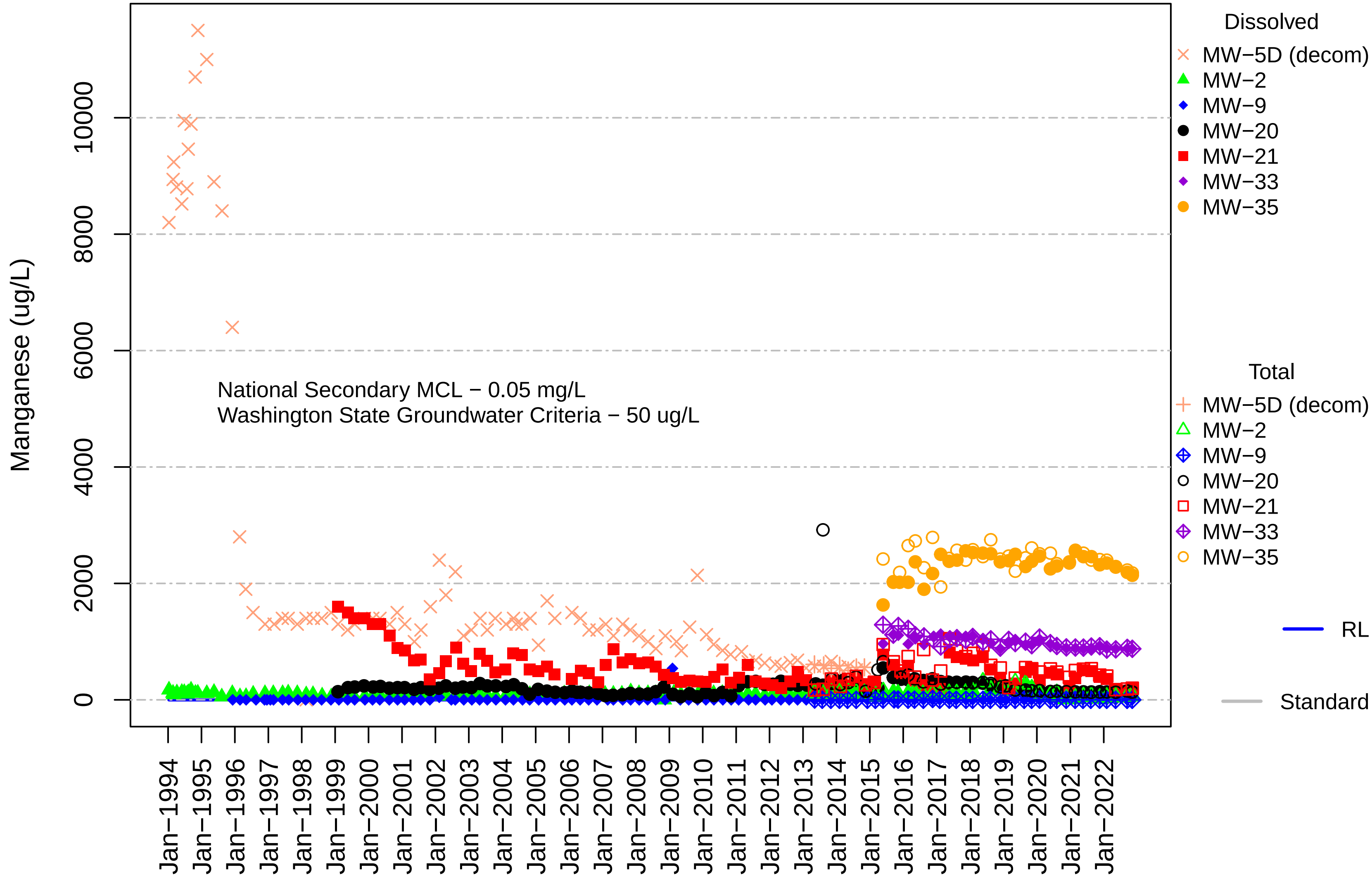


Figure D−13B
Channel Cc2
Manganese

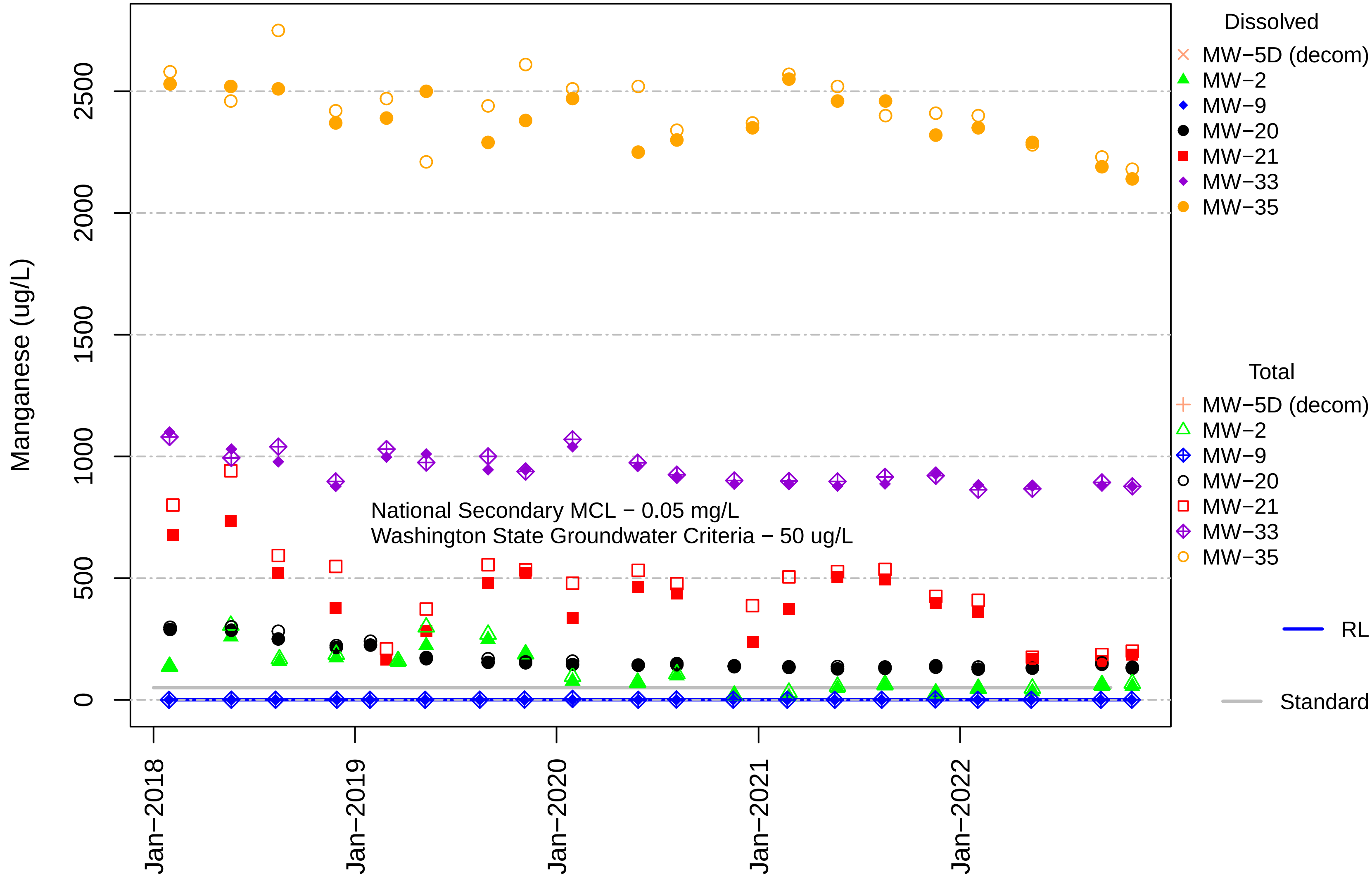


Figure D−14A
Channel Cc2
Potassium

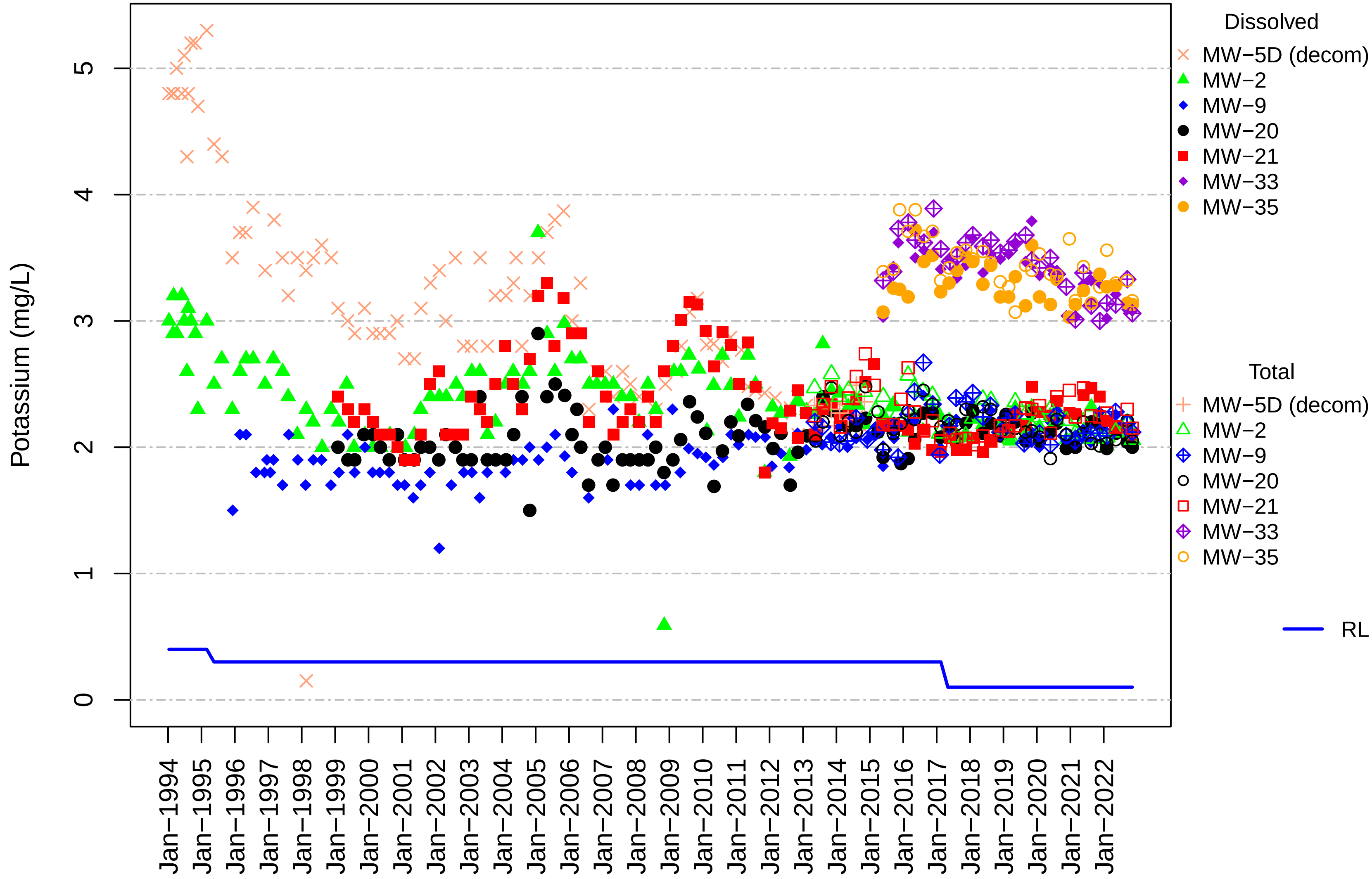
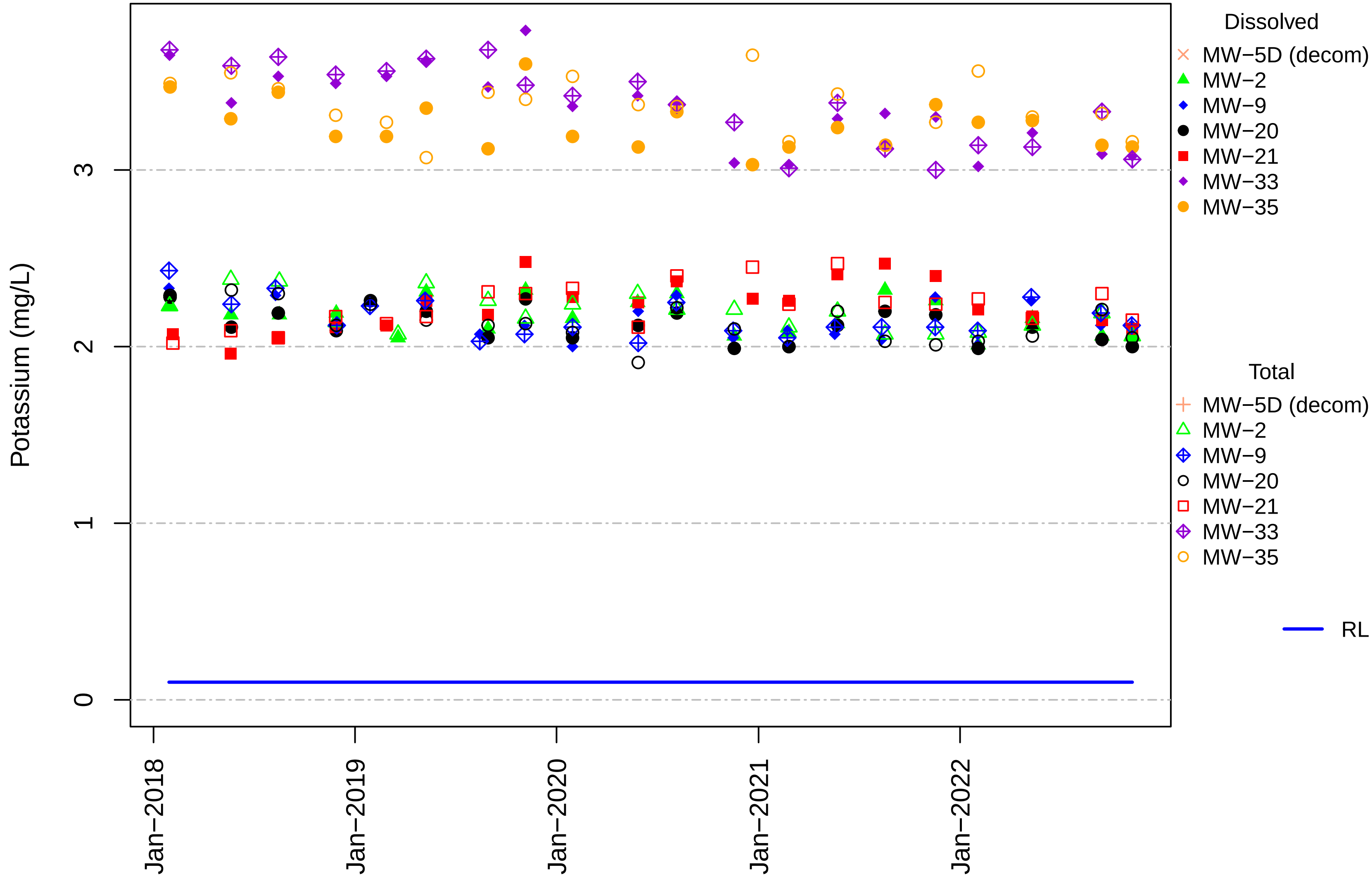


Figure D−14B
Channel Cc2
Potassium



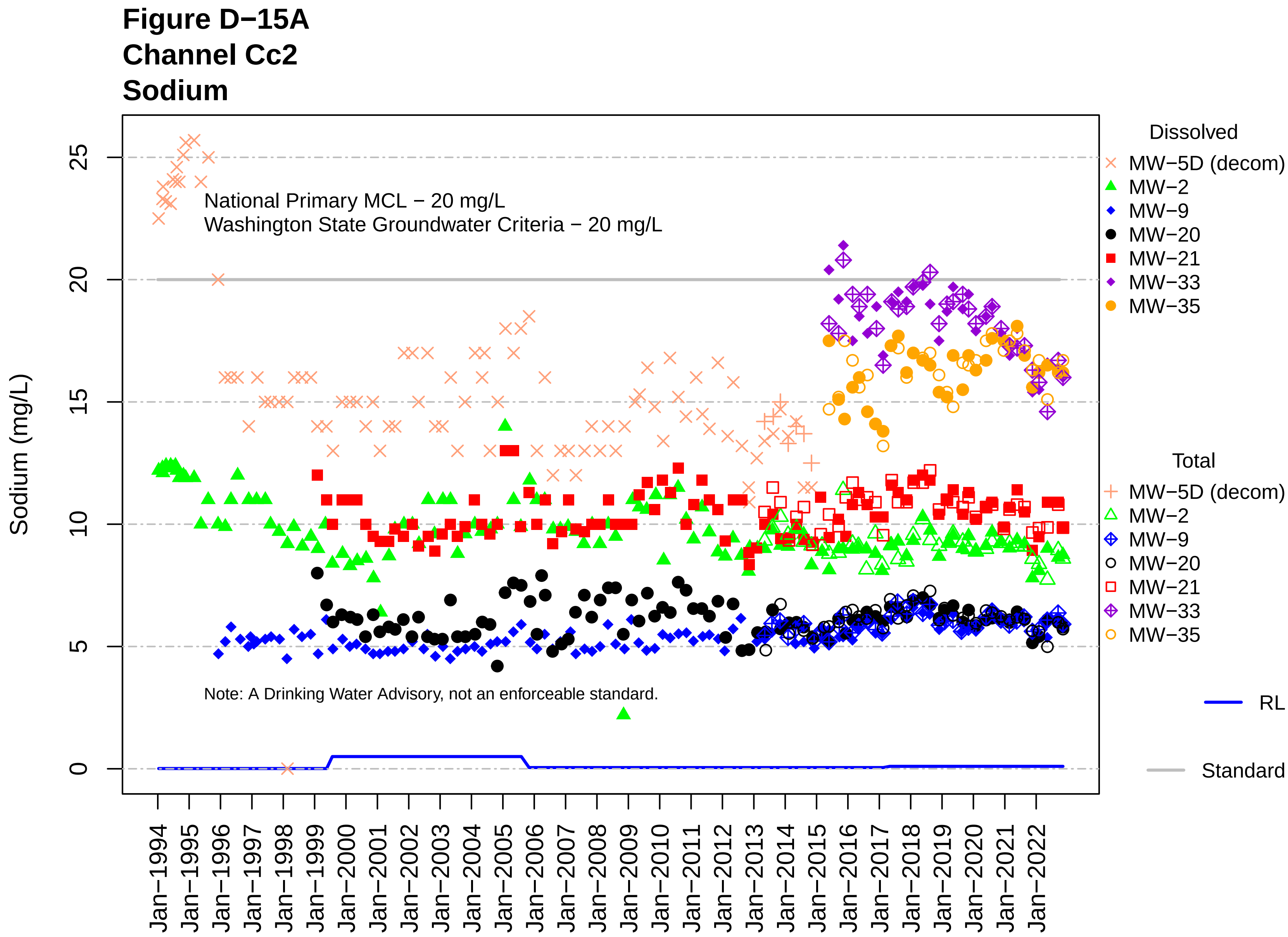


Figure D−15A
Channel Cc2
Sodium
Sodium (mg/L)
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard
0
5
10
15
20
25
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
Jan−2022

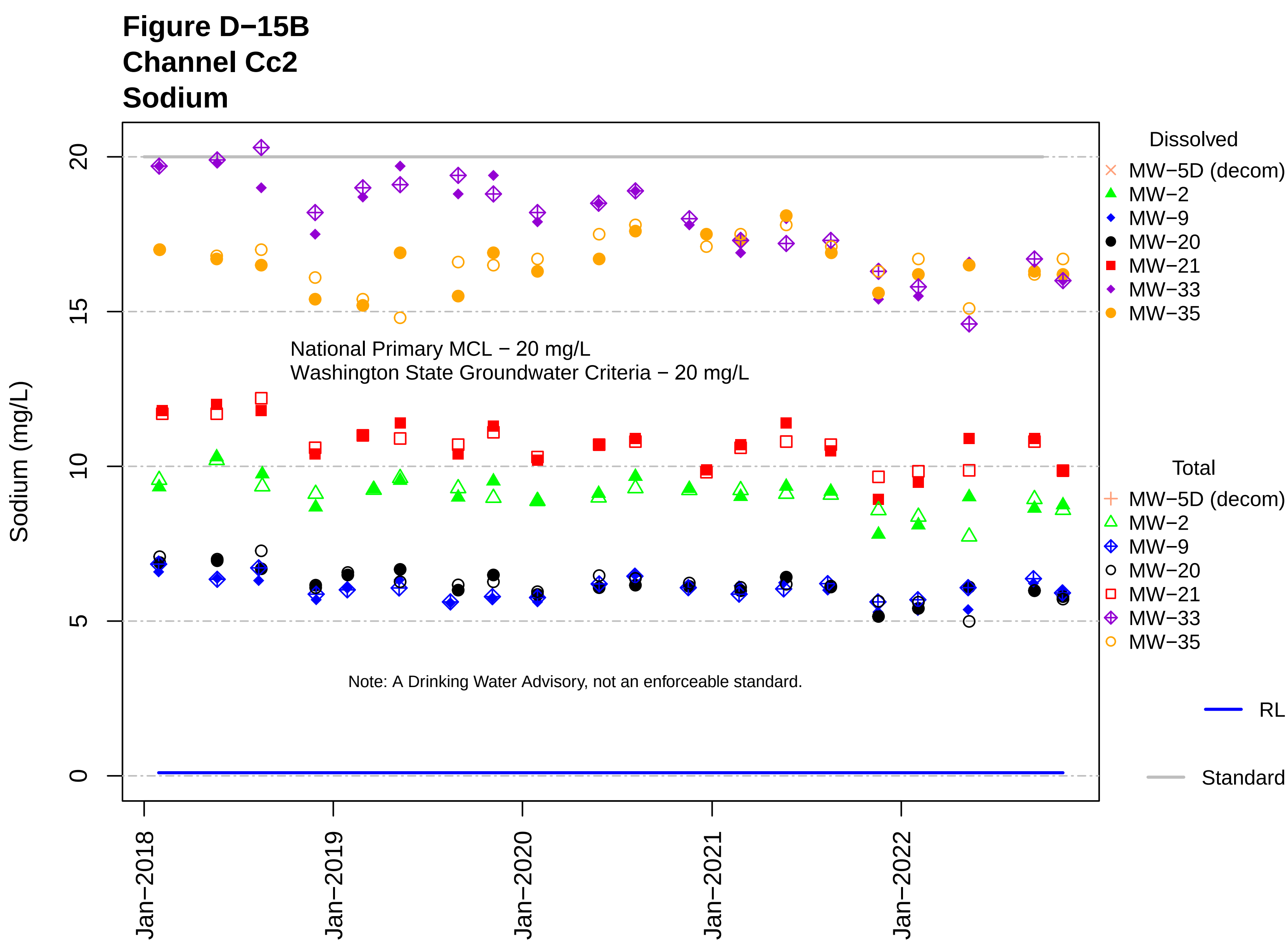


Figure D−15B
Channel Cc2
Sodium
Sodium (mg/L)
0
5
10
15
20
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
Total
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

Figure D−16A
Channel Cc2
1,1−Dichloroethane

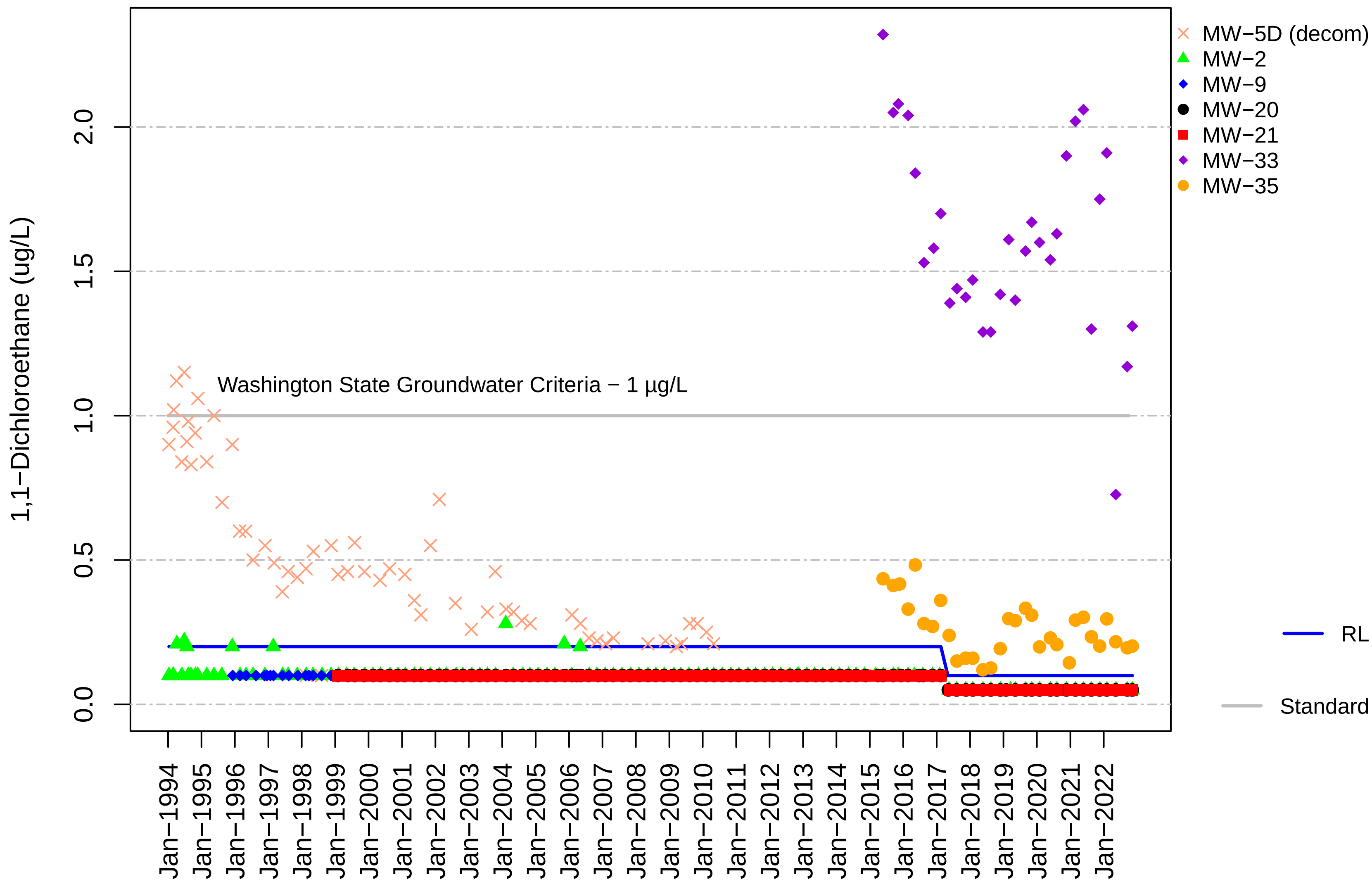


Figure D−16B
Channel Cc2
1,1−Dichloroethane

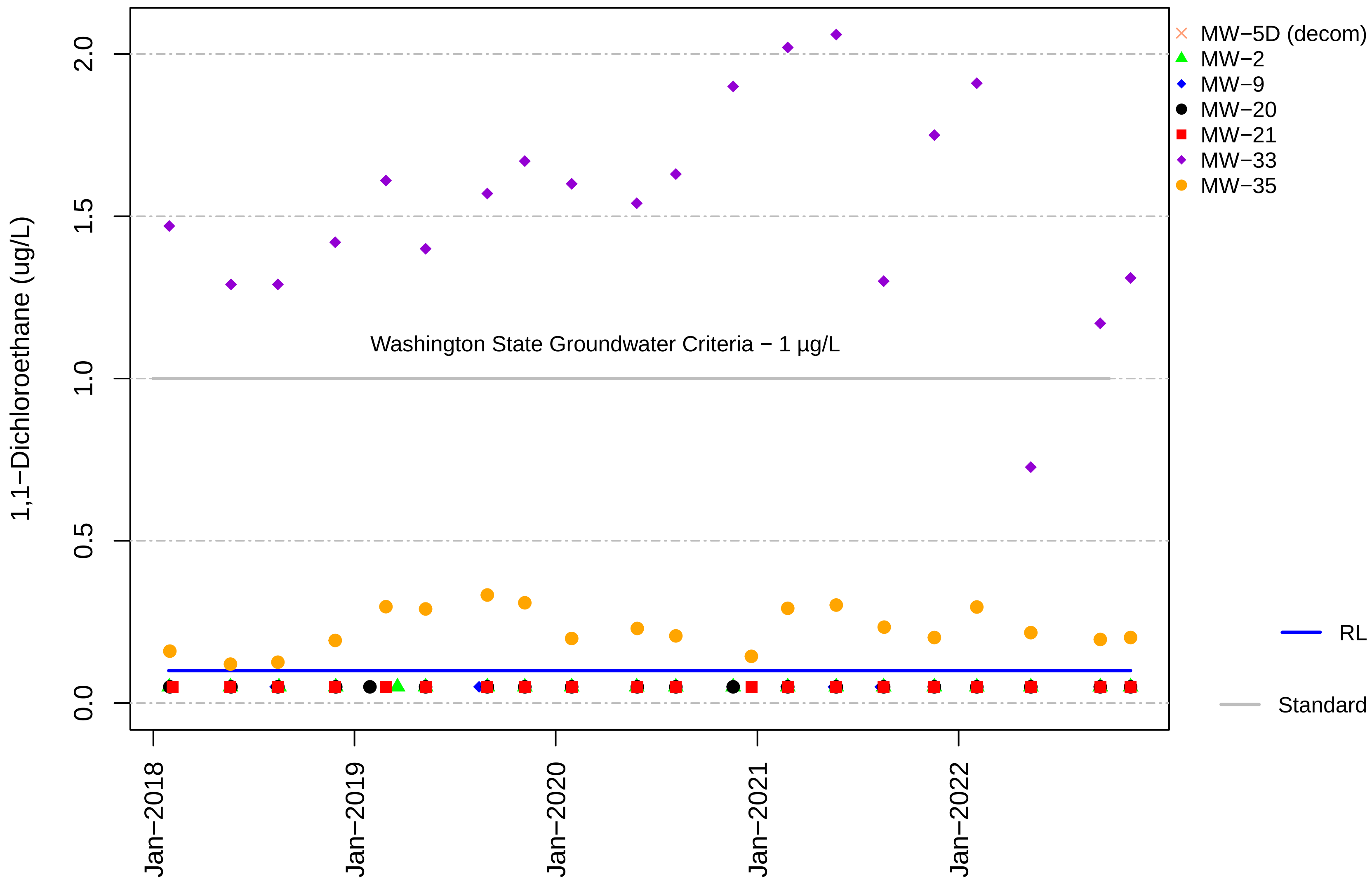


Figure D−17A
Channel Cc2
1,2−Dichloropropane

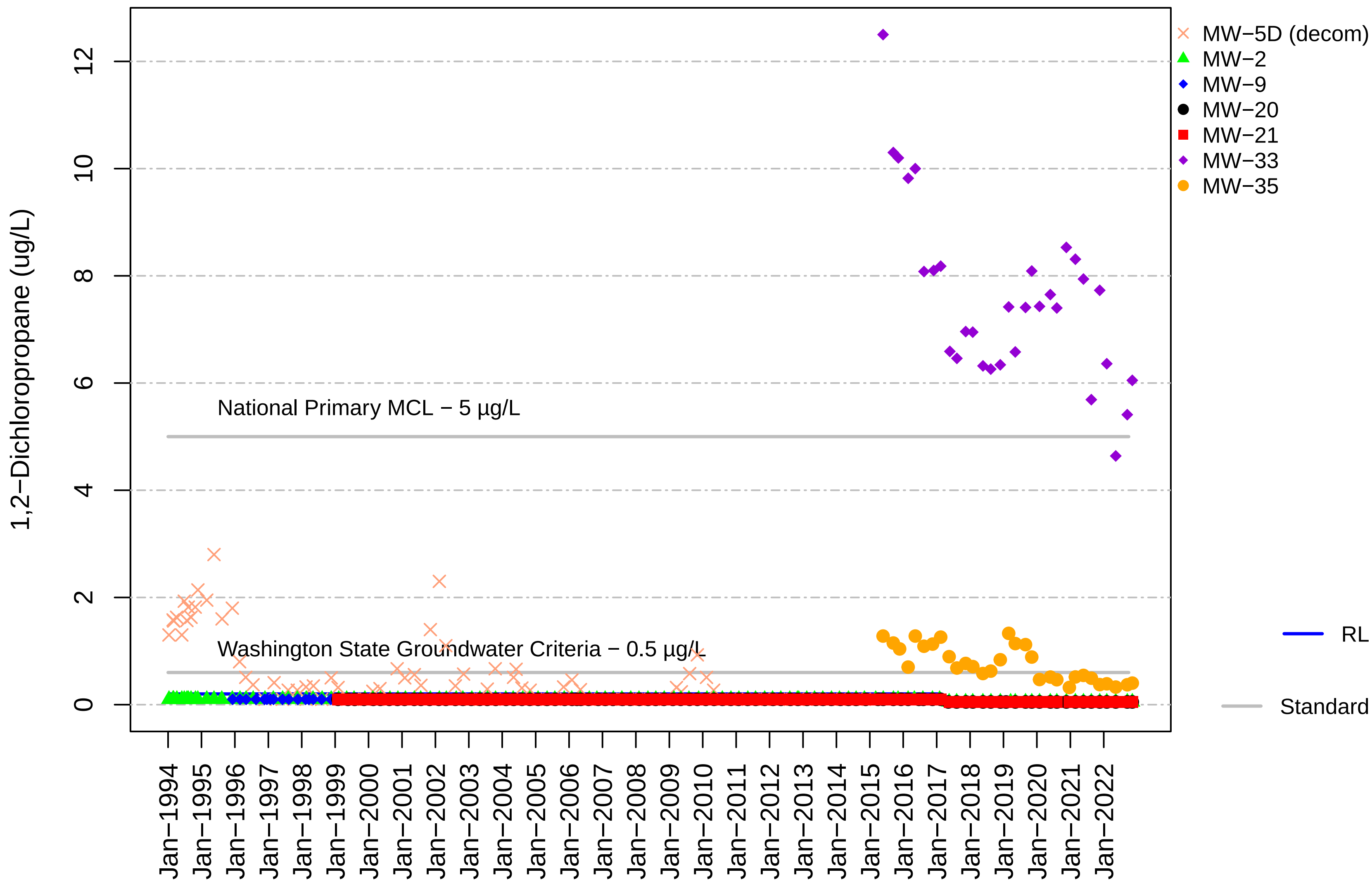


Figure D−17B
Channel Cc2
1,2−Dichloropropane

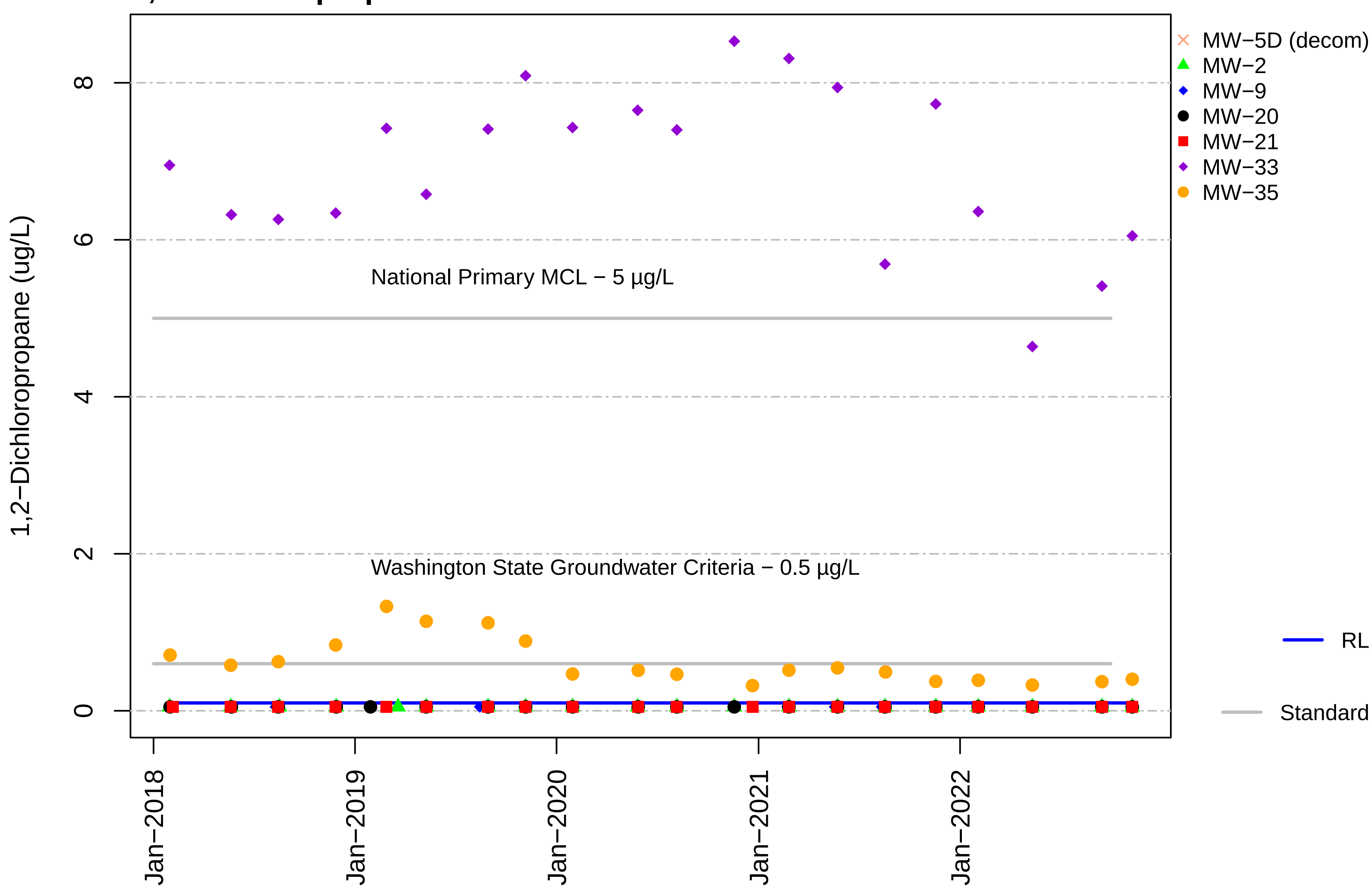
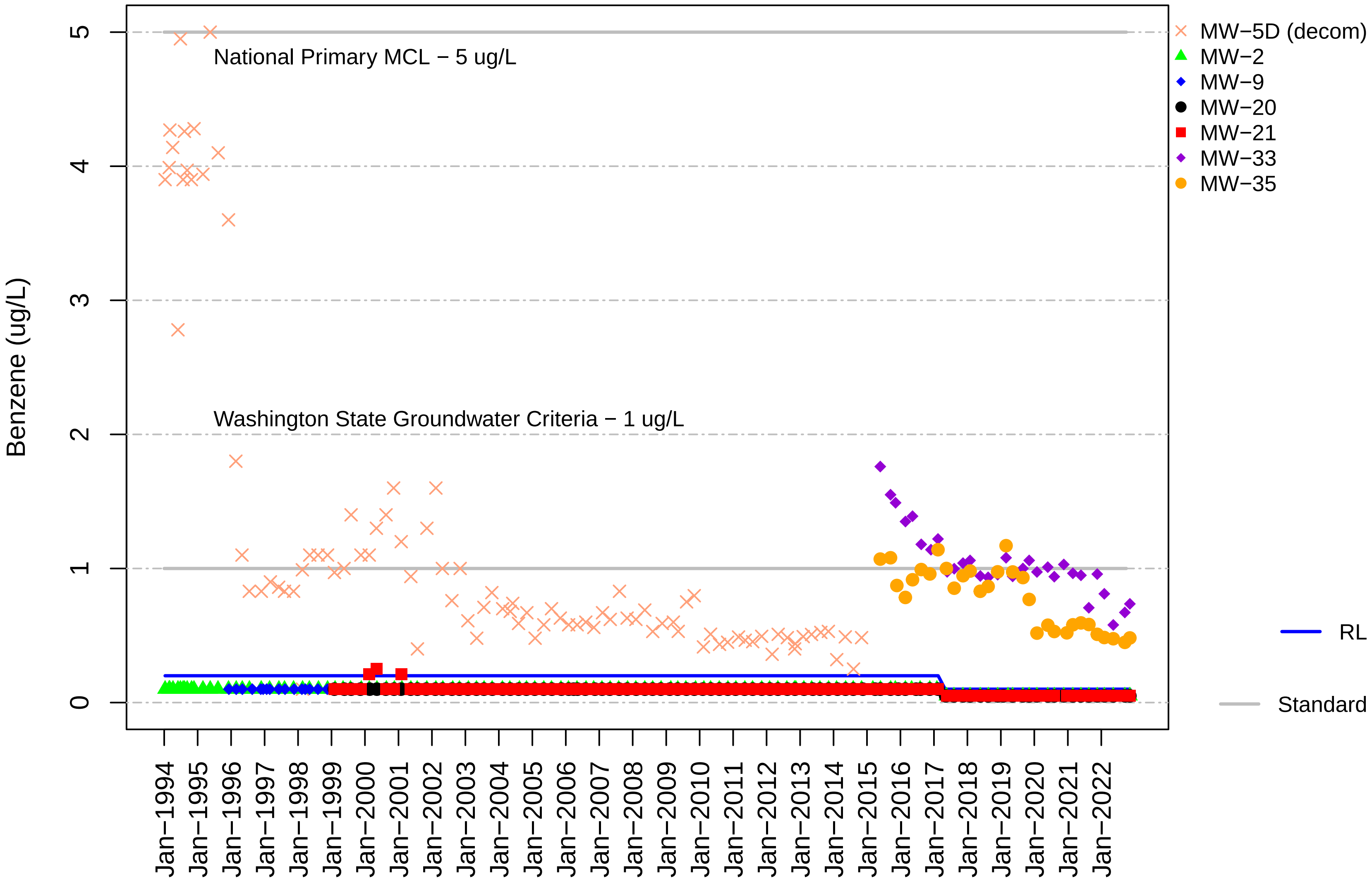


Figure D−18A
Channel Cc2
Benzene



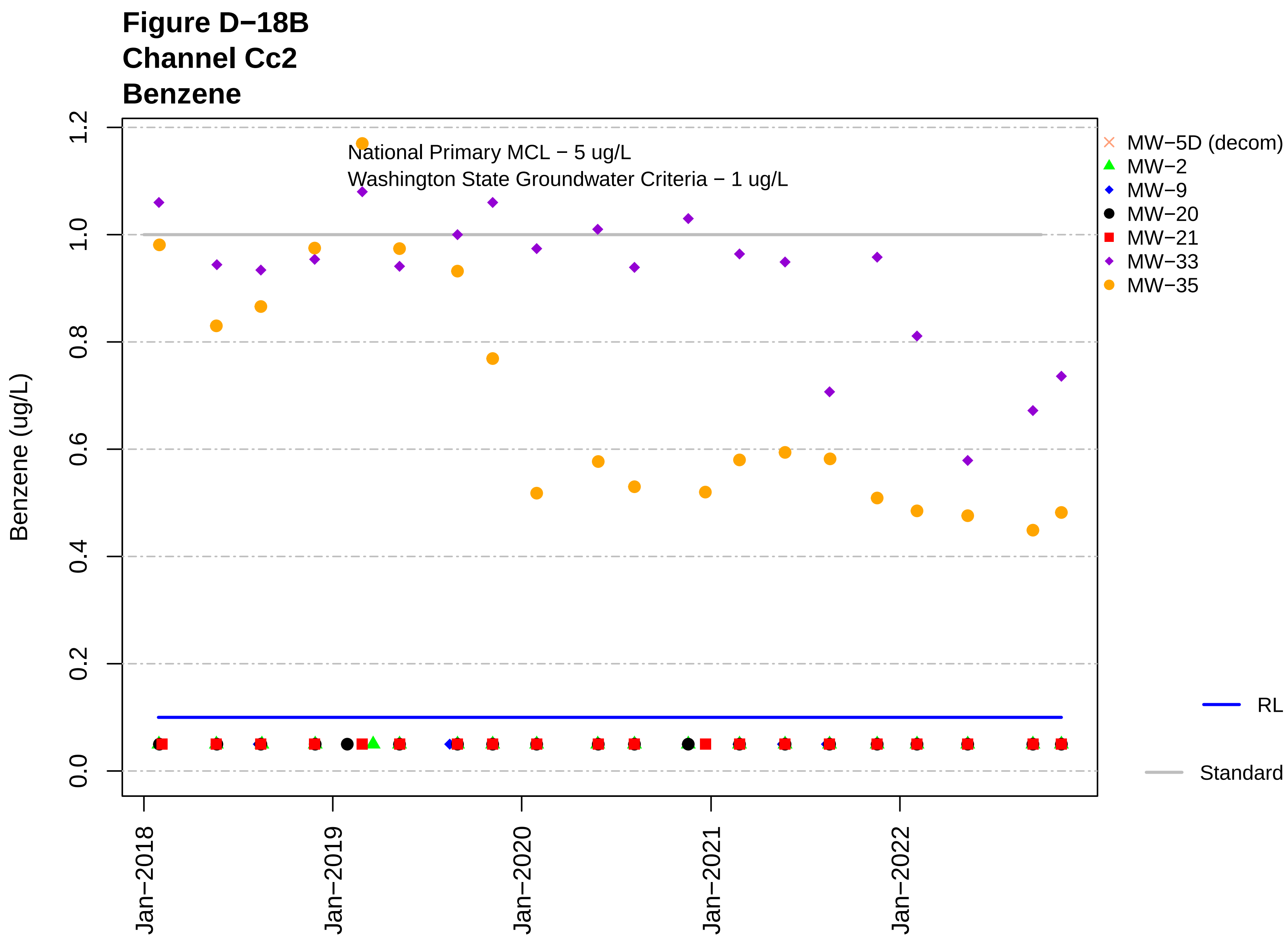


Figure D−18B
Channel Cc2
Benzene
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Benzene (ug/L)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−5D (decom)
MW−2
MW−9
MW−20
MW−21
MW−33
MW−35
RL
Standard

Figure D−19A
Channel Cc2
Chloroethane

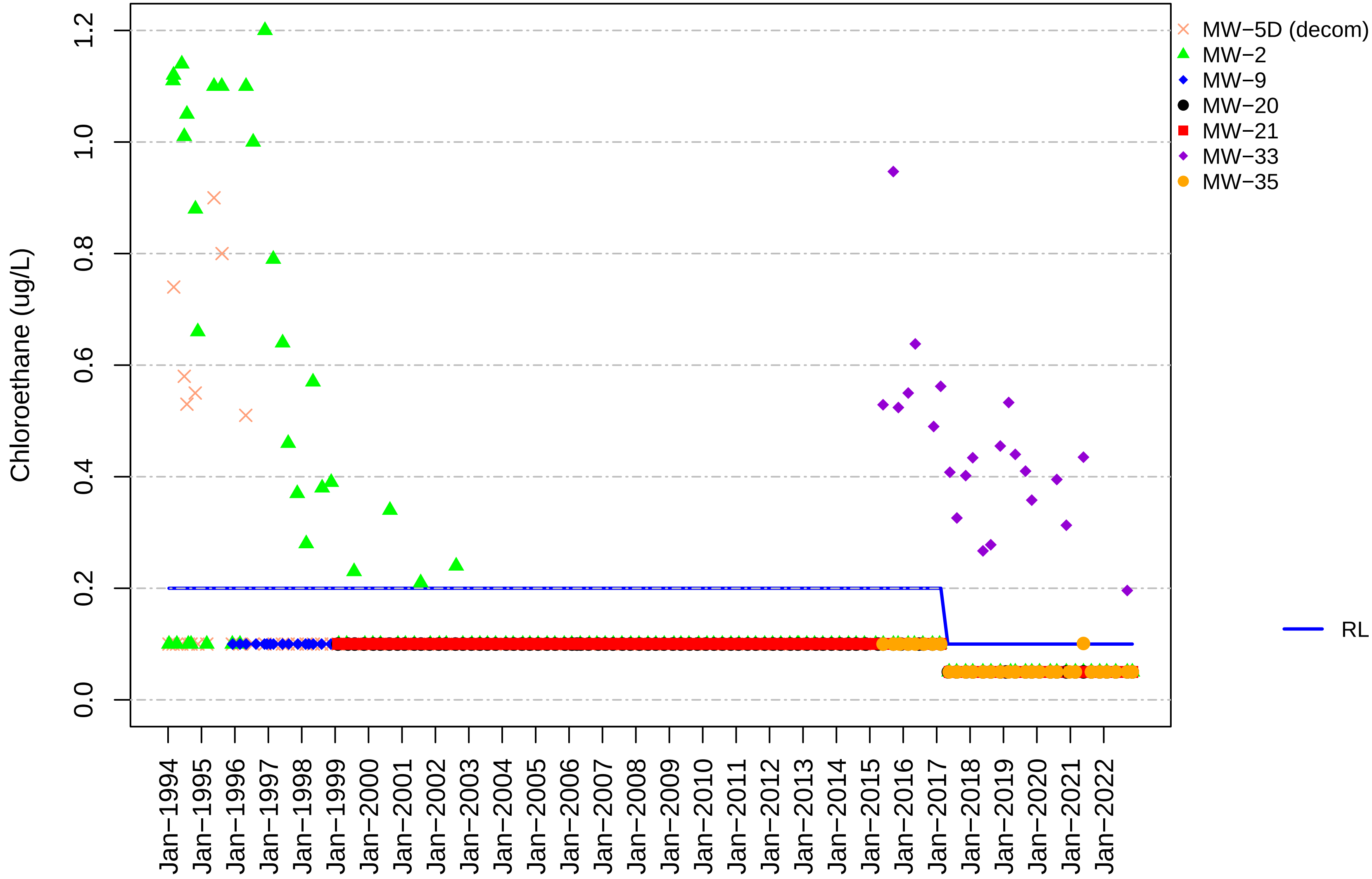


Figure D−19B
Channel Cc2
Chloroethane

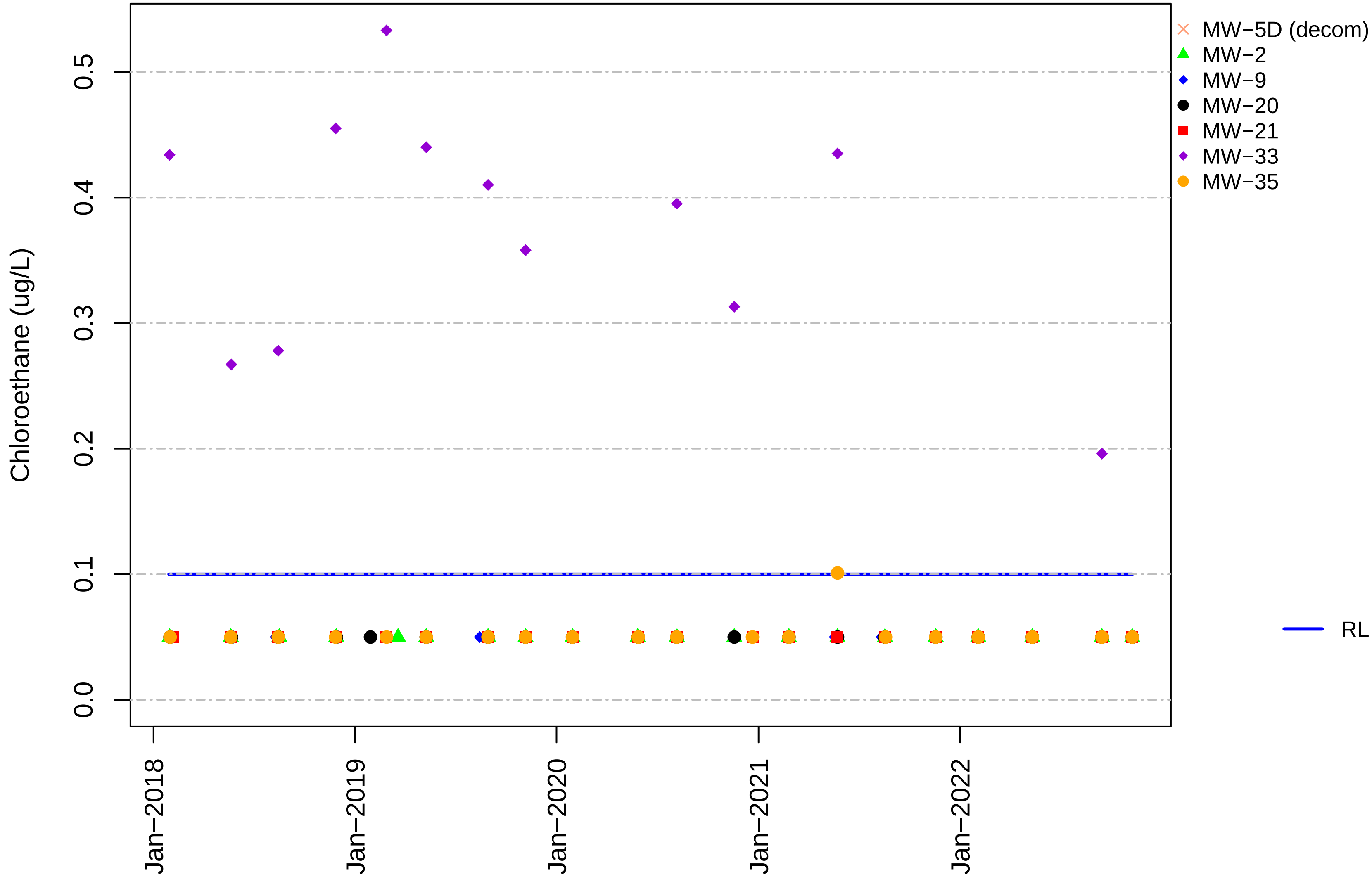


Figure D−20A
Channel Cc2
cis−1,2−Dichloroethene

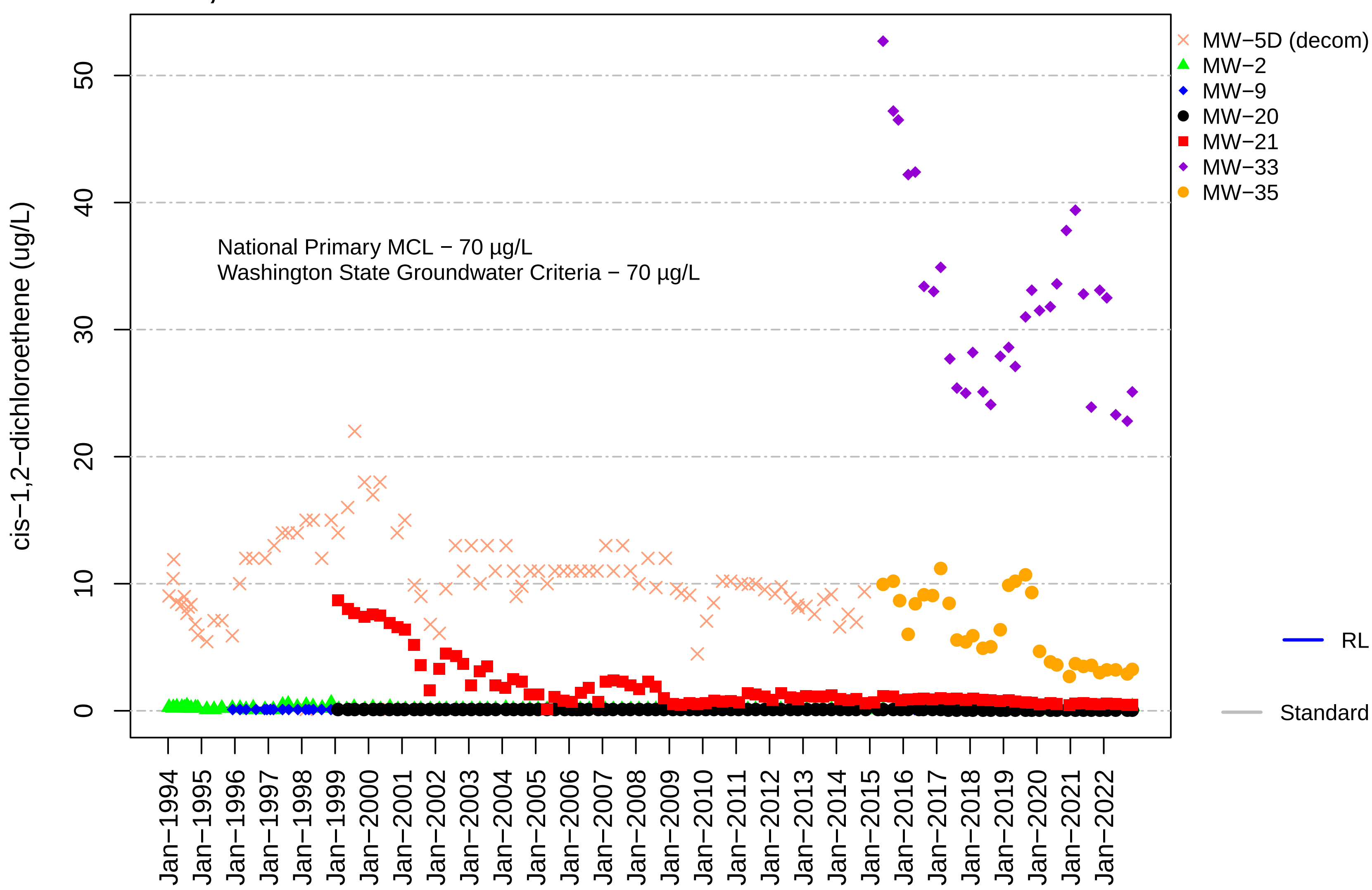


Figure D−20B
Channel Cc2
cis−1,2−Dichloroethene

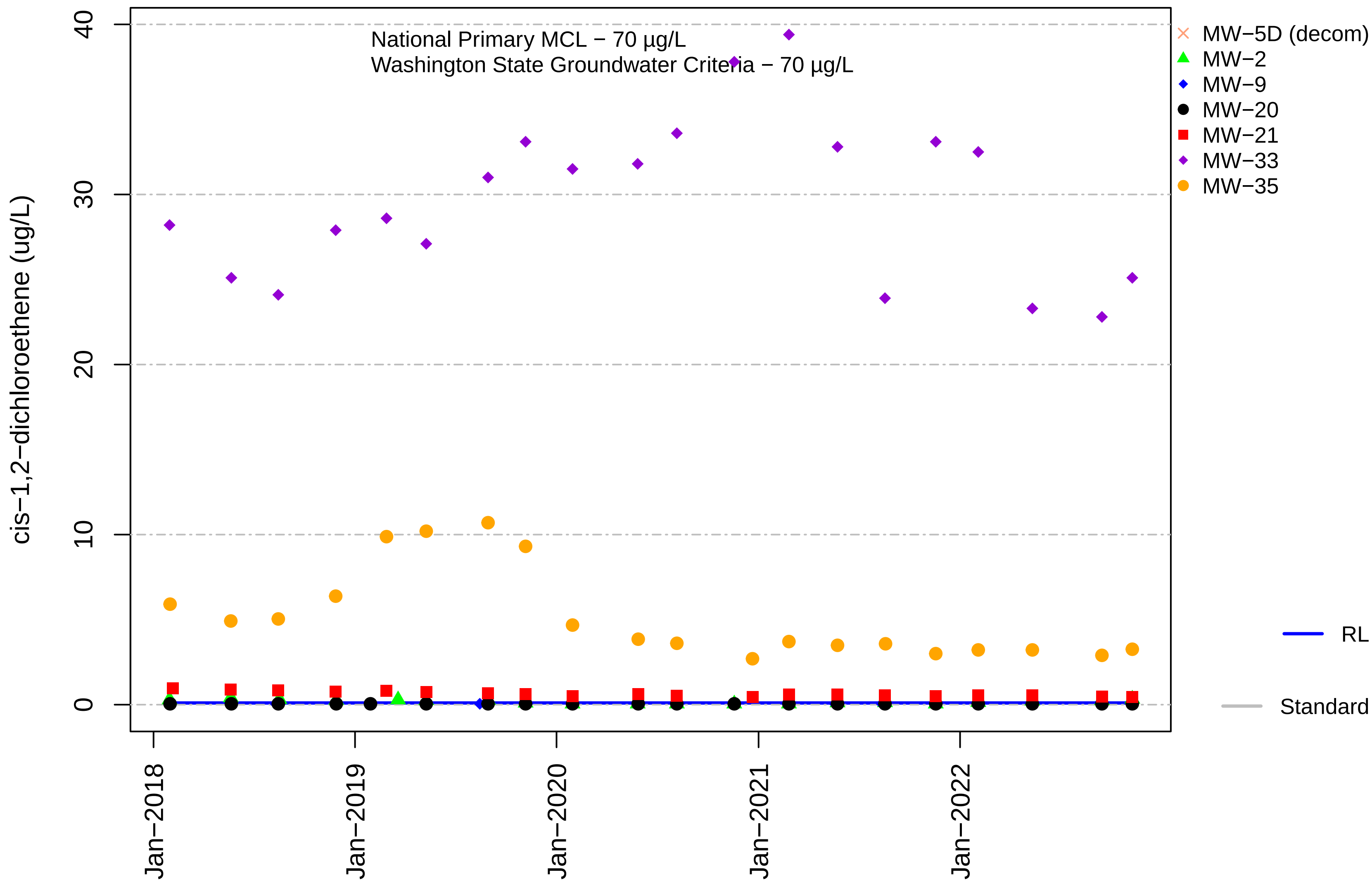


Figure D−21A
Channel Cc2
Dichlorodifluoromethane

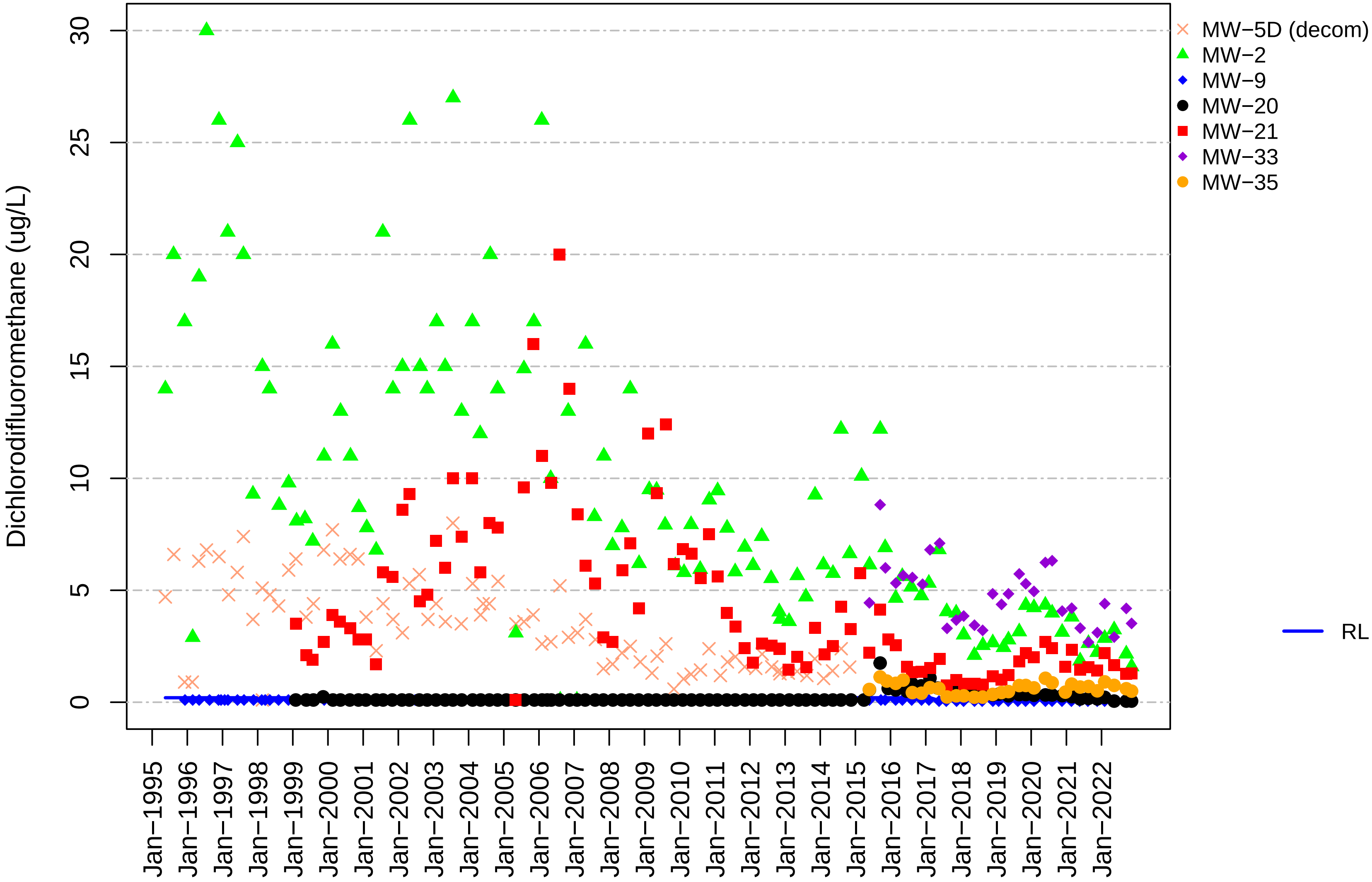


Figure D−21B
Channel Cc2
Dichlorodifluoromethane

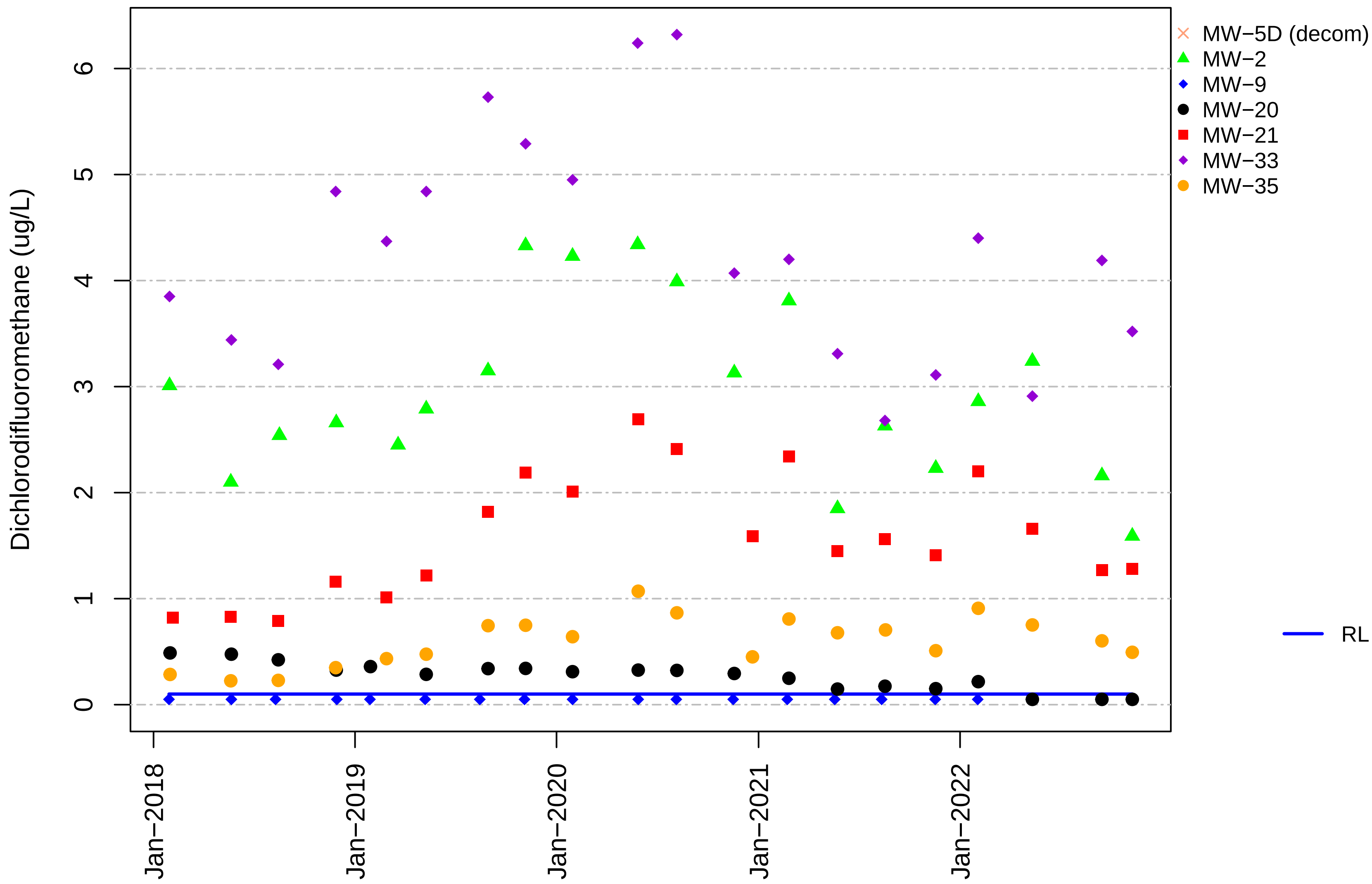


Figure D−22A
Channel Cc2
Tetrachloroethene

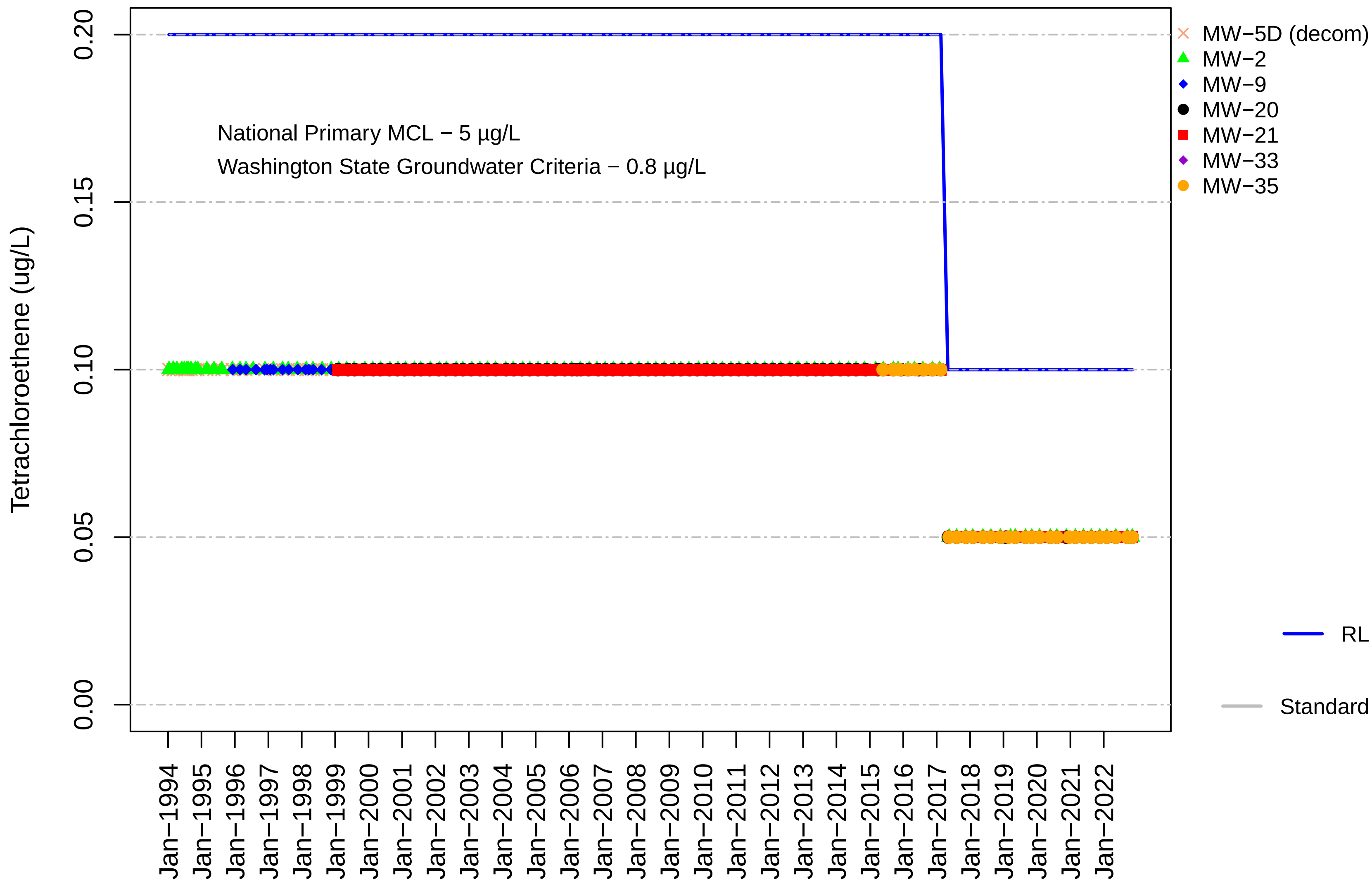


Figure D−22B
Channel Cc2
Tetrachloroethene

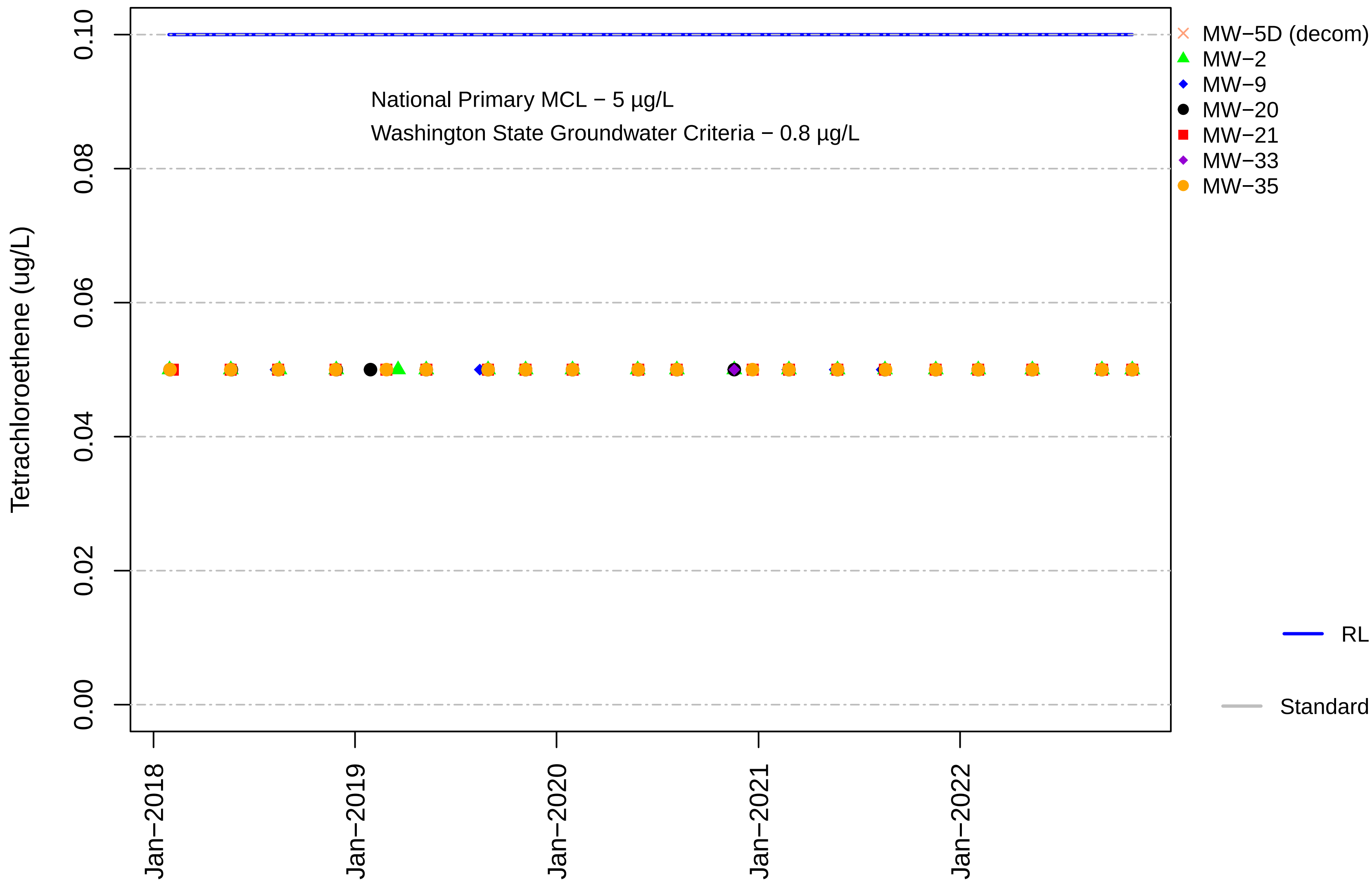


Figure D−23A
Channel Cc2
Toluene

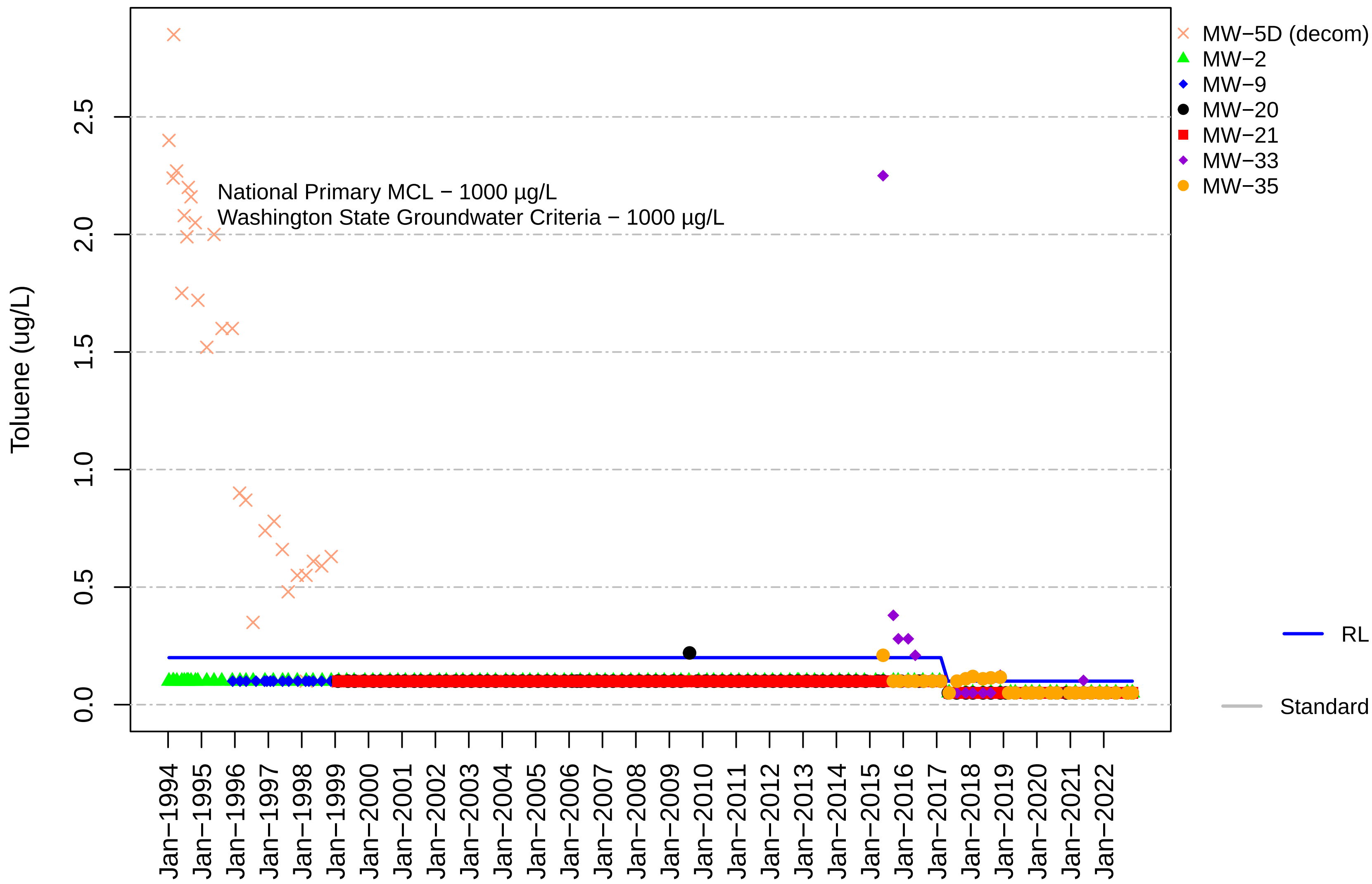


Figure D−23B
Channel Cc2
Toluene

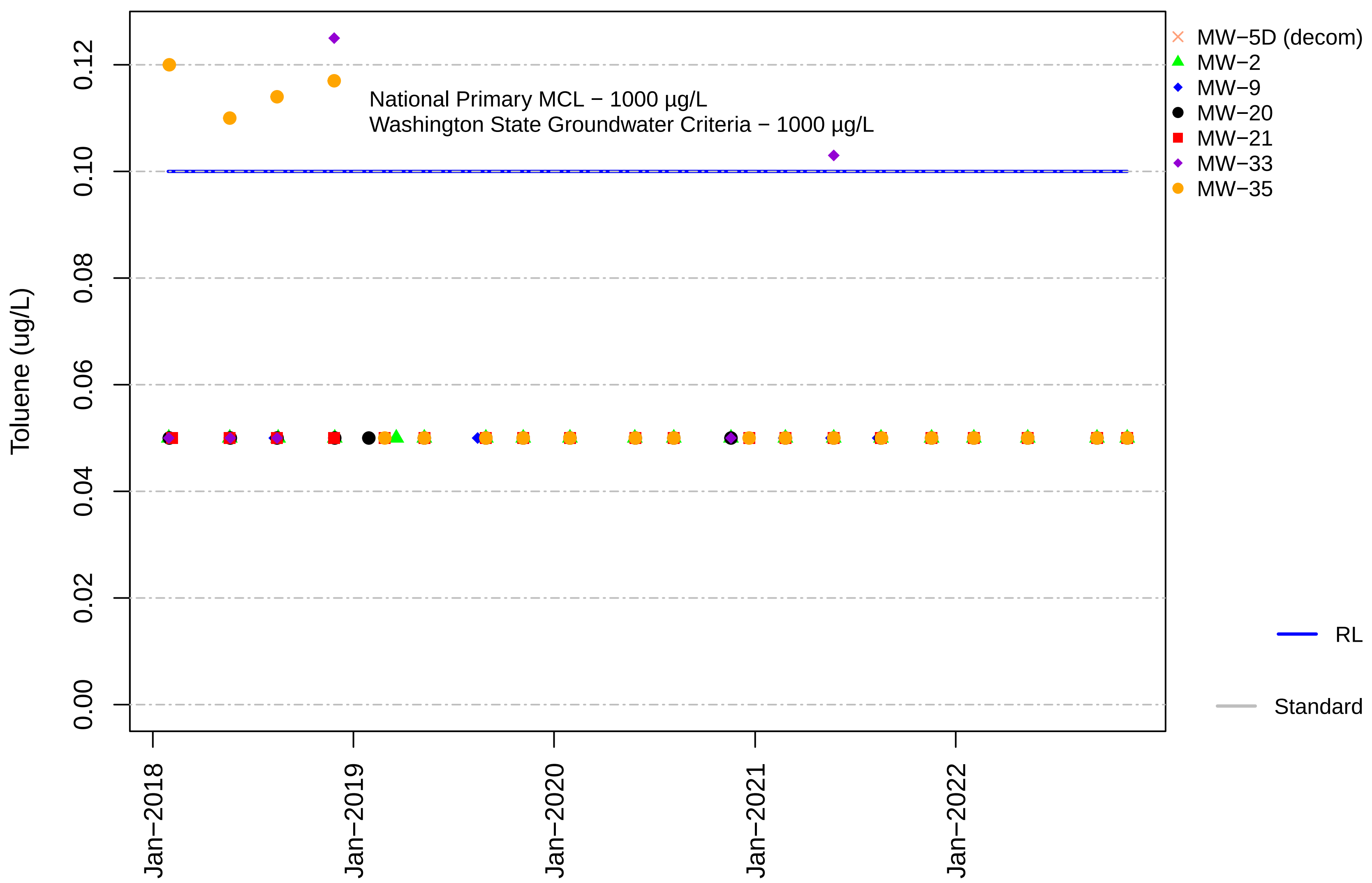


Figure D−24A
Channel Cc2
Trans−1,2−Dichloroethene

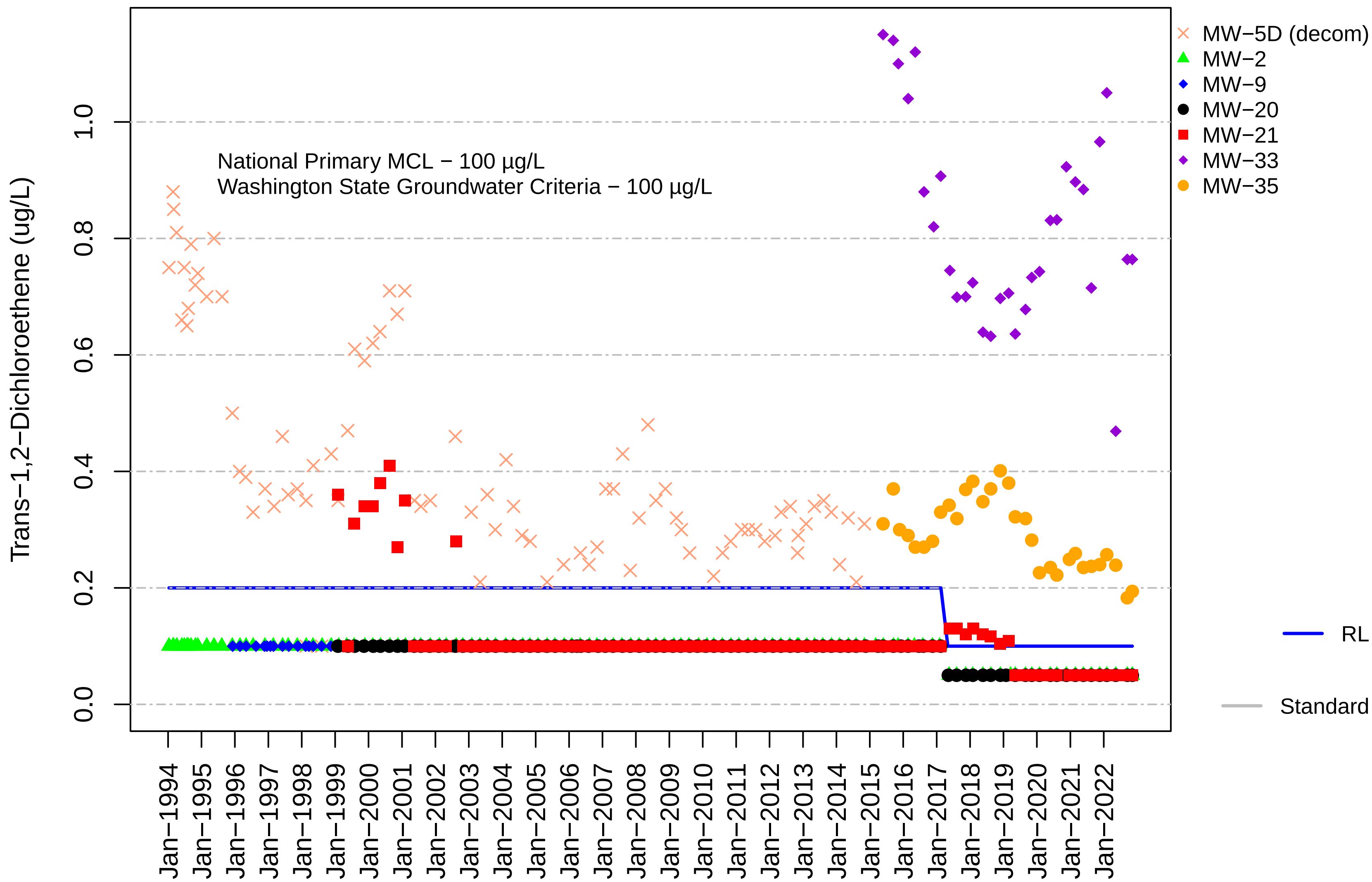


Figure D−24B
Channel Cc2
Trans−1,2−Dichloroethene

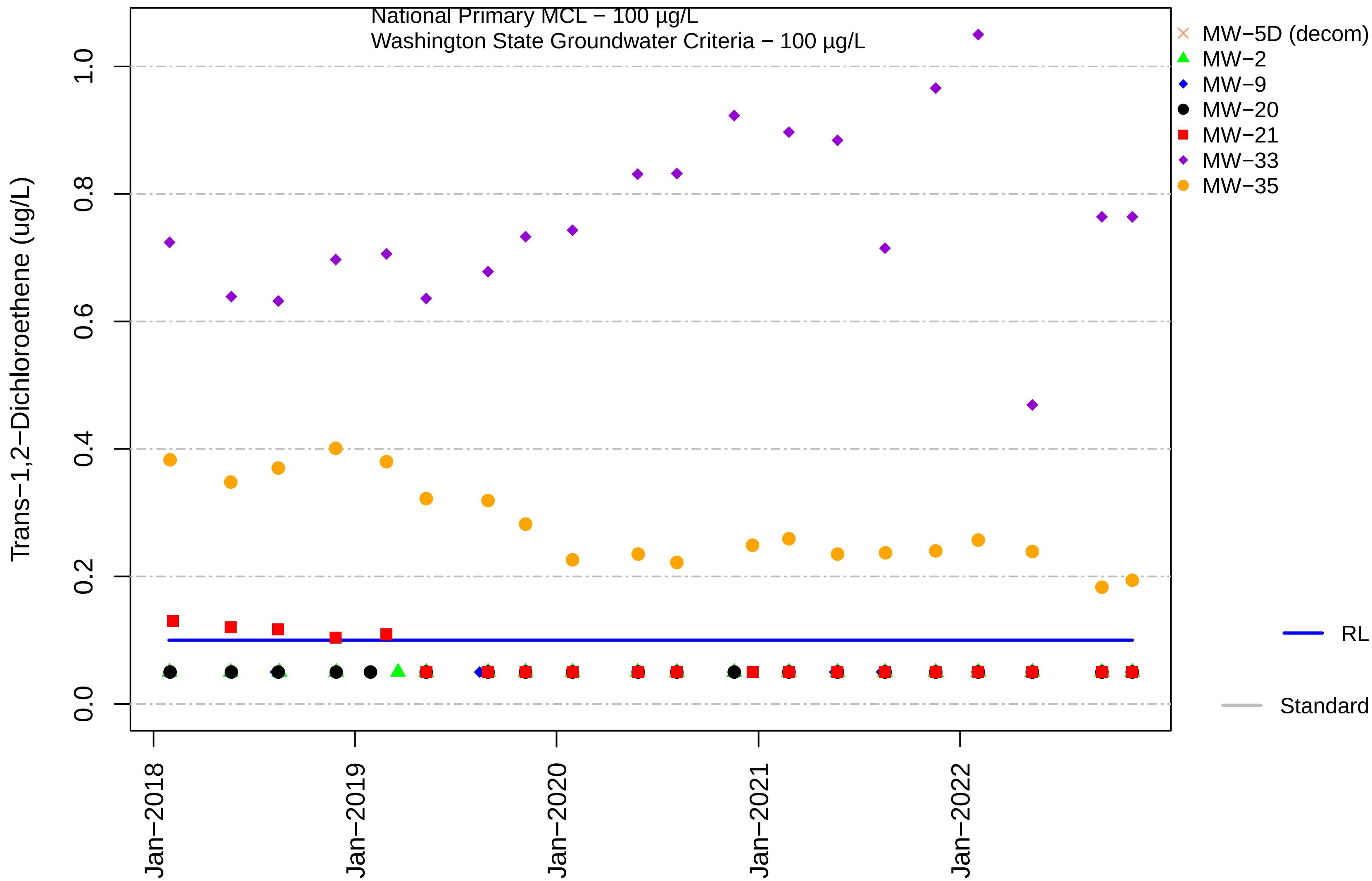


Figure D−25A
Channel Cc2
Trichloroethene

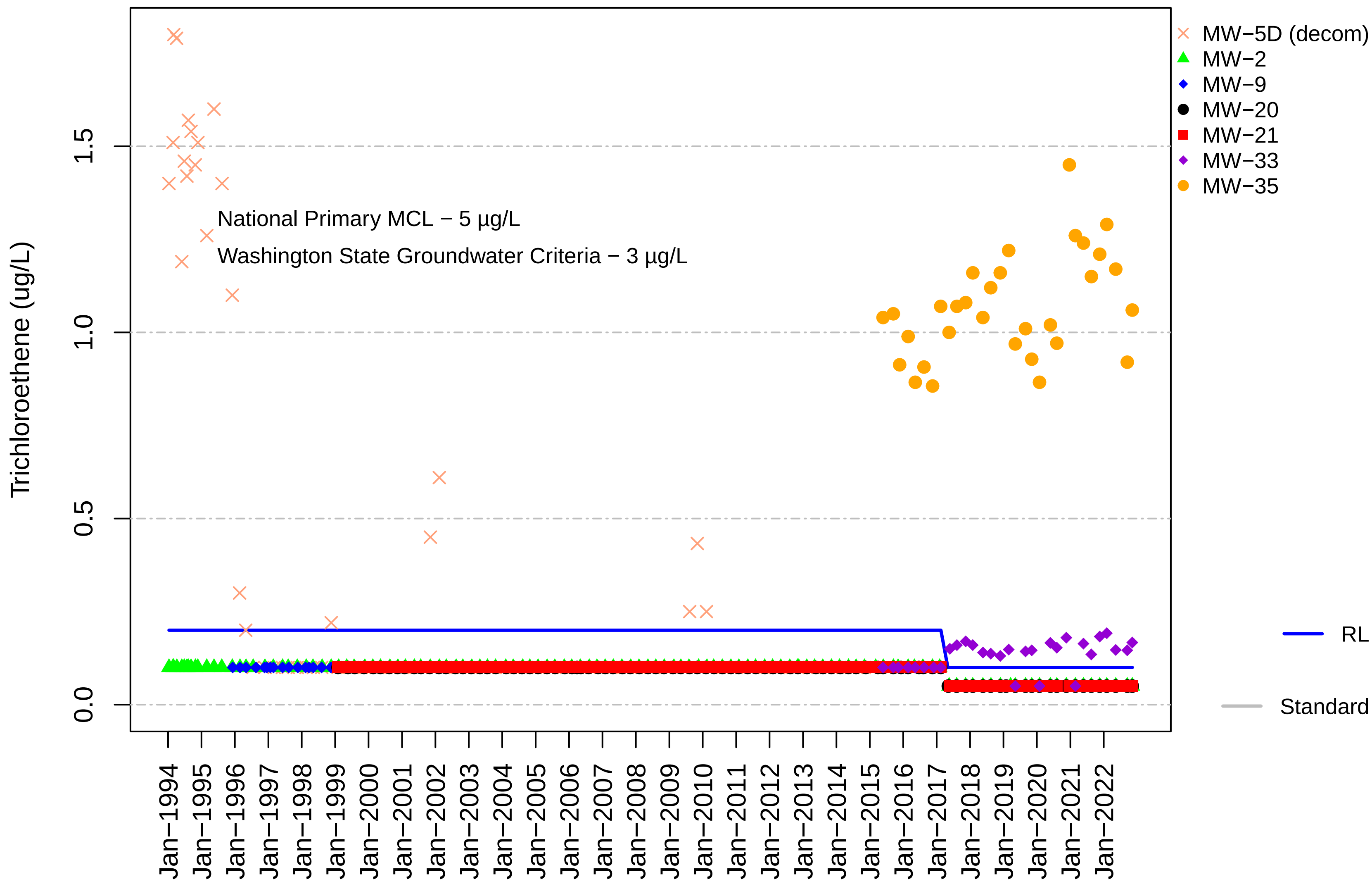


Figure D−25B
Channel Cc2
Trichloroethene

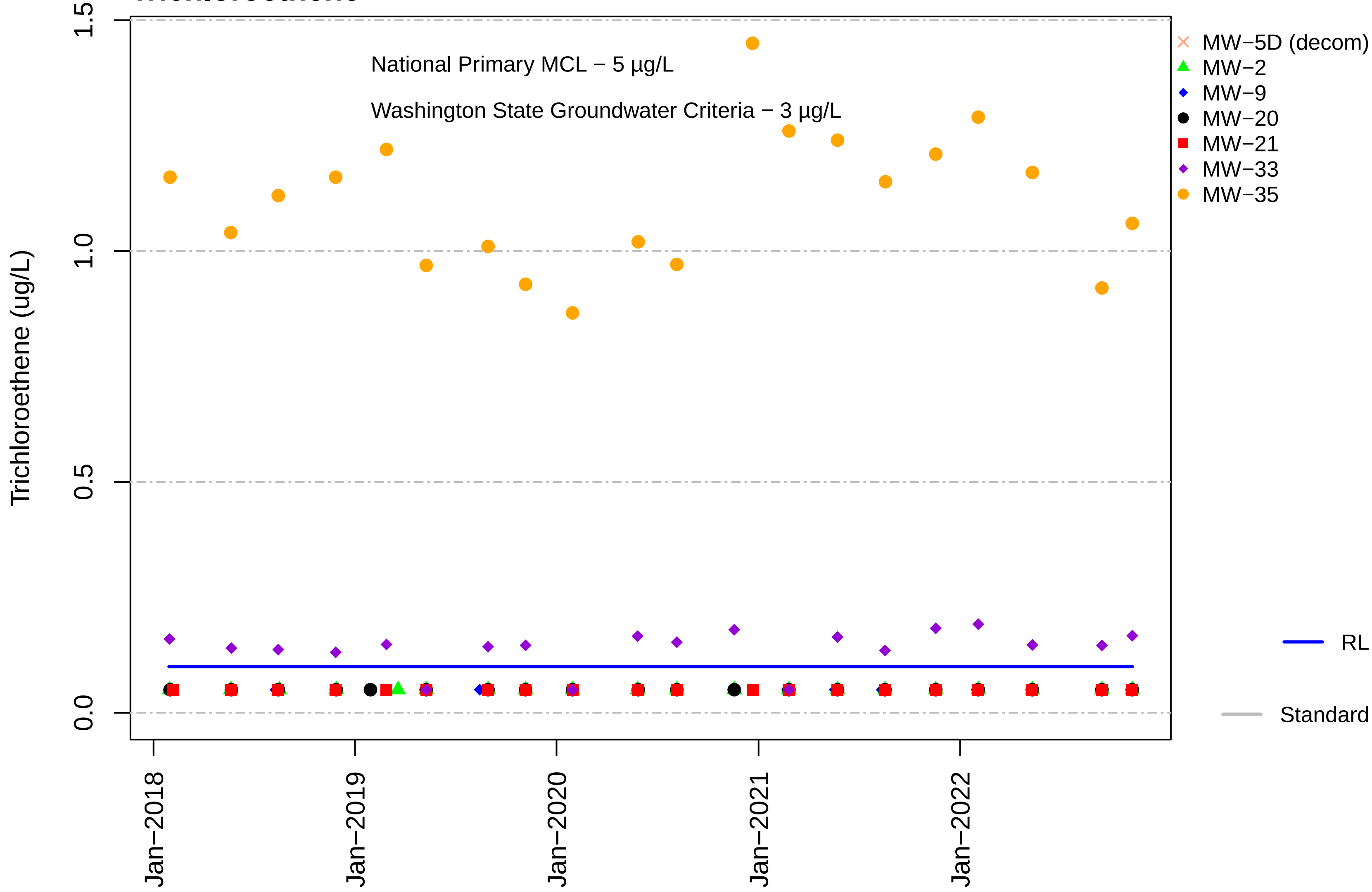


Figure D−26B
Channel Cc2
Trichlorofluoromethane

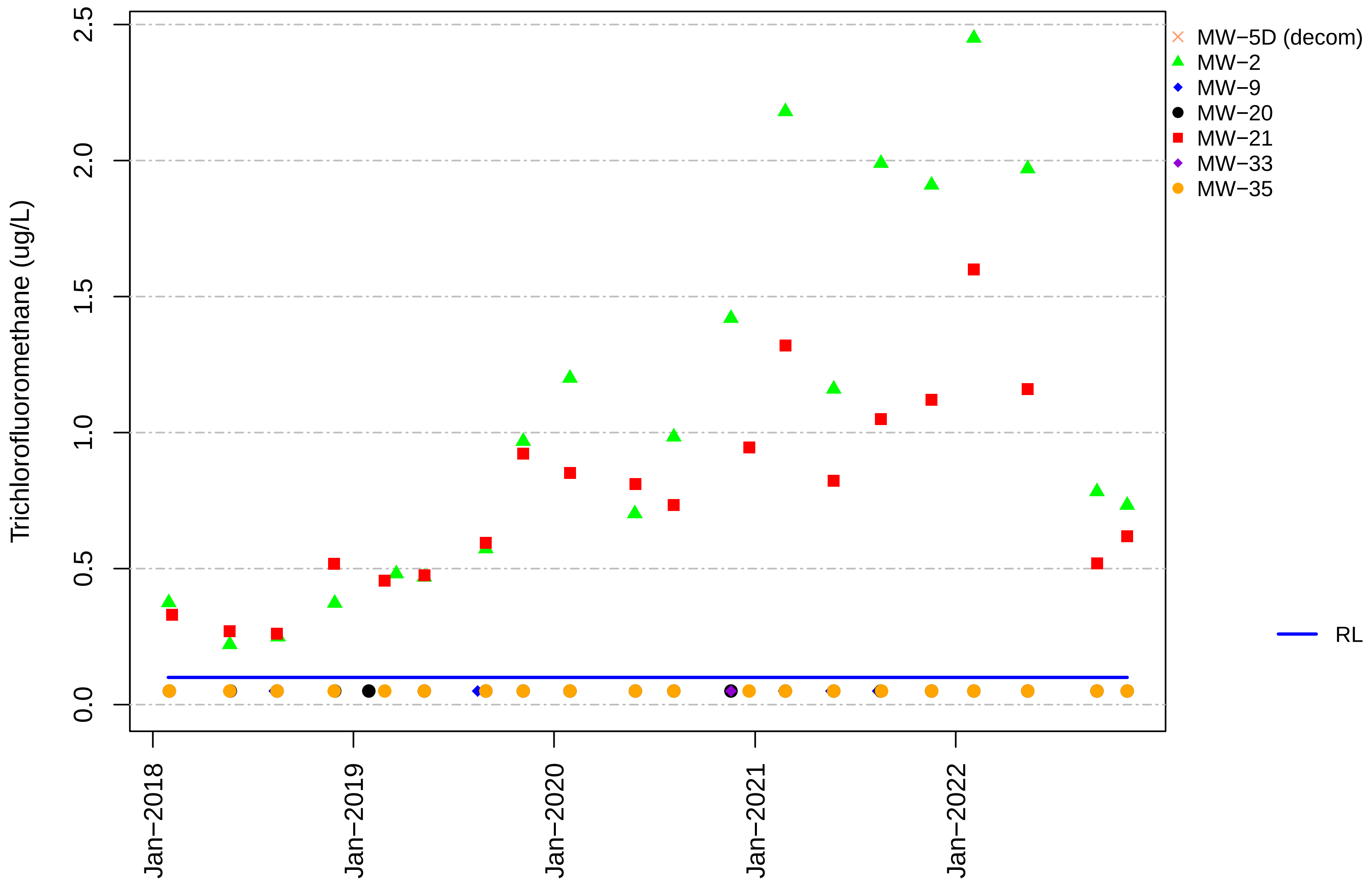


Figure D−26A
Channel Cc2
Trichlorofluoromethane

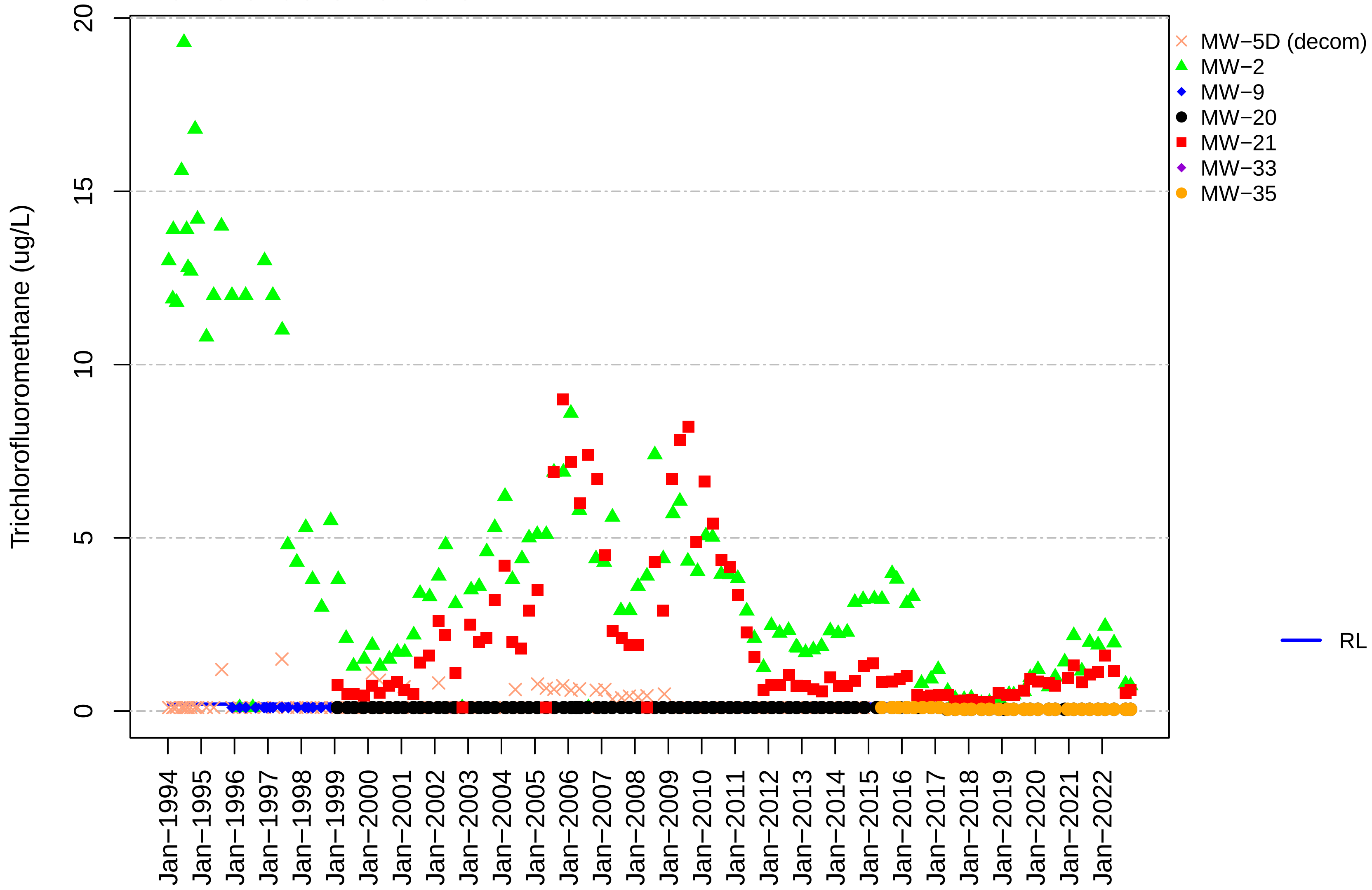


Figure D−27B
Channel Cc2
Vinyl chloride

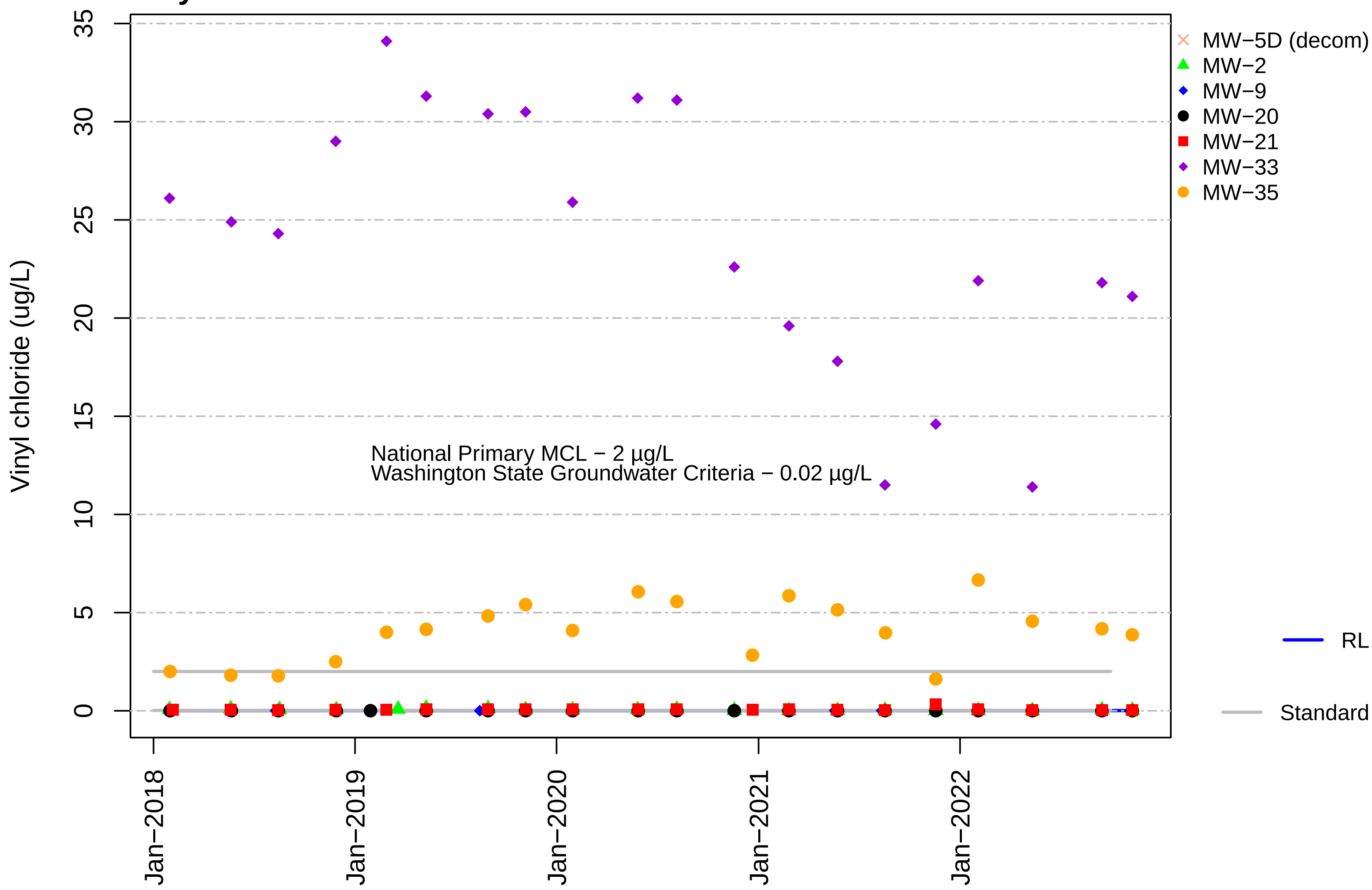


Figure D−27A
Channel Cc2
Vinyl chloride

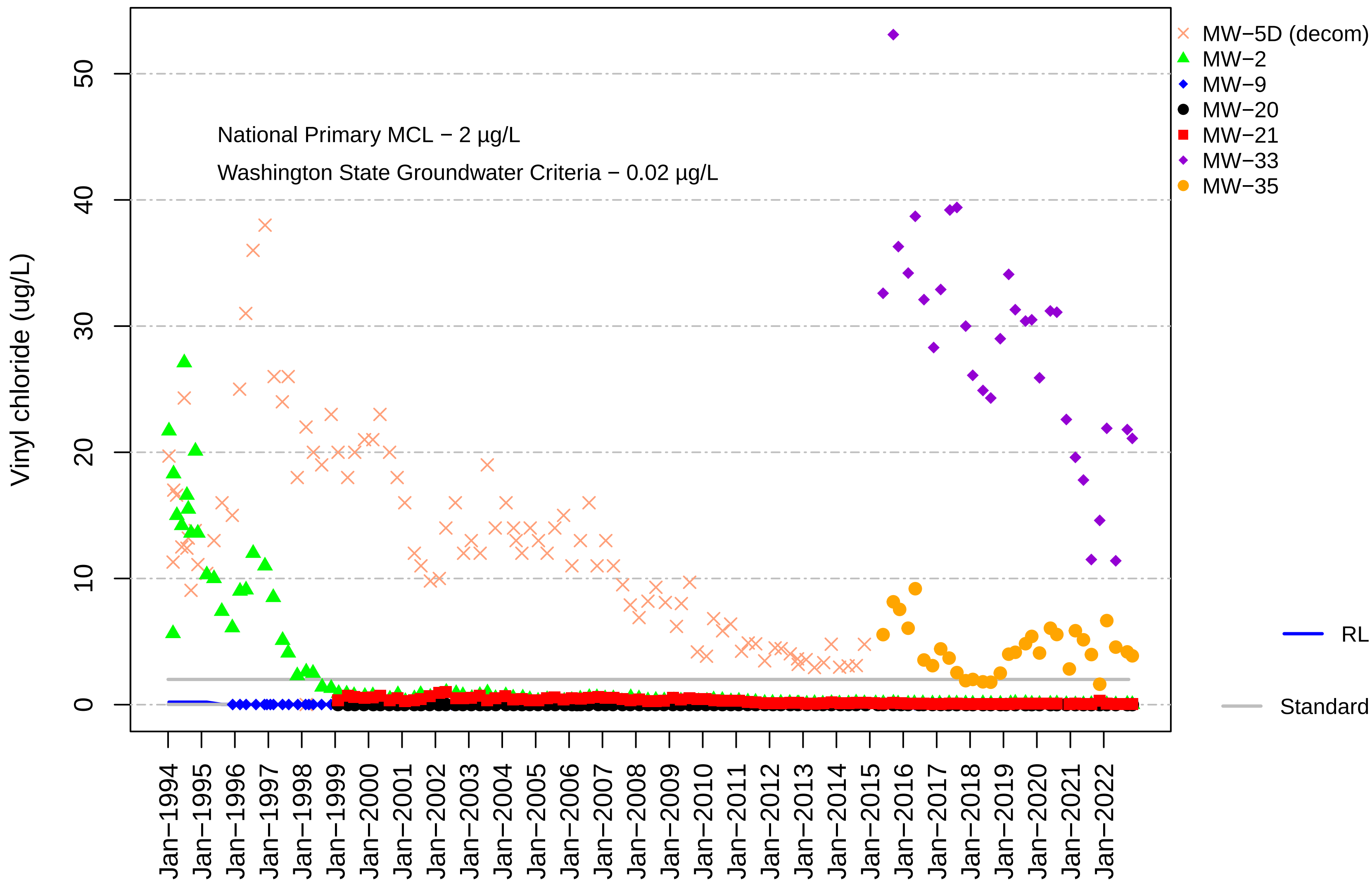
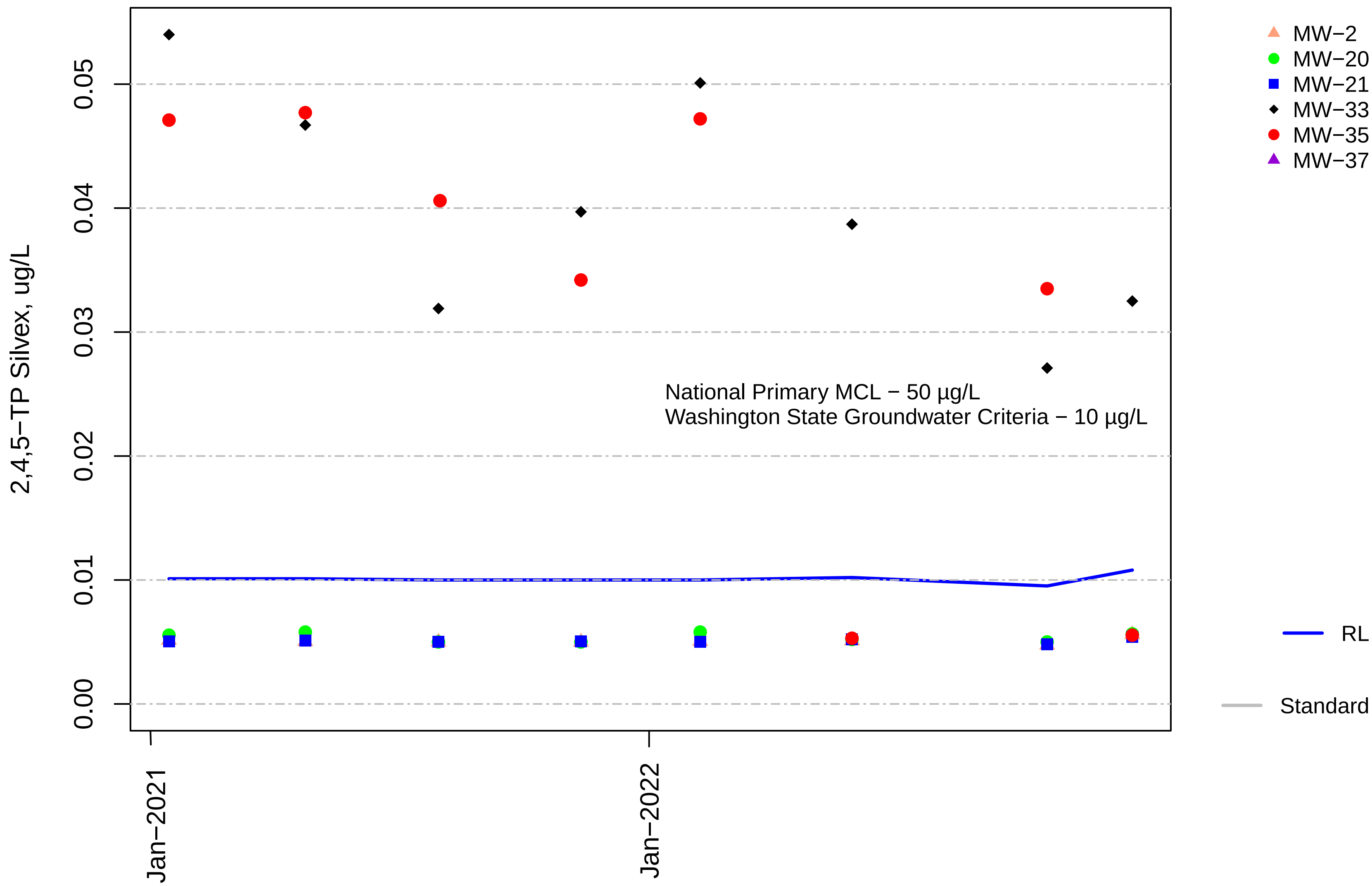


Figure D−28
Channel Cc2
2,4,5−TP Silvex



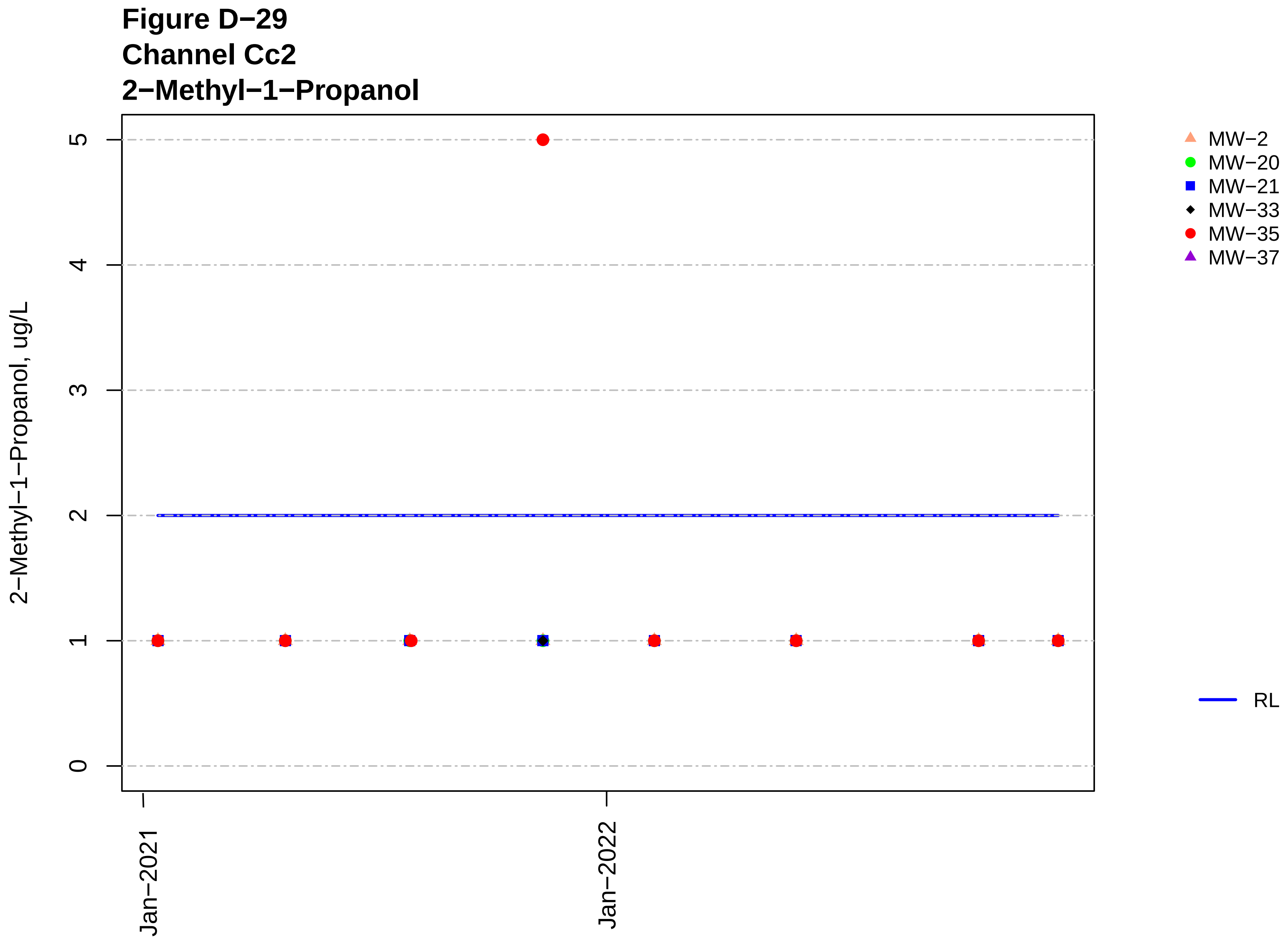


Figure D−29
Channel Cc2
2−Methyl−1−Propanol
2−Methyl−1−Propanol, ug/L
0
1
2
3
4
5
Jan−2021
Jan−2022
MW−2
MW−20
MW−21
MW−33
MW−35
MW−37
RL

Figure D−30
Channel Cc2
Bis(2−Chloroethyl)Ether

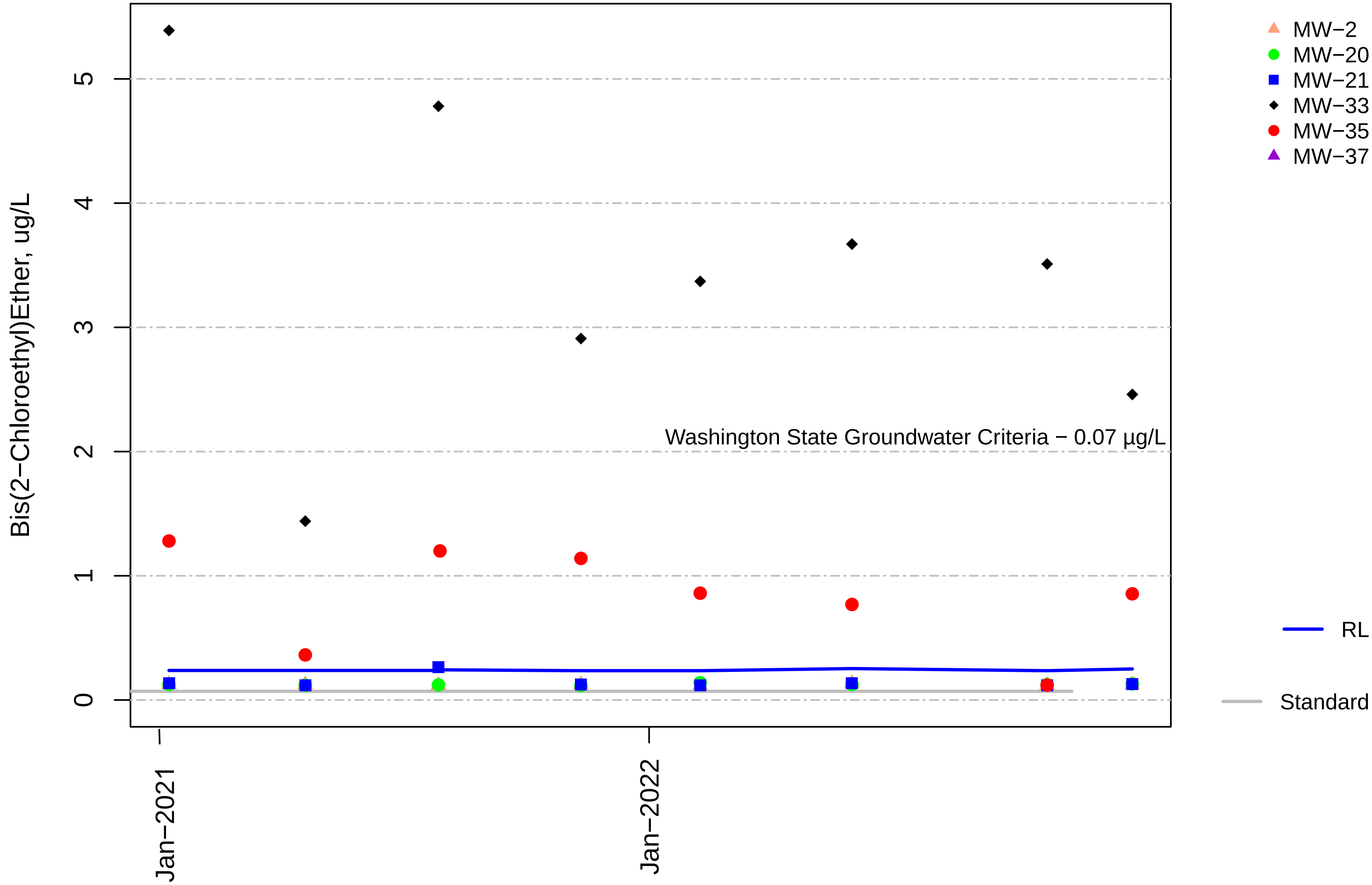


Figure D−31
Channel Cc2
Bis(2−Ethylhexyl)Phthalate

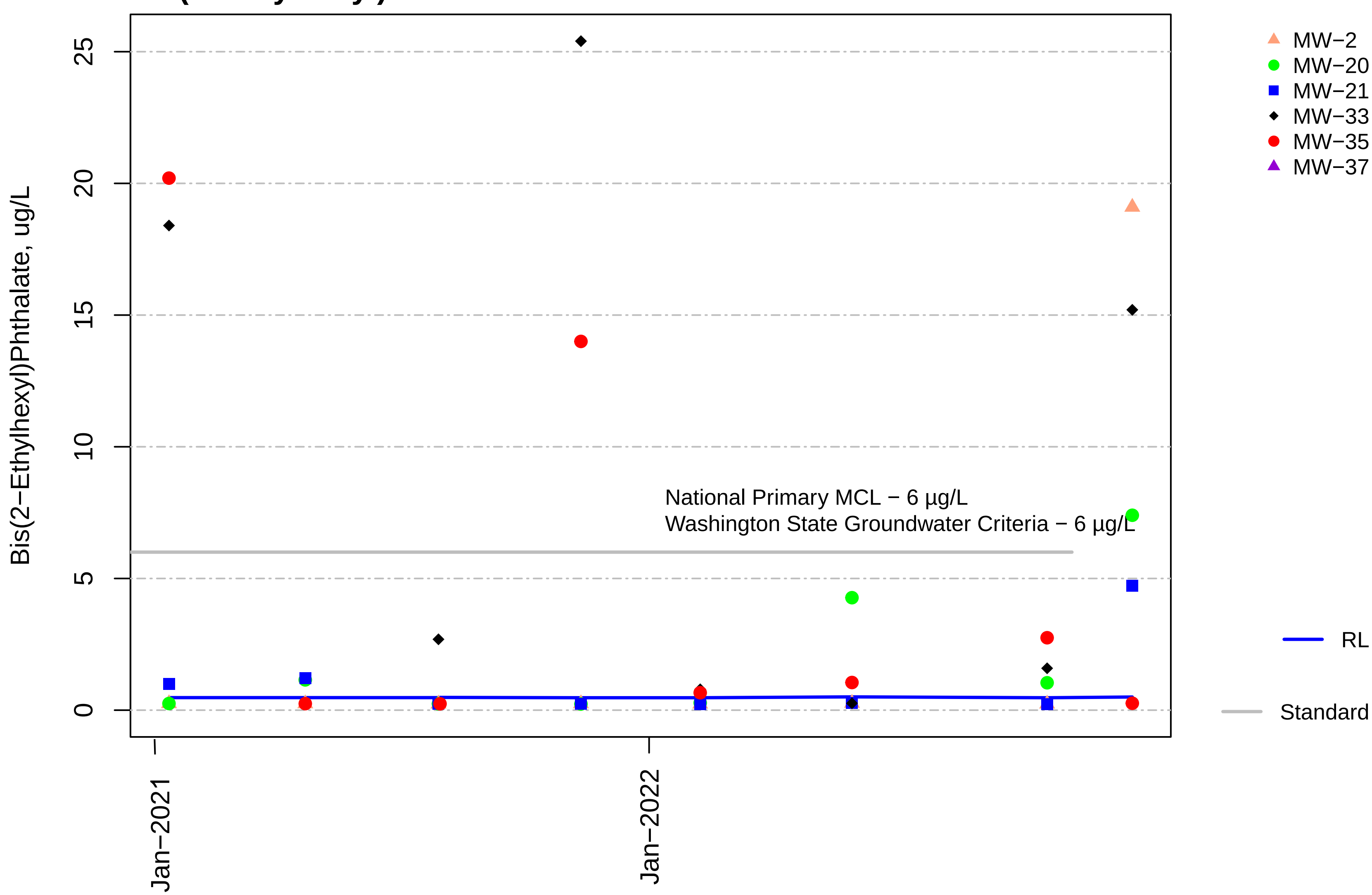
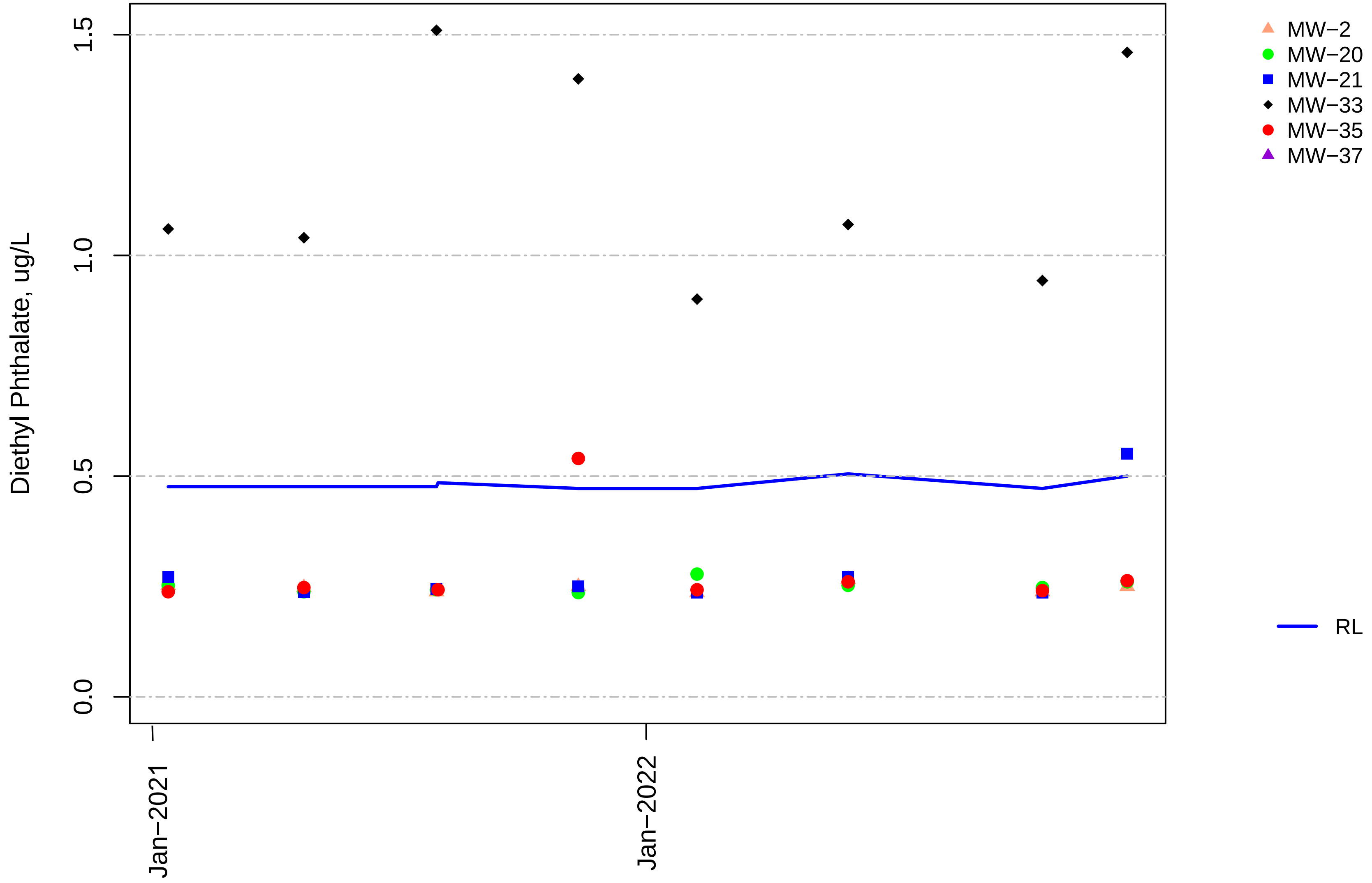


Figure D−32
Channel Cc2
Diethyl Phthalate



Appendix E

Time Concentration Plots for
Groundwater in Channel Cc3

Figure E−1A
Channel Cc3
Field pH

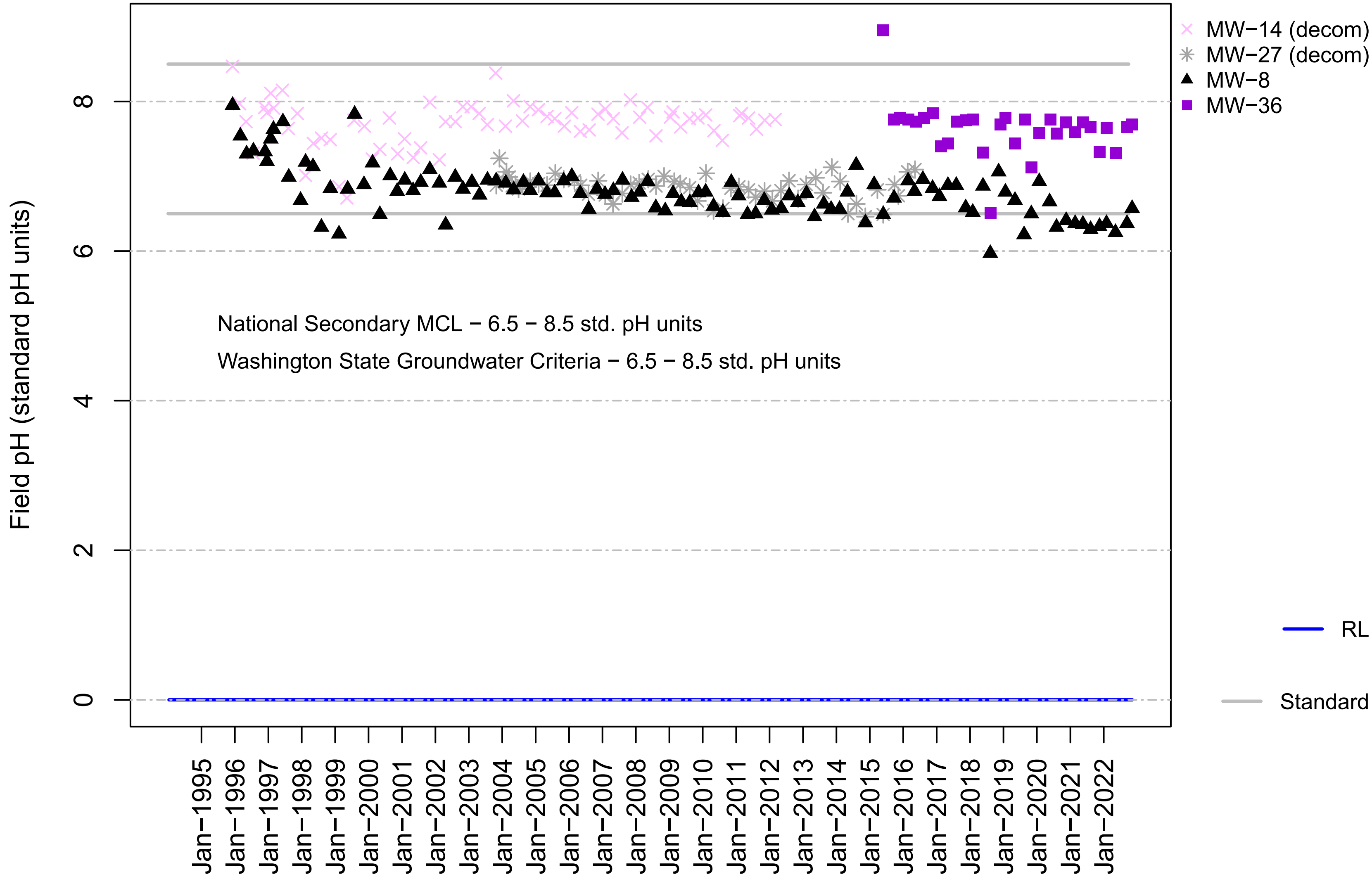


Figure E−1B
Channel Cc3
Field pH

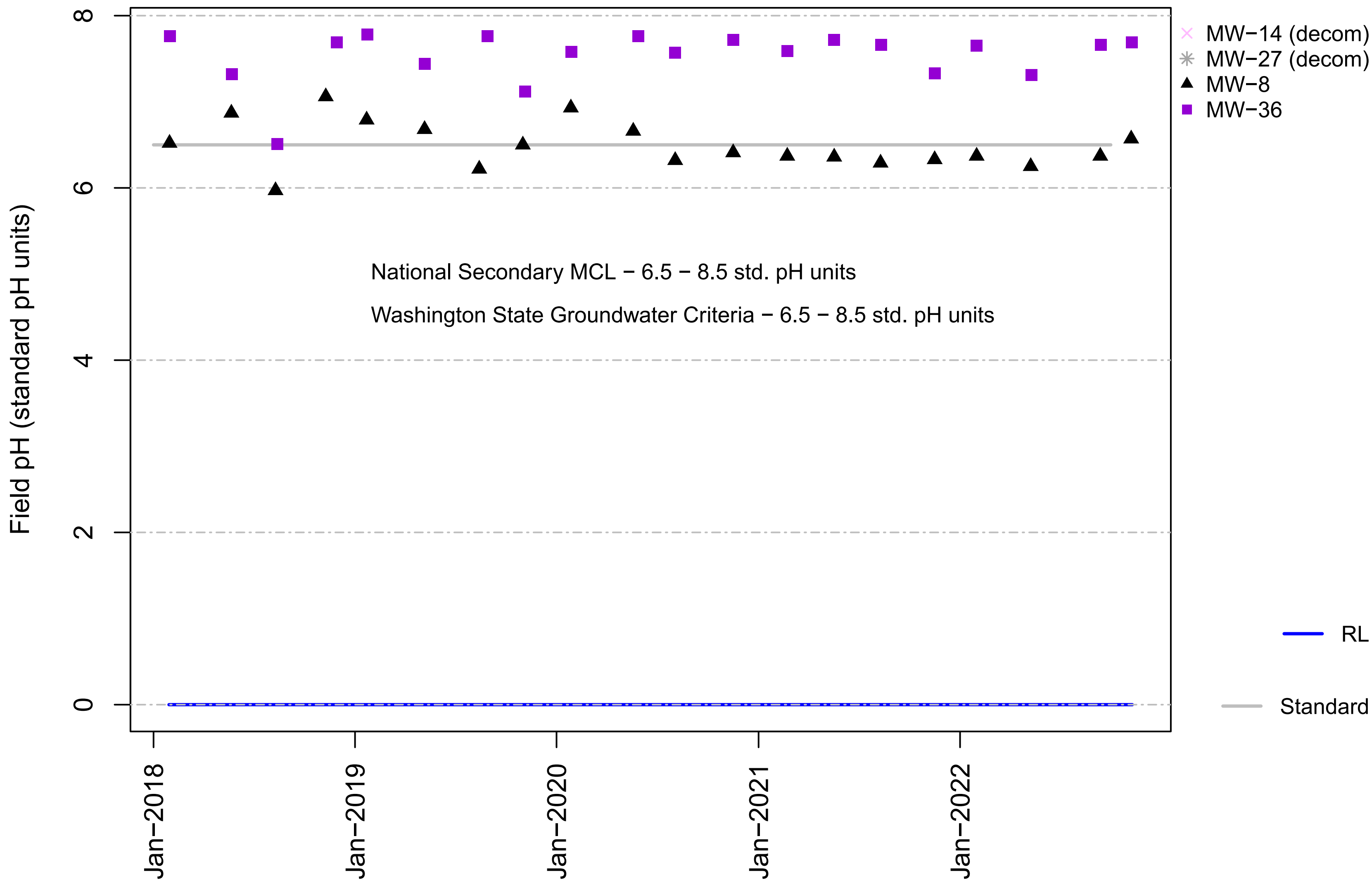


Figure E−2A
Channel Cc3
Field Specific Conductance

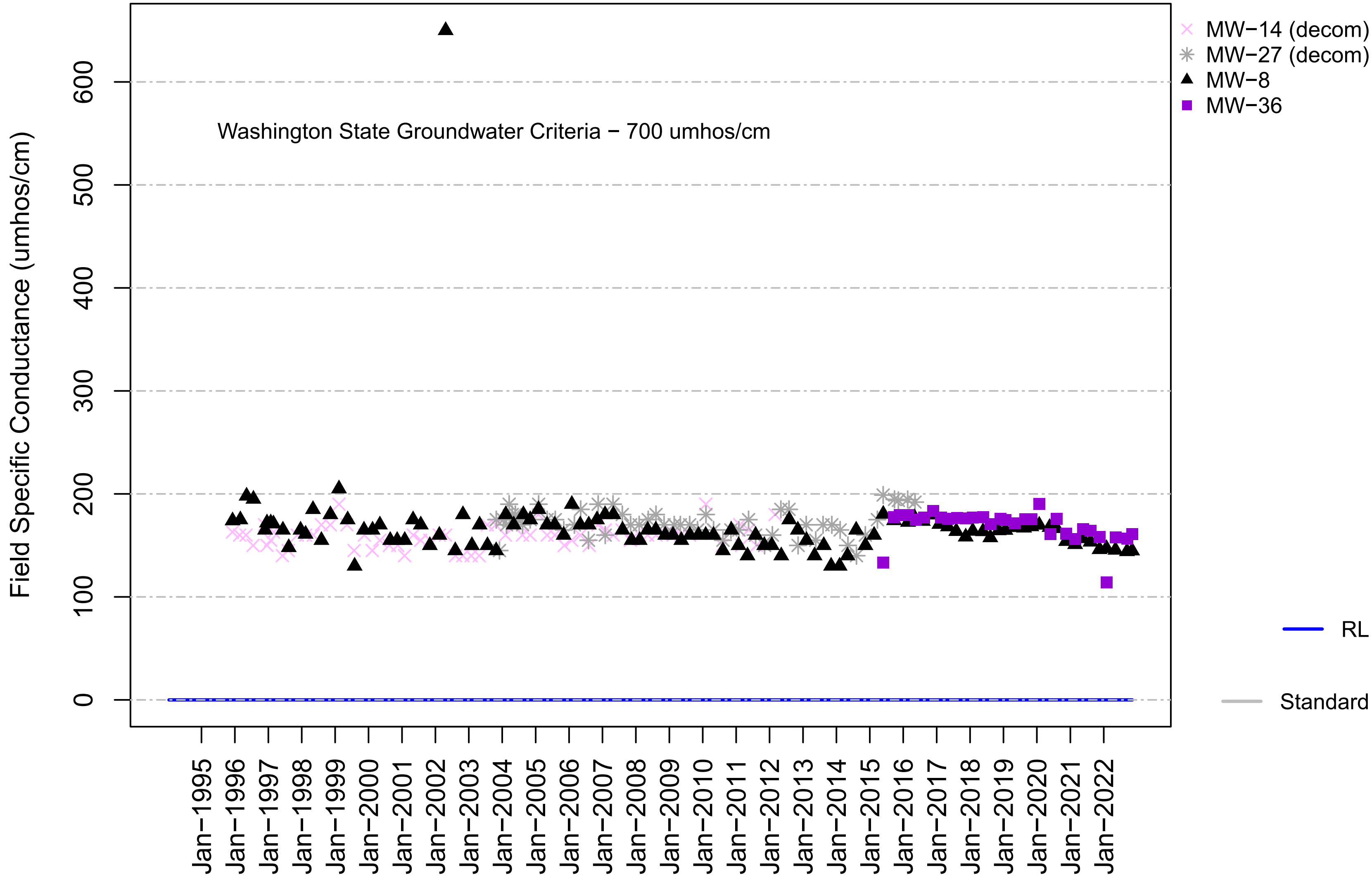


Figure E−2B
Channel Cc3
Field Specific Conductance

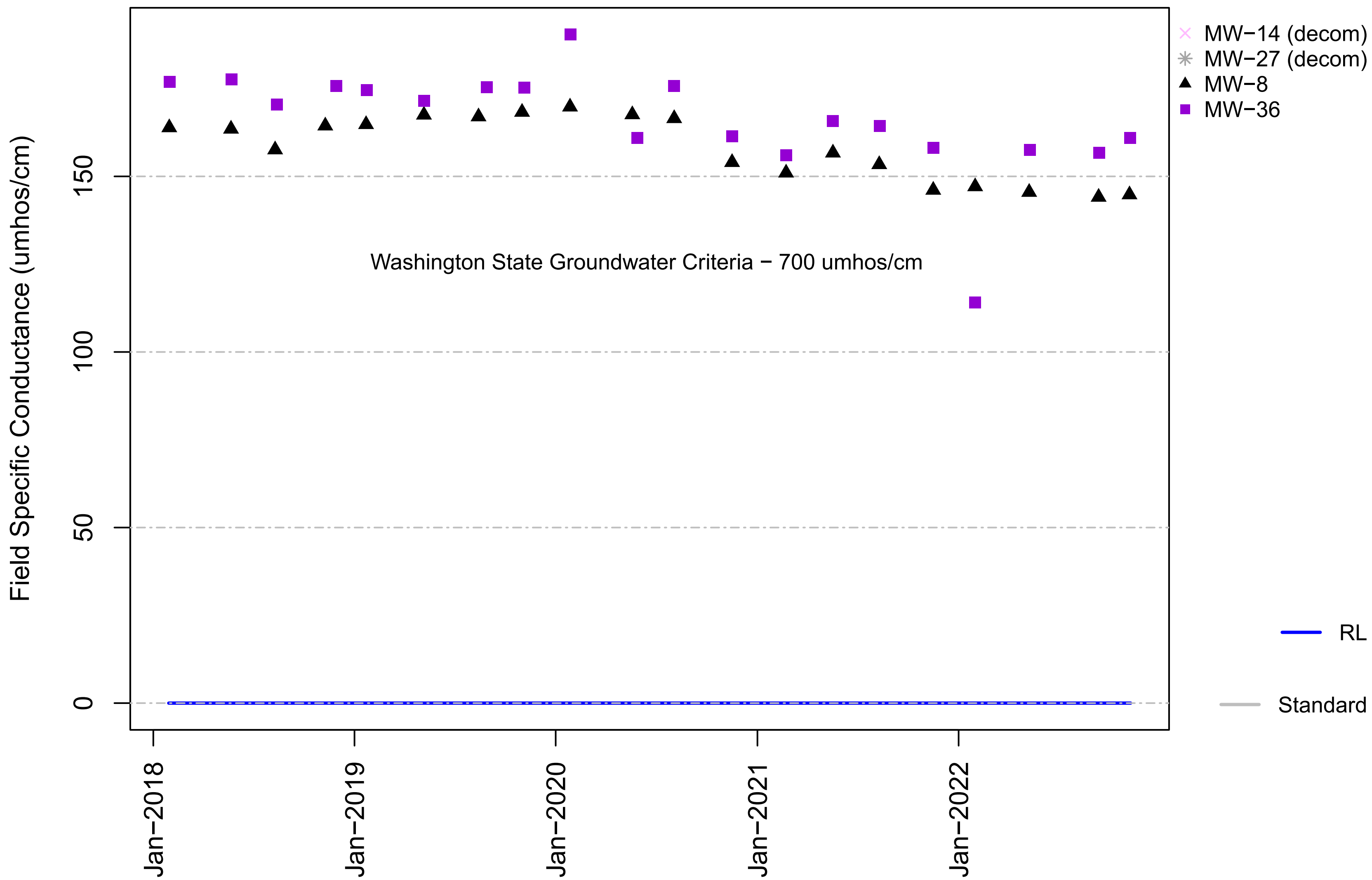
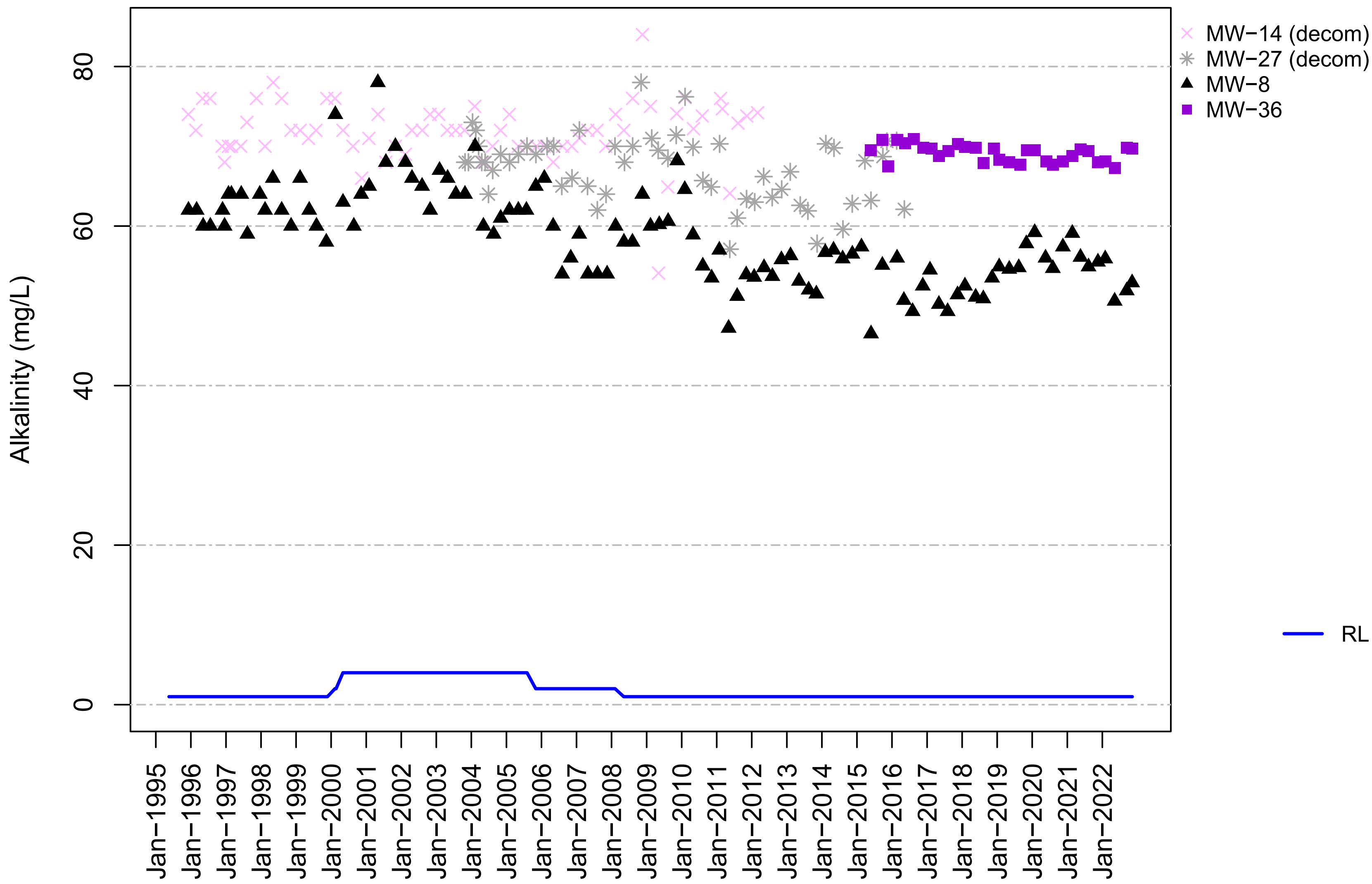


Figure E-3A
Channel Cc3
Alkalinity



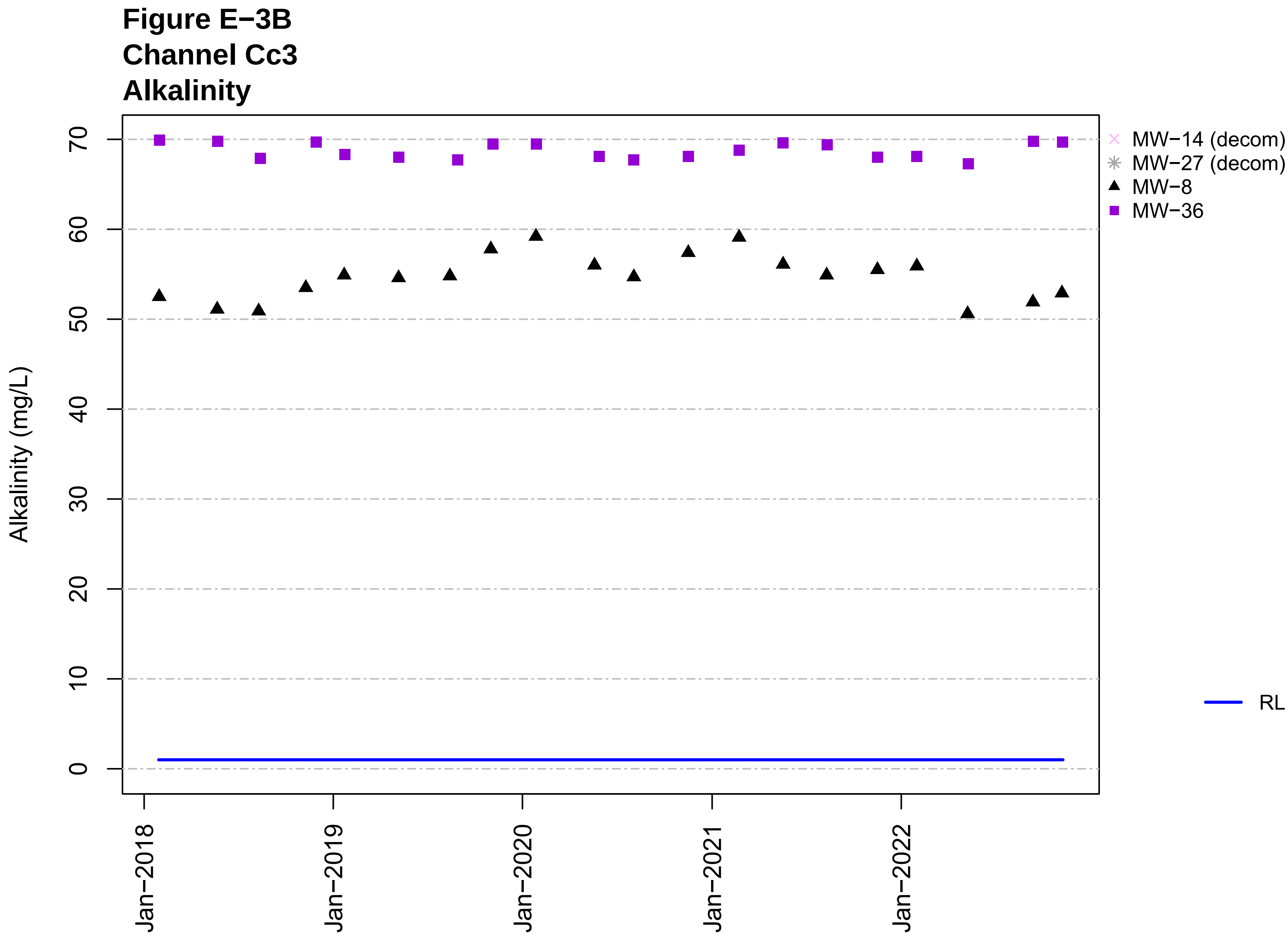


Figure E−3B
Channel Cc3
Alkalinity
Alkalinity (mg/L)
0
10
20
30
40
50
60
70
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

Figure E−4A
Channel Cc3
Ammonia

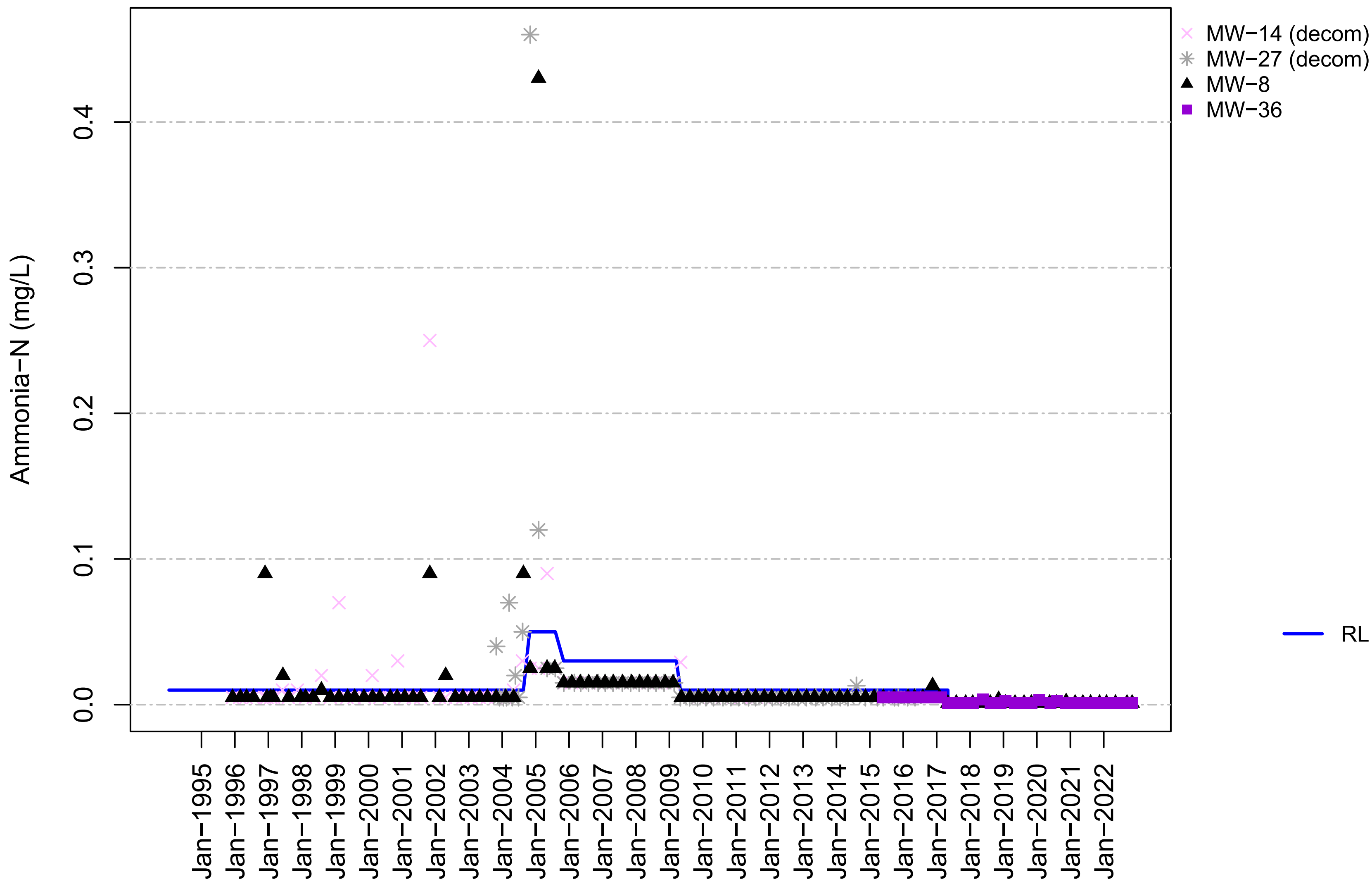
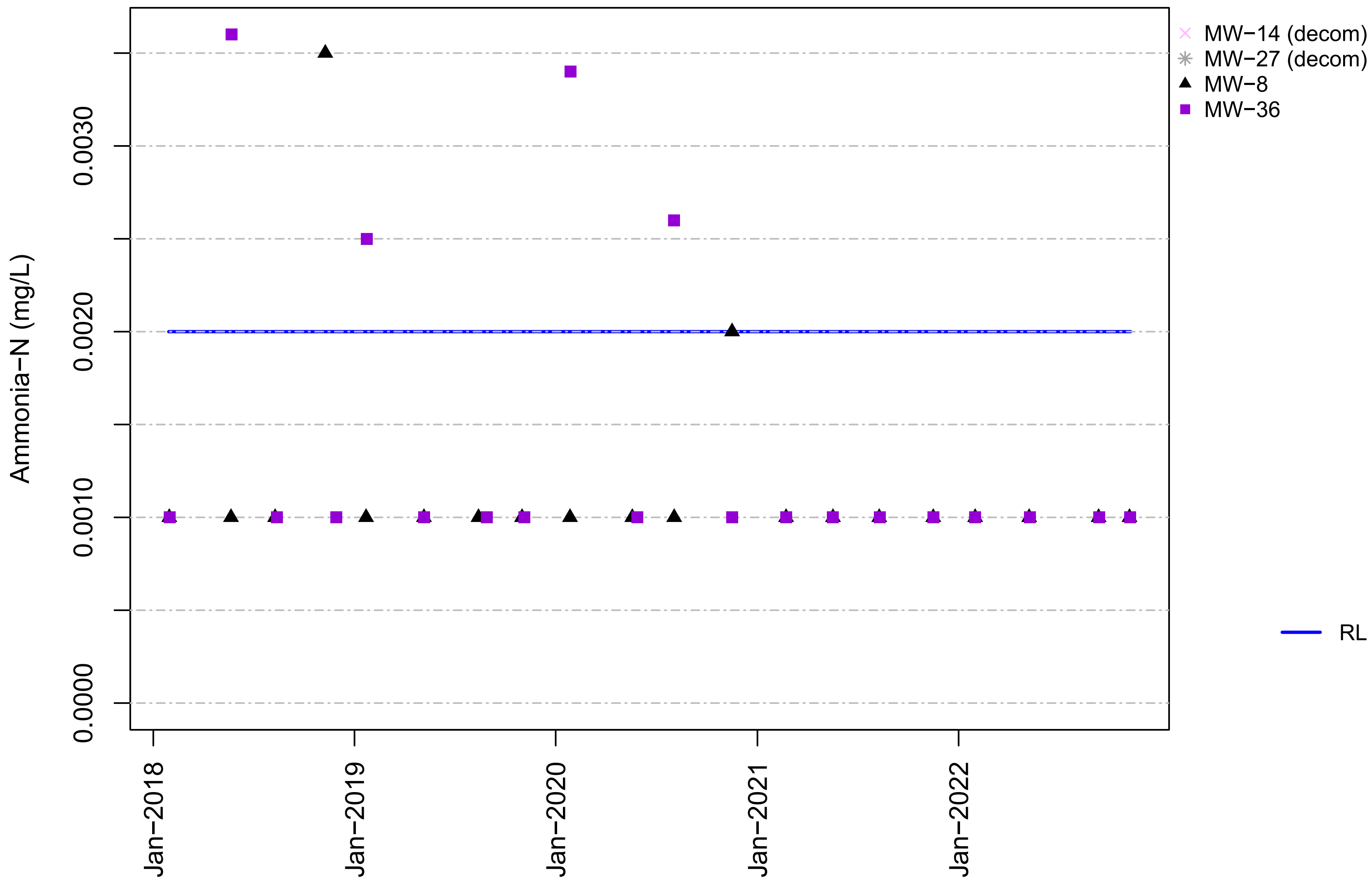


Figure E−4B
Channel Cc3
Ammonia



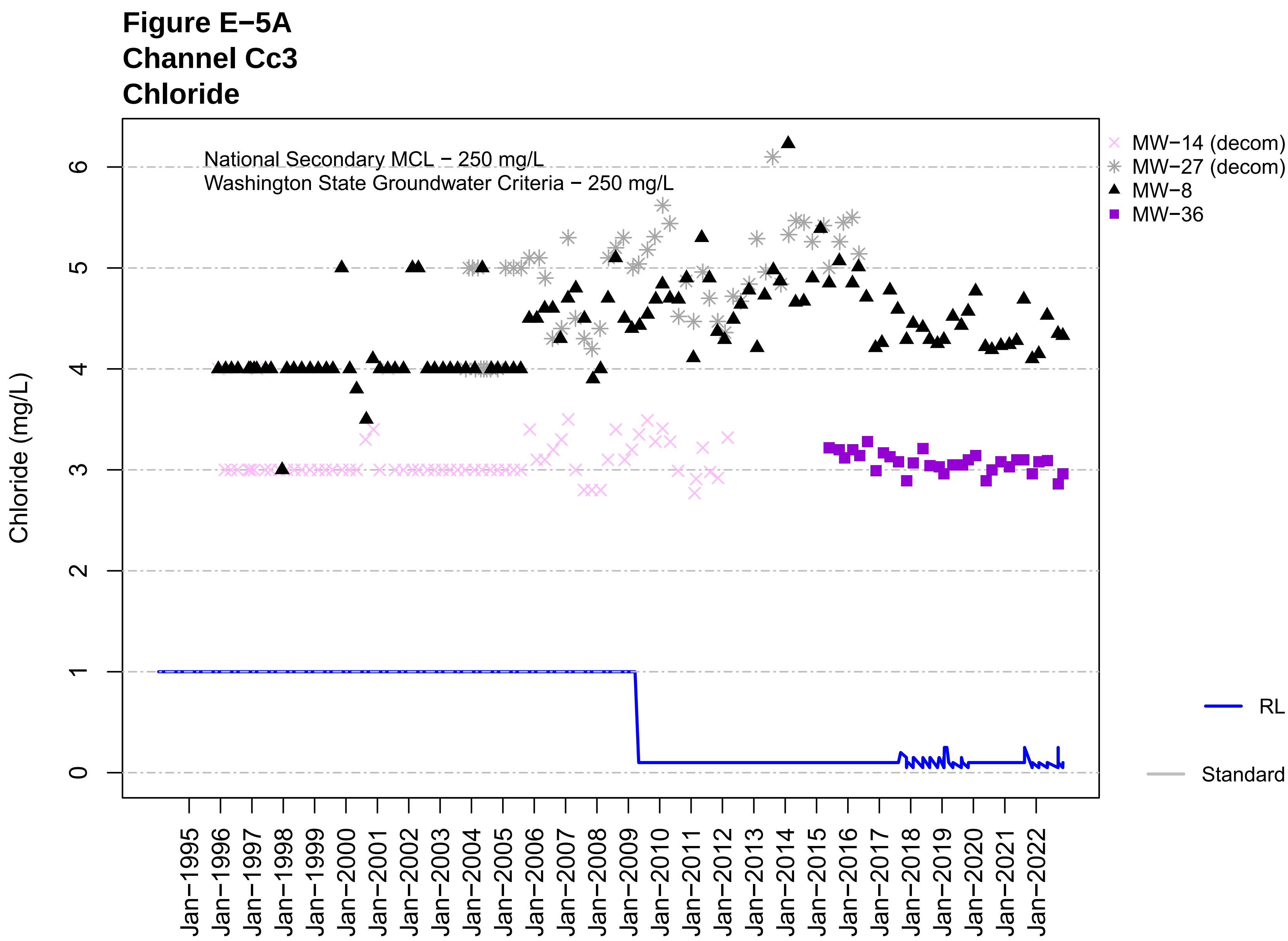
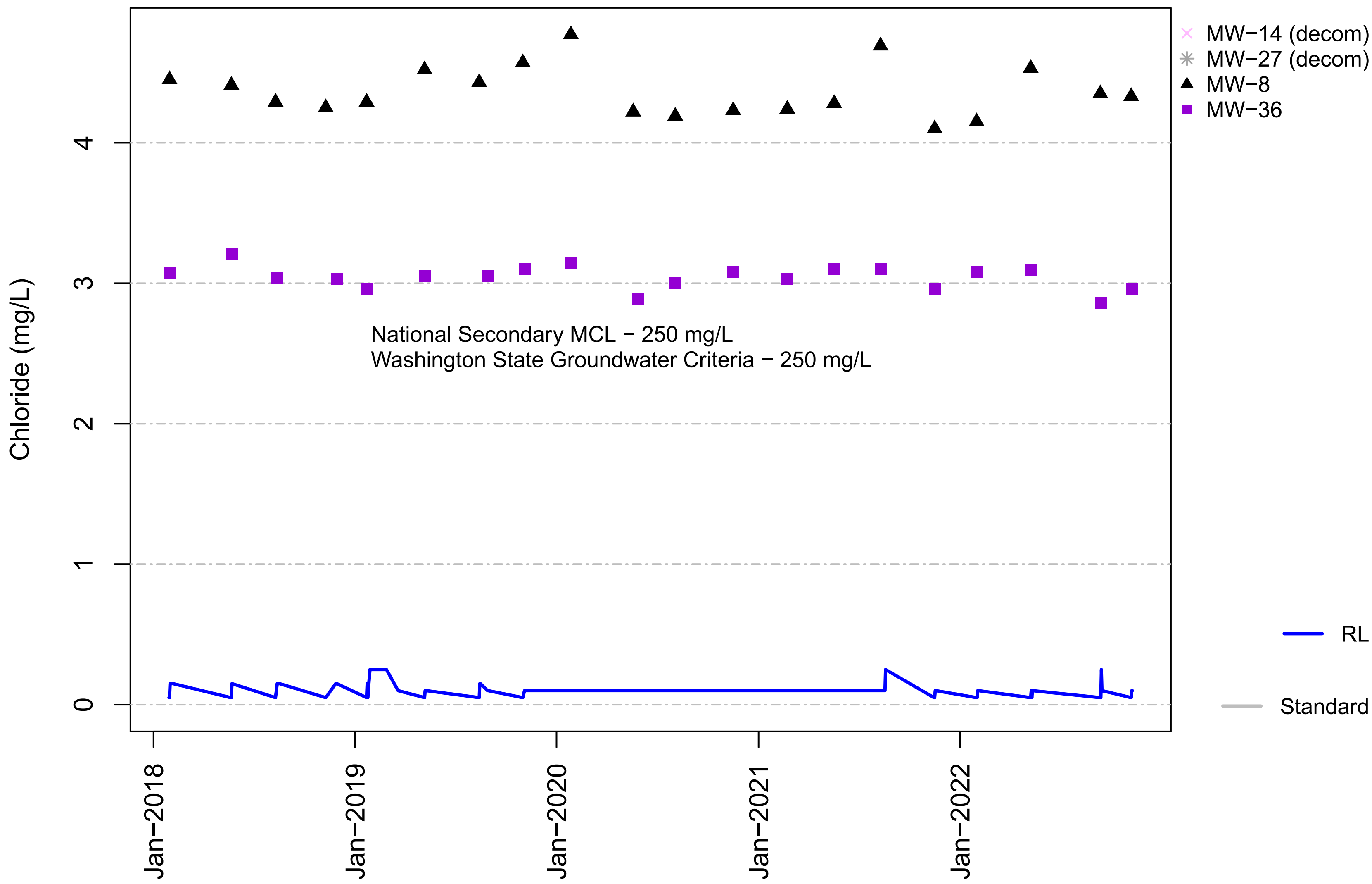


Figure E−5A
Channel Cc3
Chloride
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Chloride (mg/L)
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
0
1
2
3
4
5
6
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
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
Jan−2022

Figure E−5B
Channel Cc3
Chloride



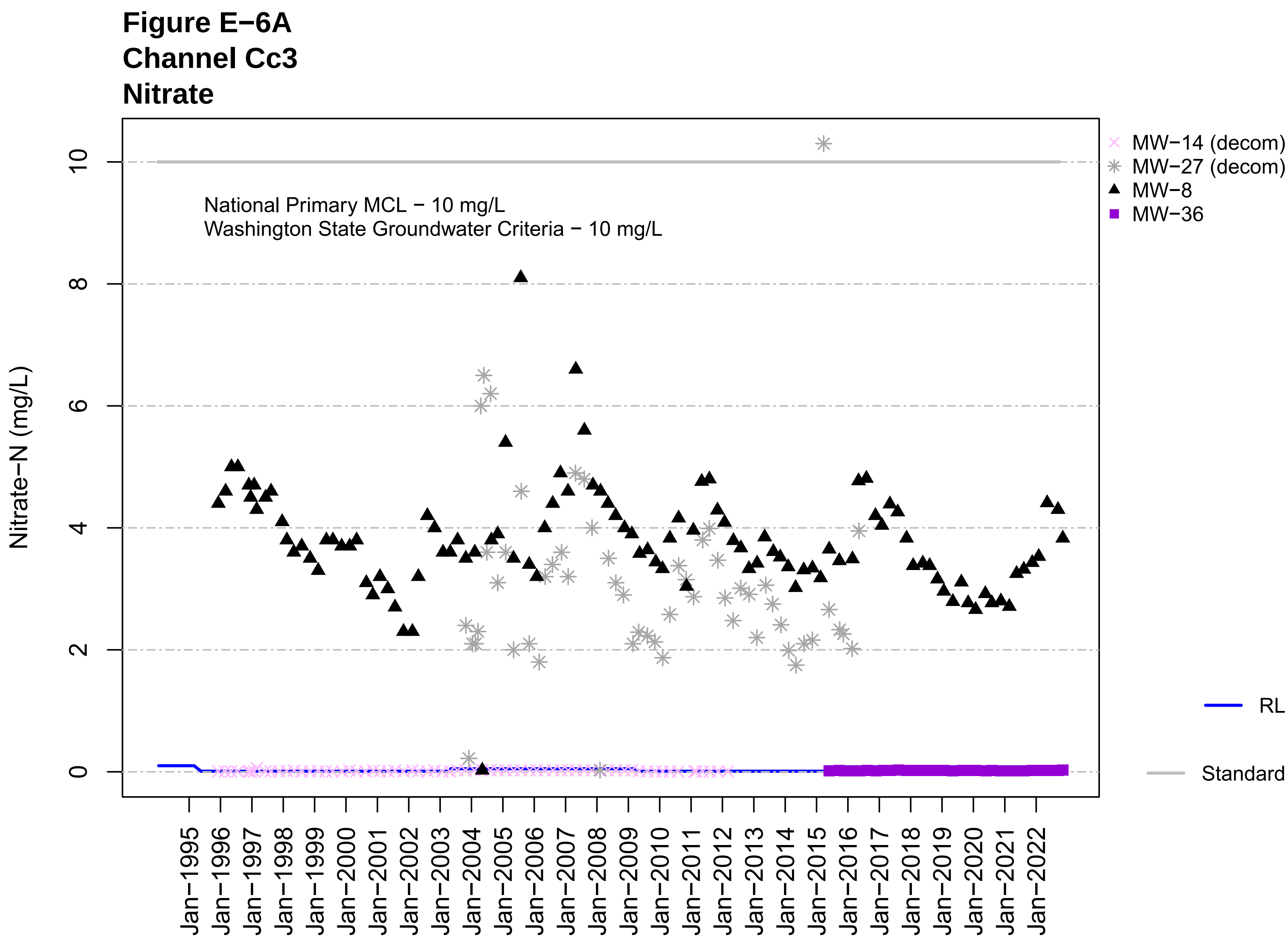
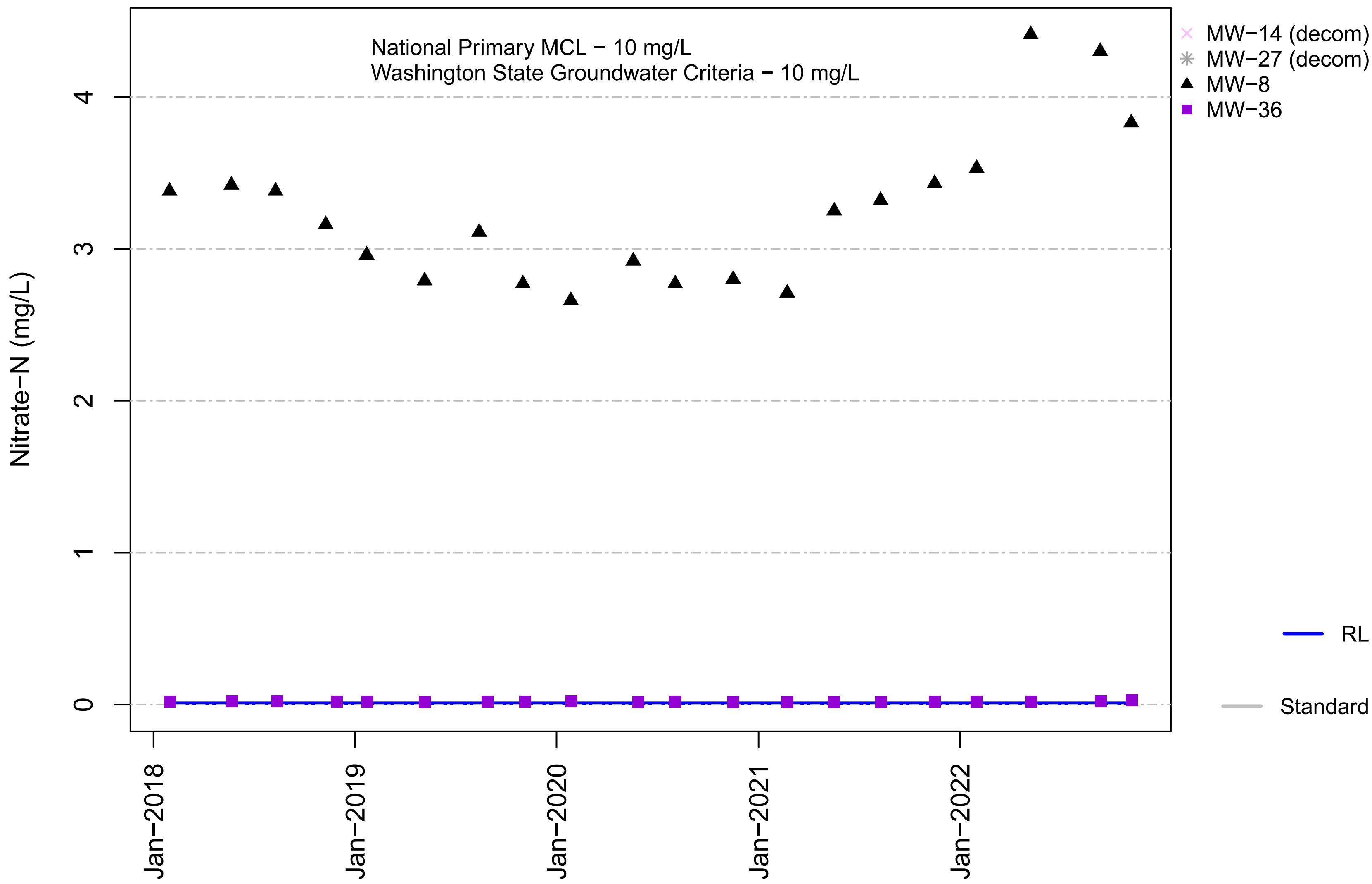


Figure E−6A
Channel Cc3
Nitrate
National Primary MCL − 10 mg/L
Washington State Groundwater Criteria − 10 mg/L
Nitrate−N (mg/L)
0
2
4
6
8
10
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
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
Jan−2022

Figure E−6B
Channel Cc3
Nitrate



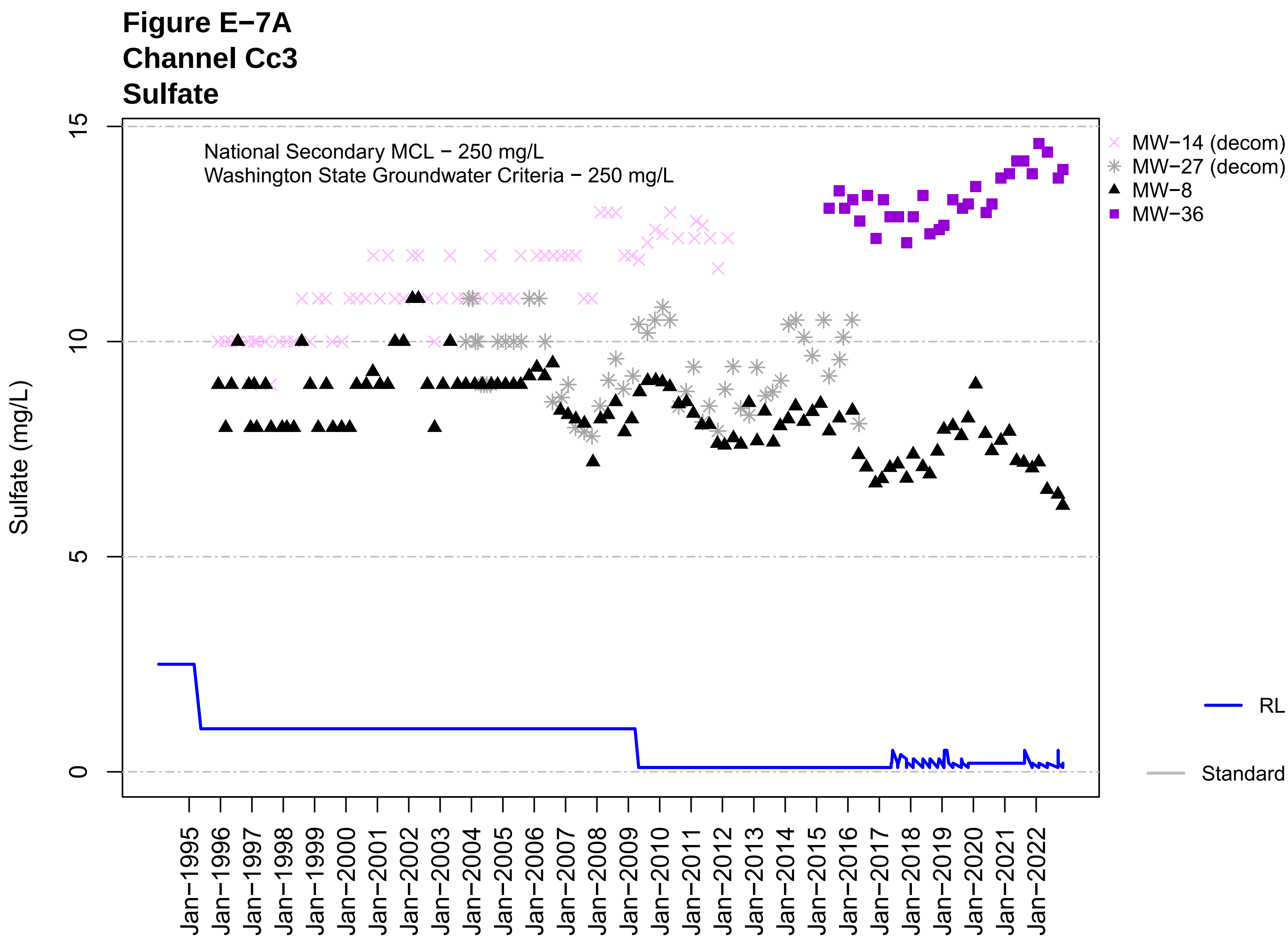


Figure E−7A
Channel Cc3
Sulfate
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
Sulfate (mg/L)
0
5
10
15
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

Figure E−7B
Channel Cc3
Sulfate

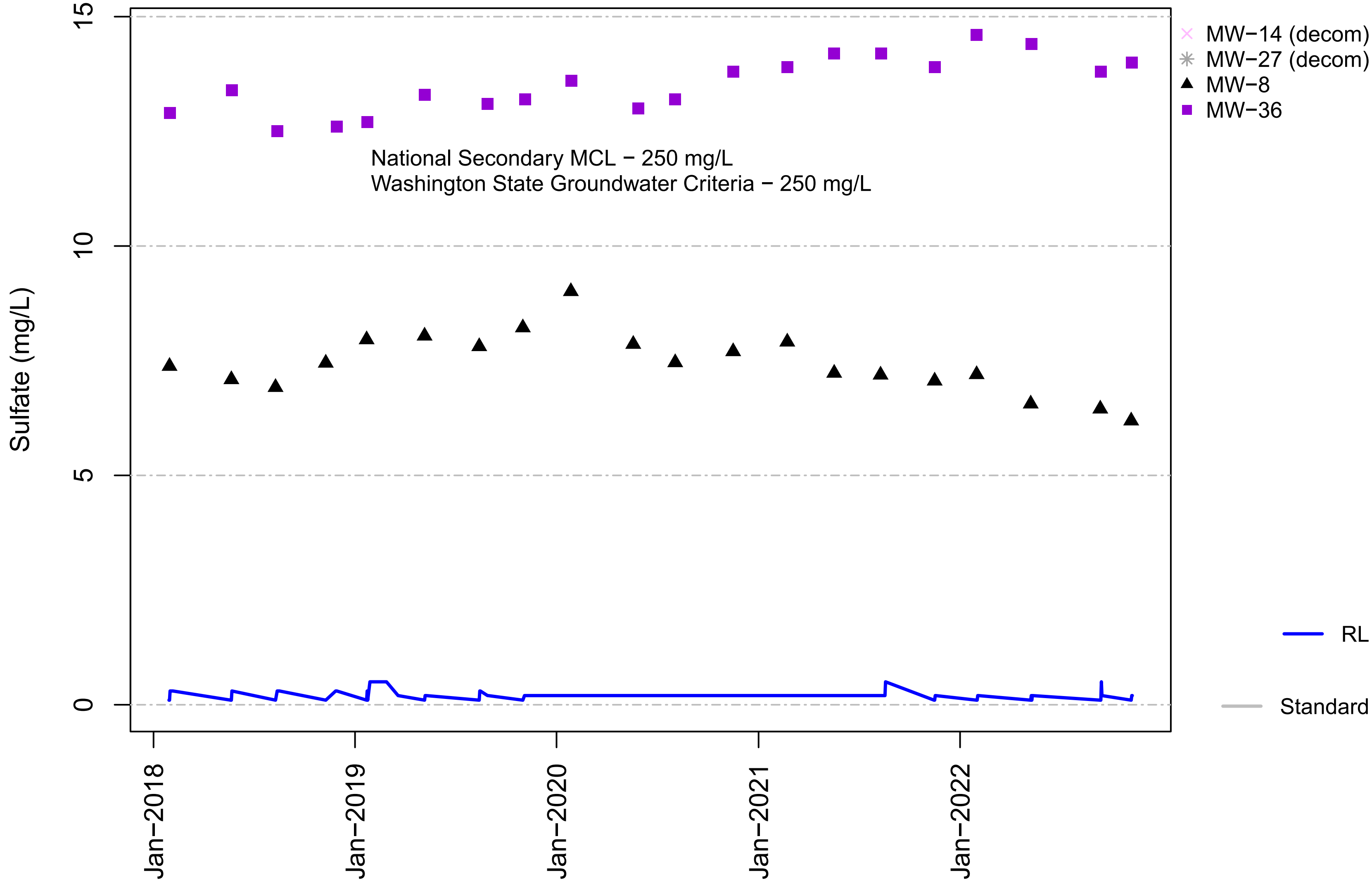


Figure E−8A
Channel Cc3
Total Dissolved Solids

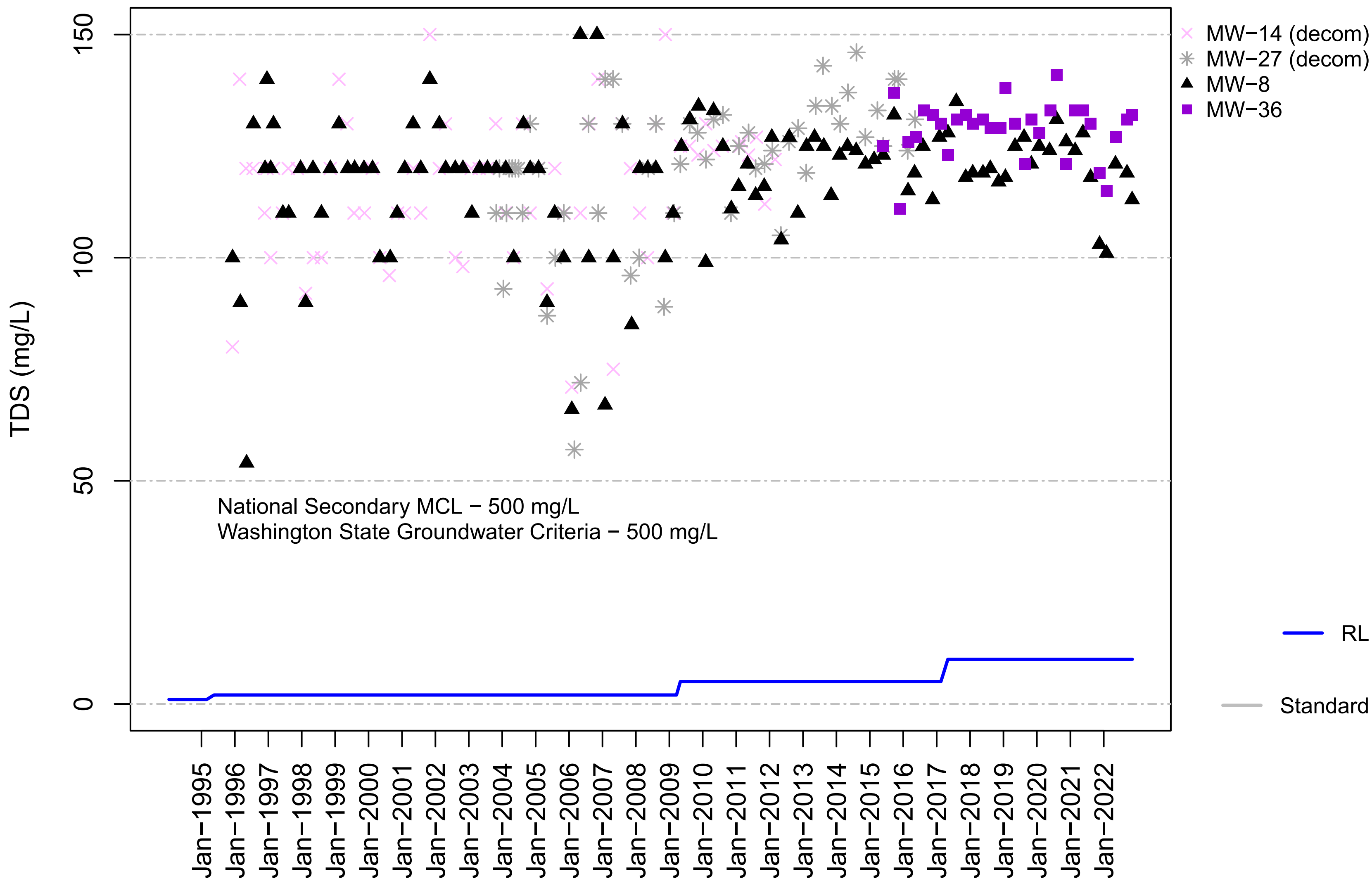


Figure E−8B
Channel Cc3
Total Dissolved Solids

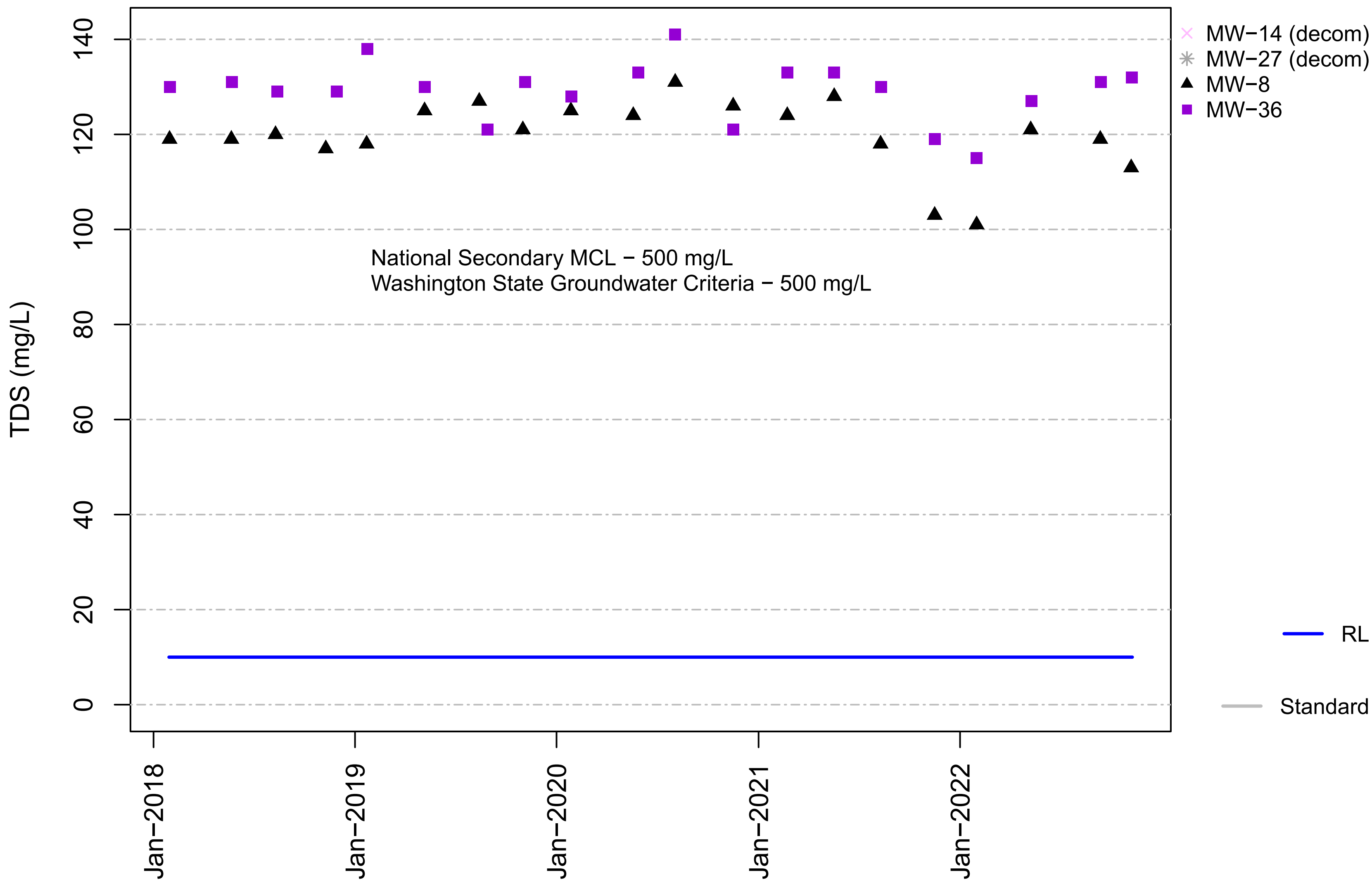


Figure E−9A
Channel Cc3
Arsenic

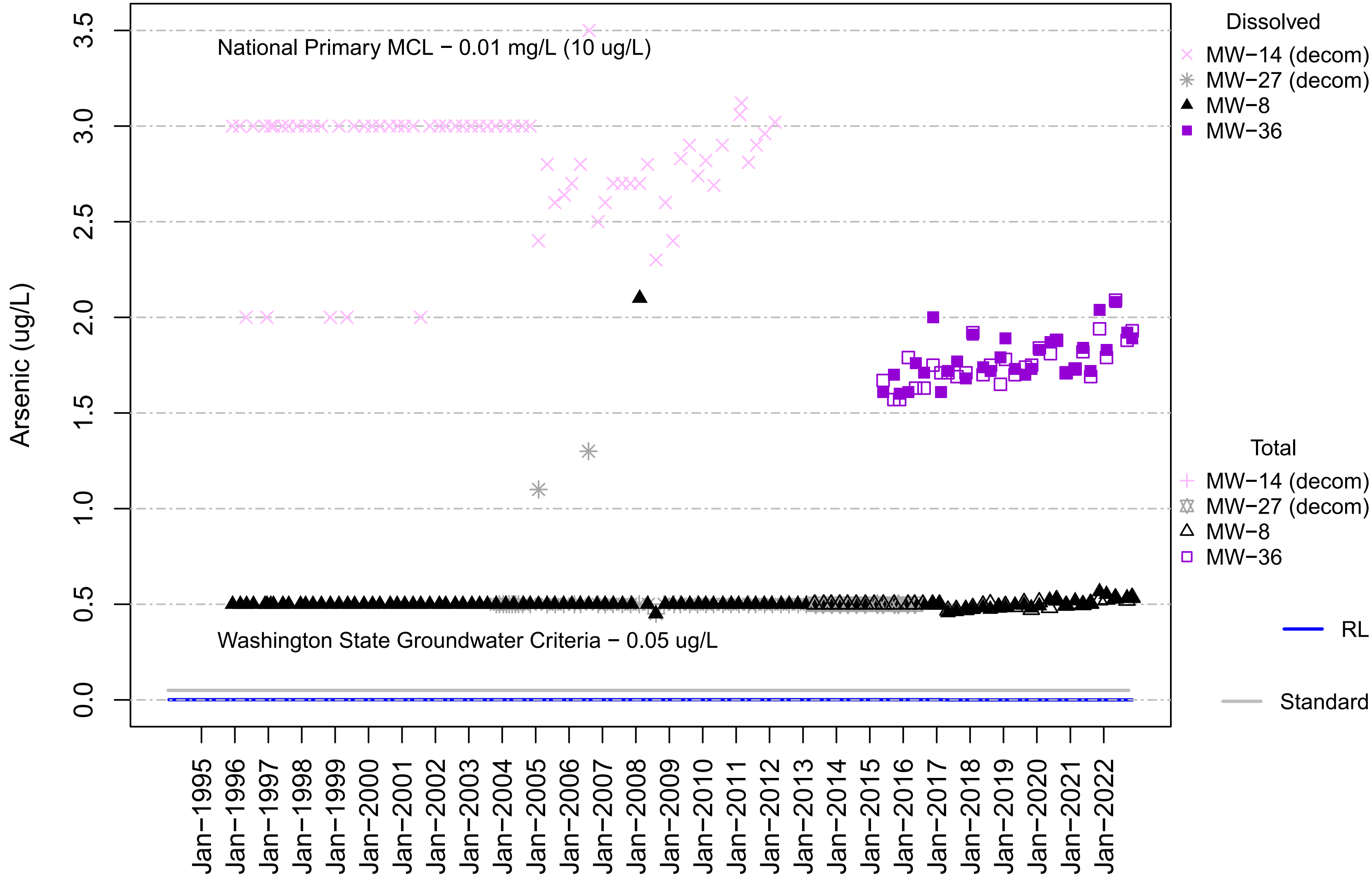


Figure E−9B
Channel Cc3
Arsenic

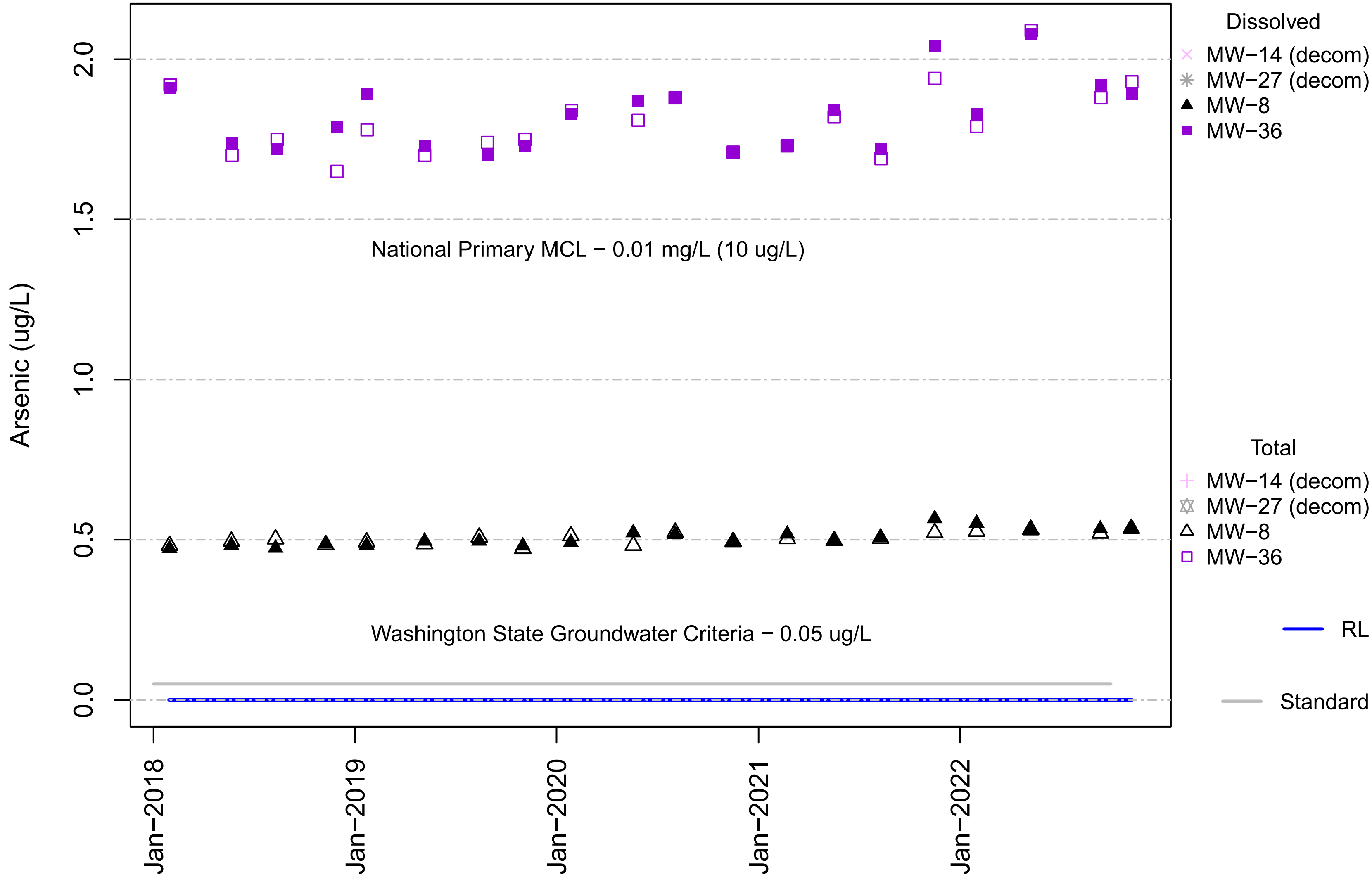


Figure E−10A
Channel Cc3
Calcium

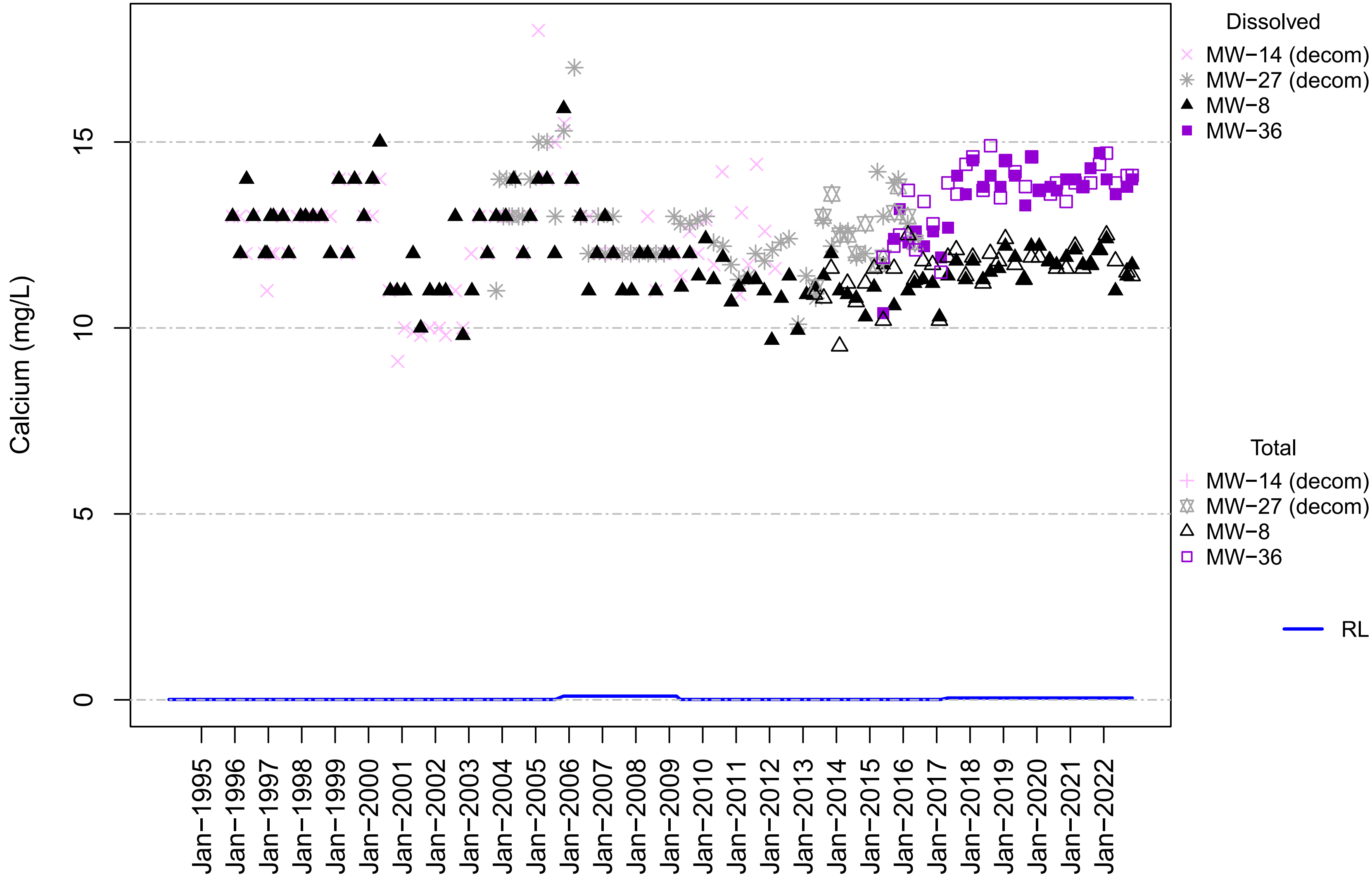


Figure E−10B
Channel Cc3
Calcium

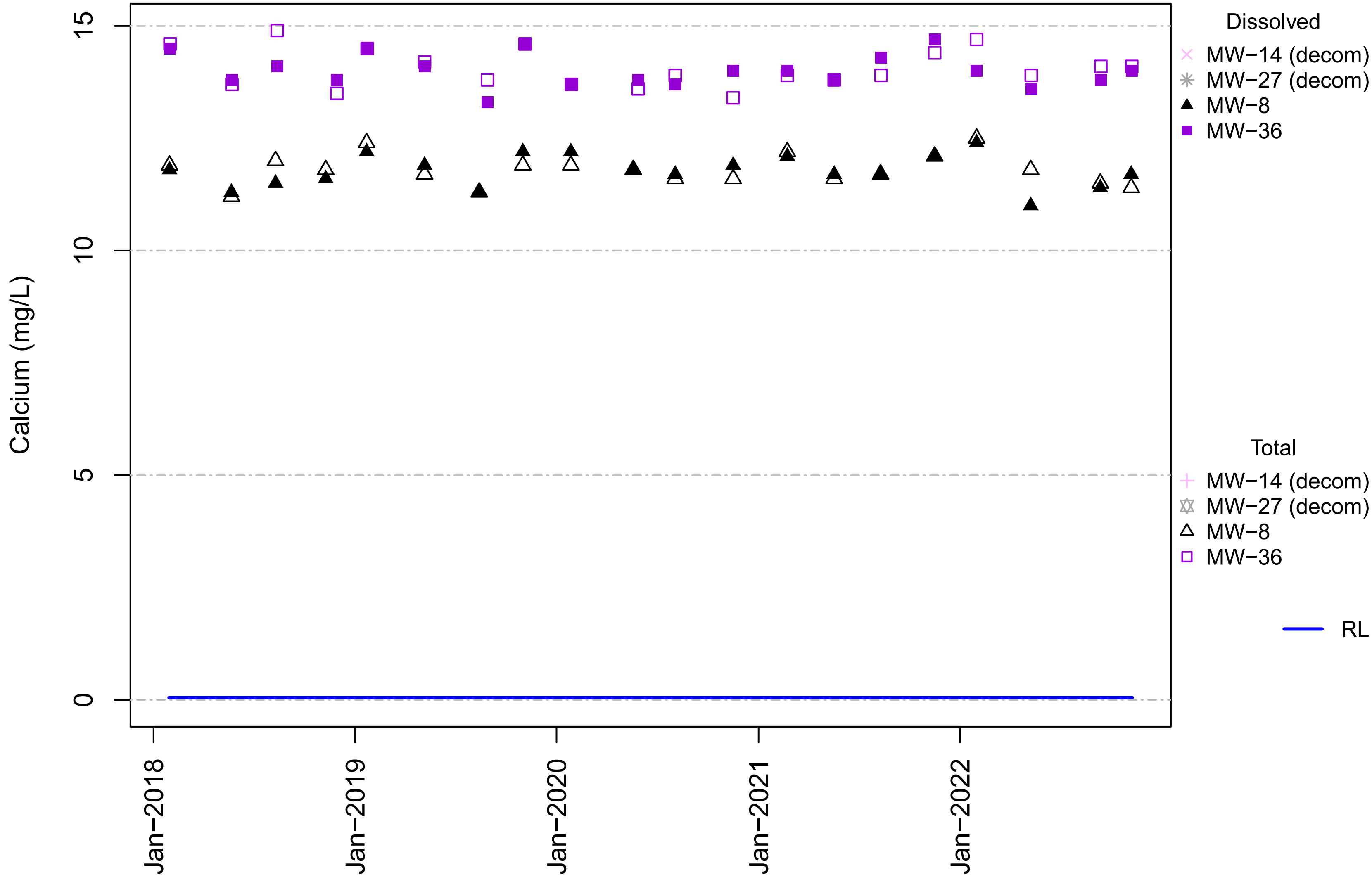


Figure E−11A
Channel Cc3
Iron

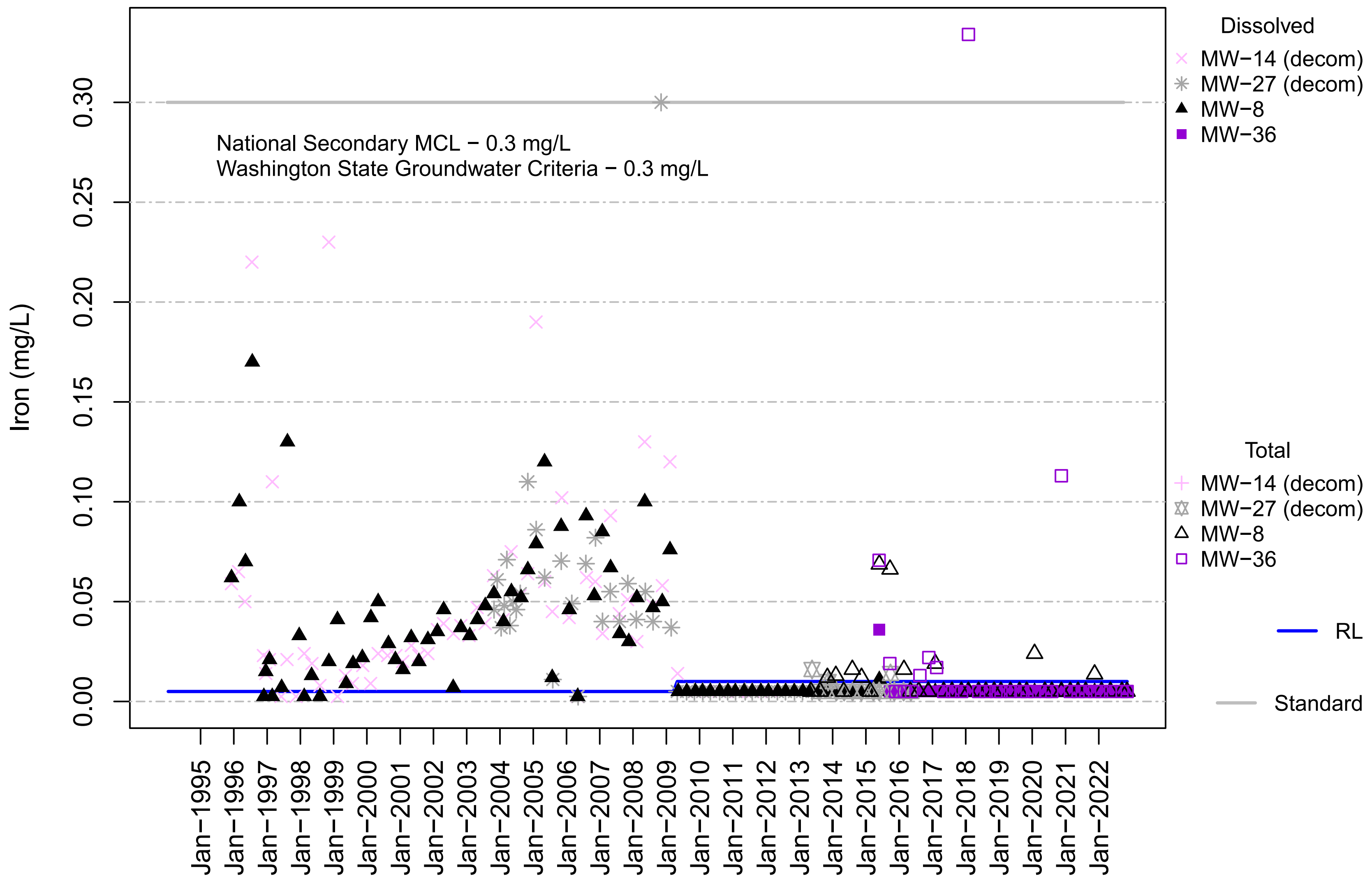


Figure E−11B
Channel Cc3
Iron

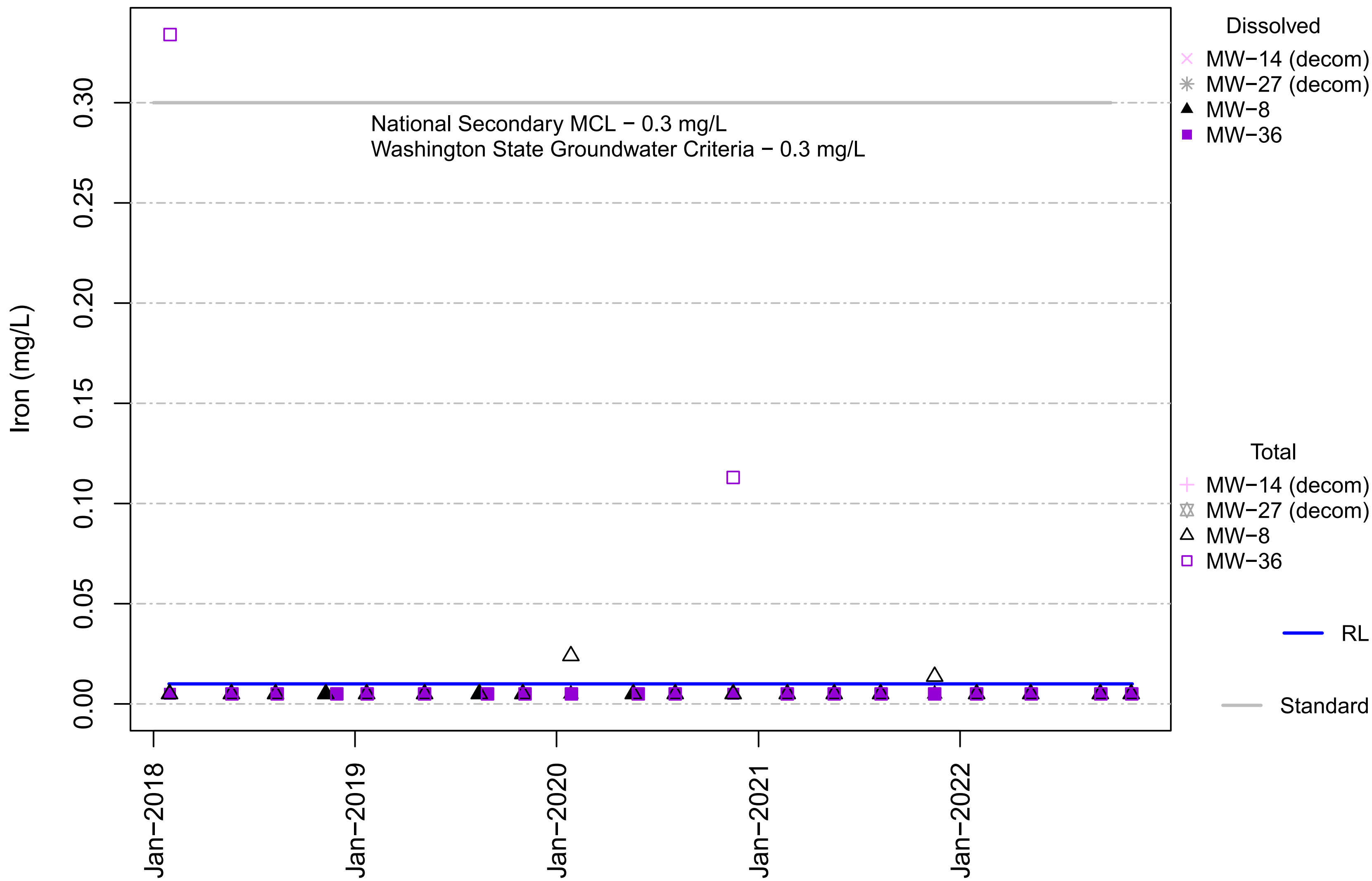


Figure E−12A
Channel Cc3
Magnesium

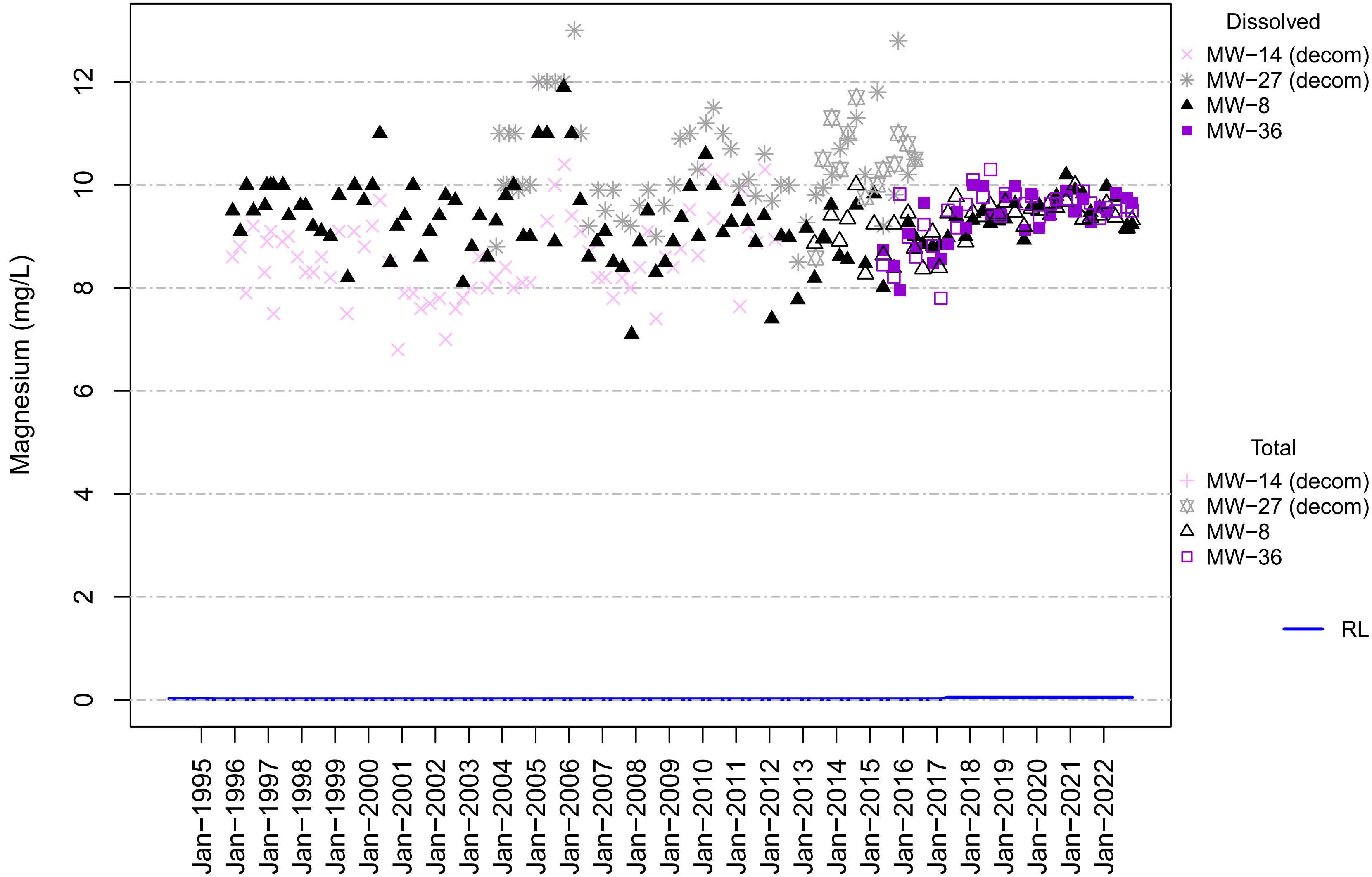


Figure E−12B
Channel Cc3
Magnesium

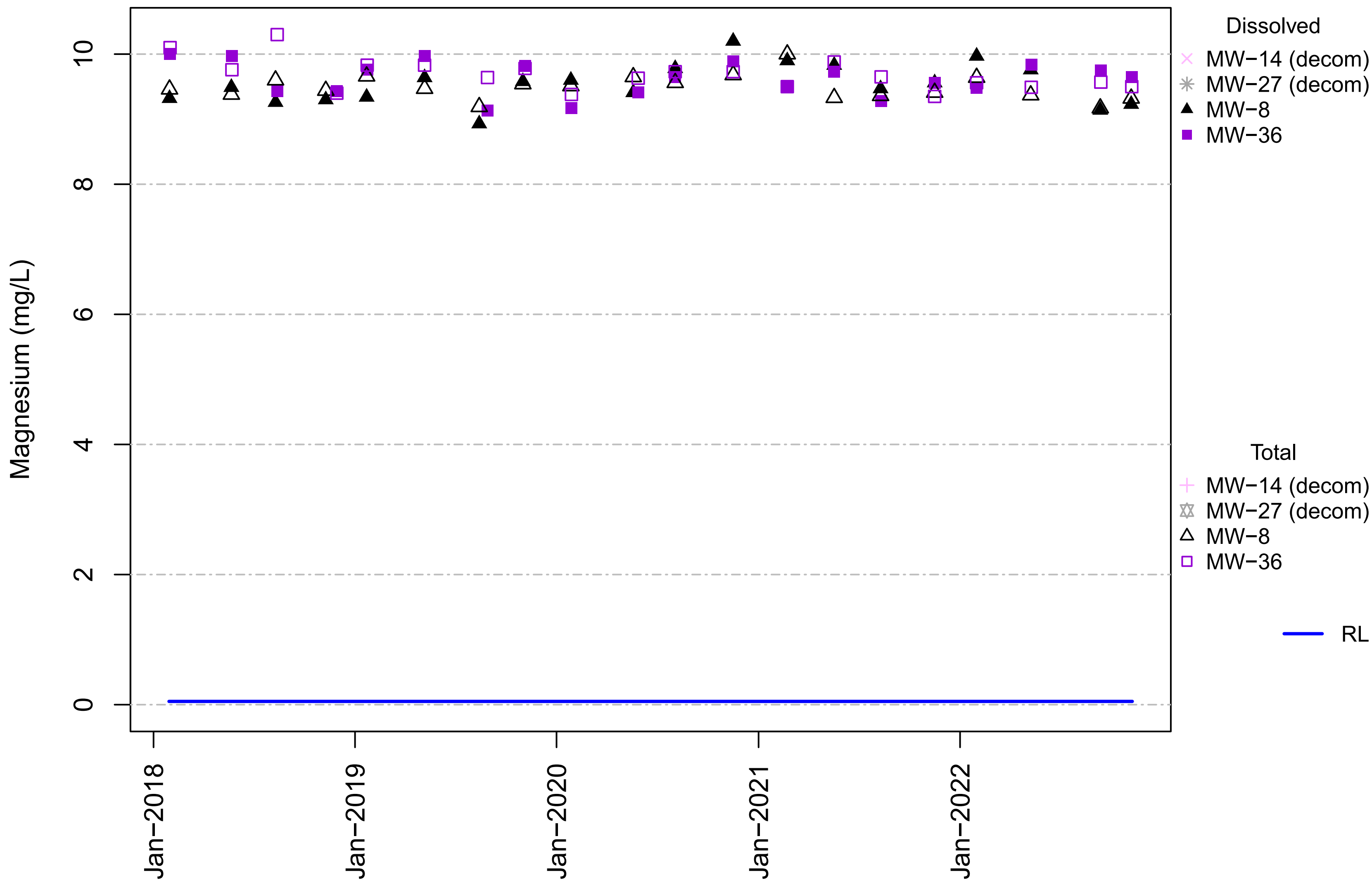
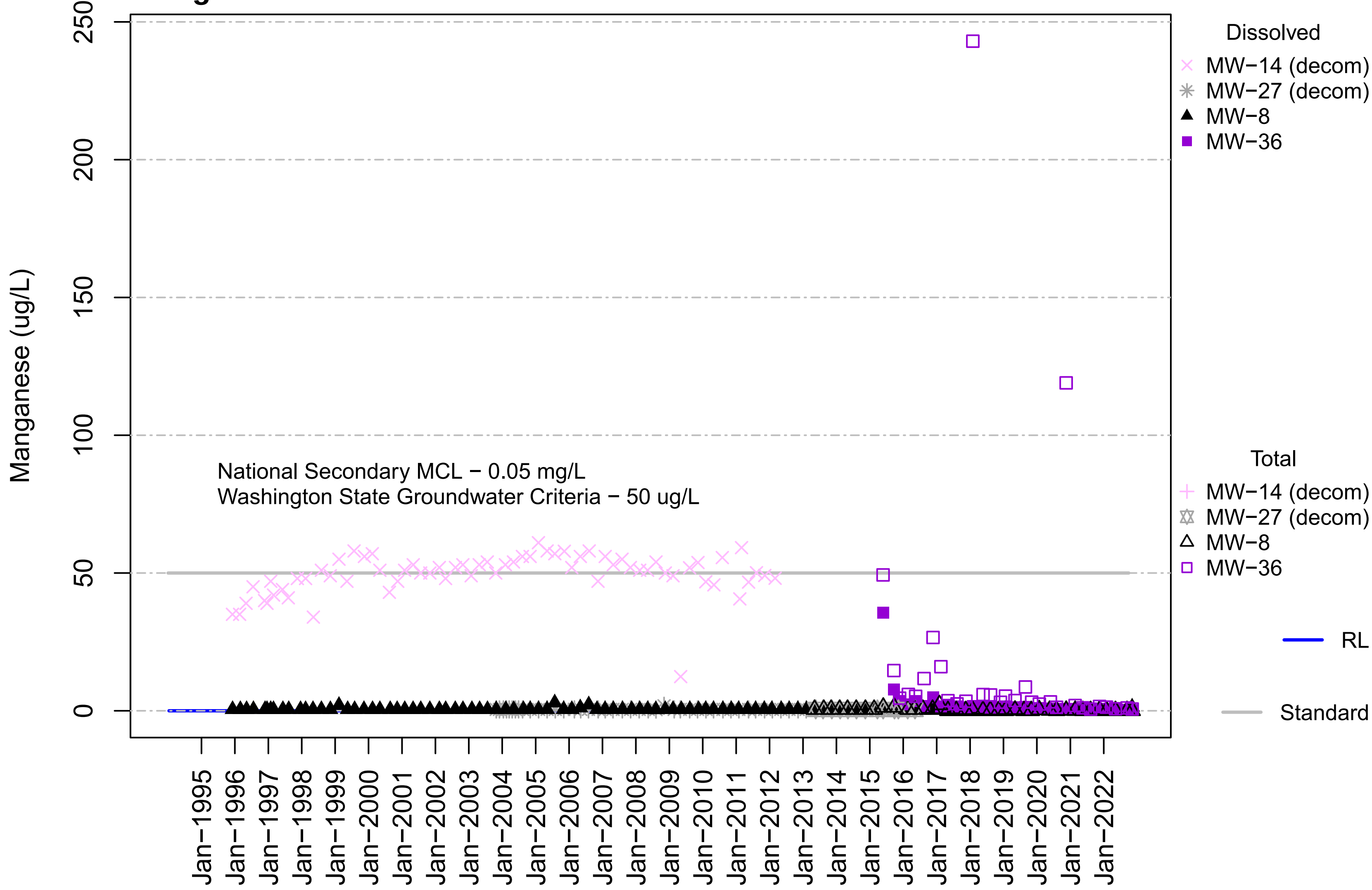


Figure E−13A
Channel Cc3
Manganese



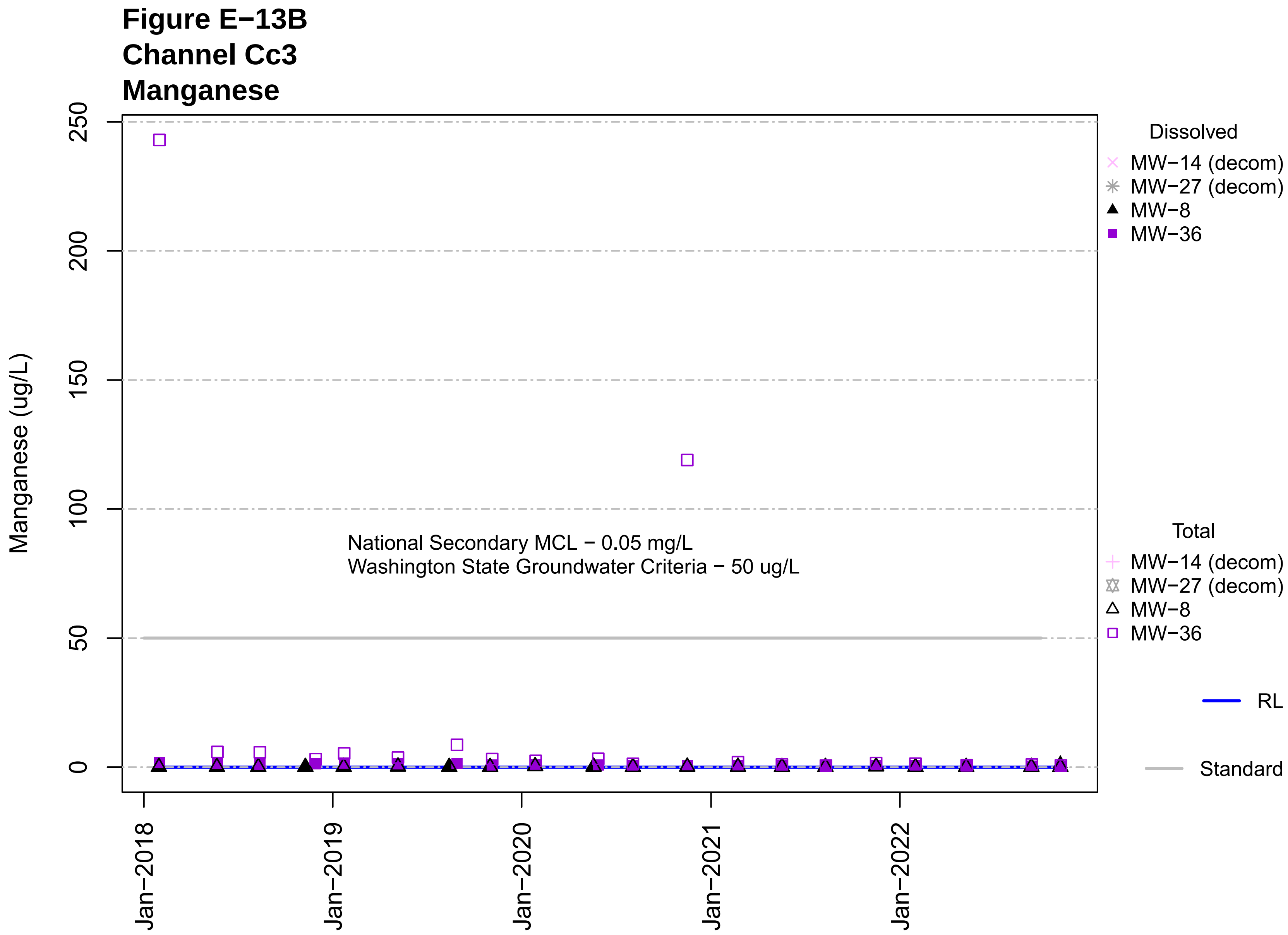


Figure E−13B
Channel Cc3
Manganese
Manganese (ug/L)
0
50
100
150
200
250
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 50 ug/L
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

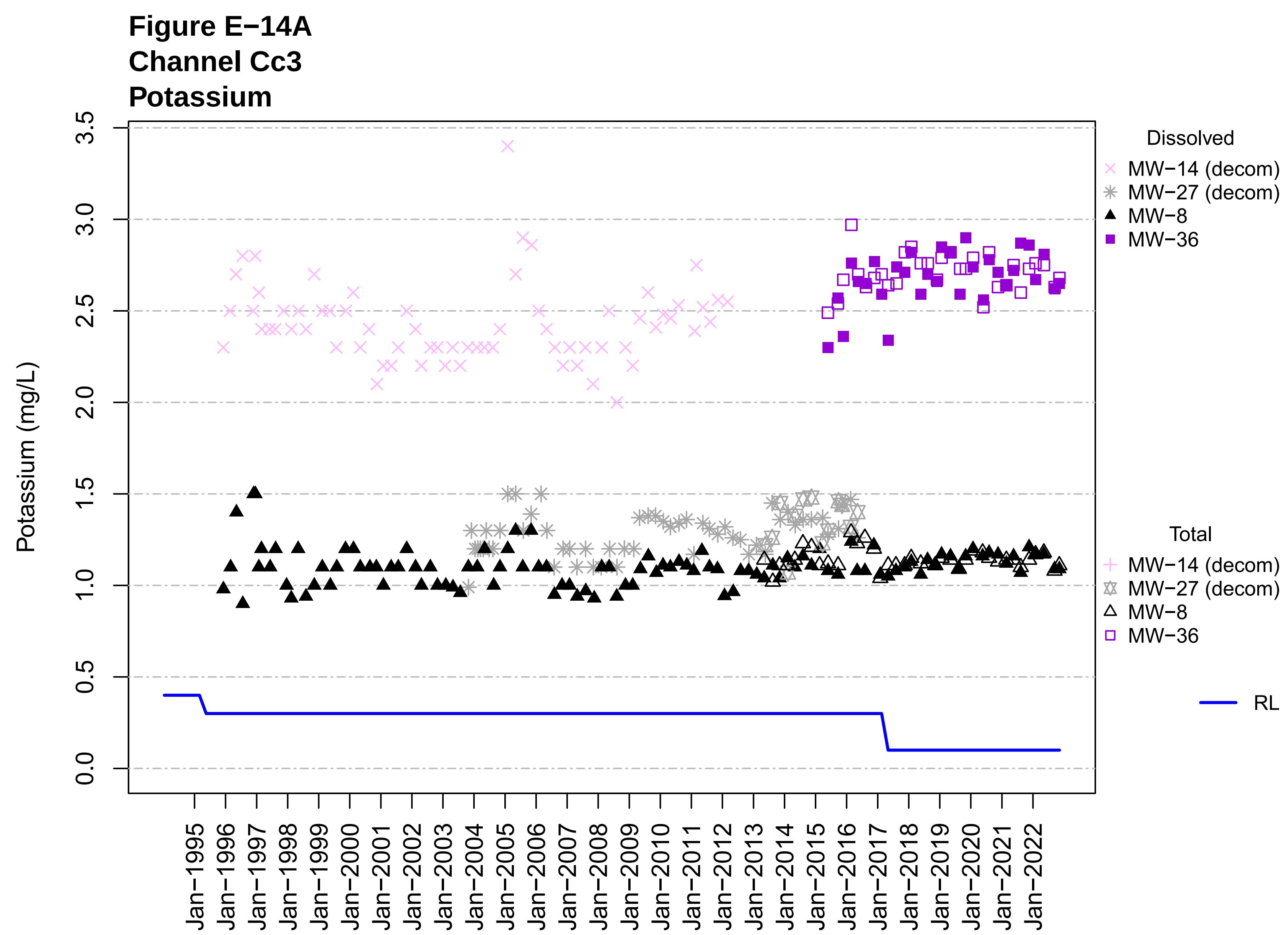


Figure E−14A
Channel Cc3
Potassium
Potassium (mg/L)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL

Figure E−14B
Channel Cc3
Potassium

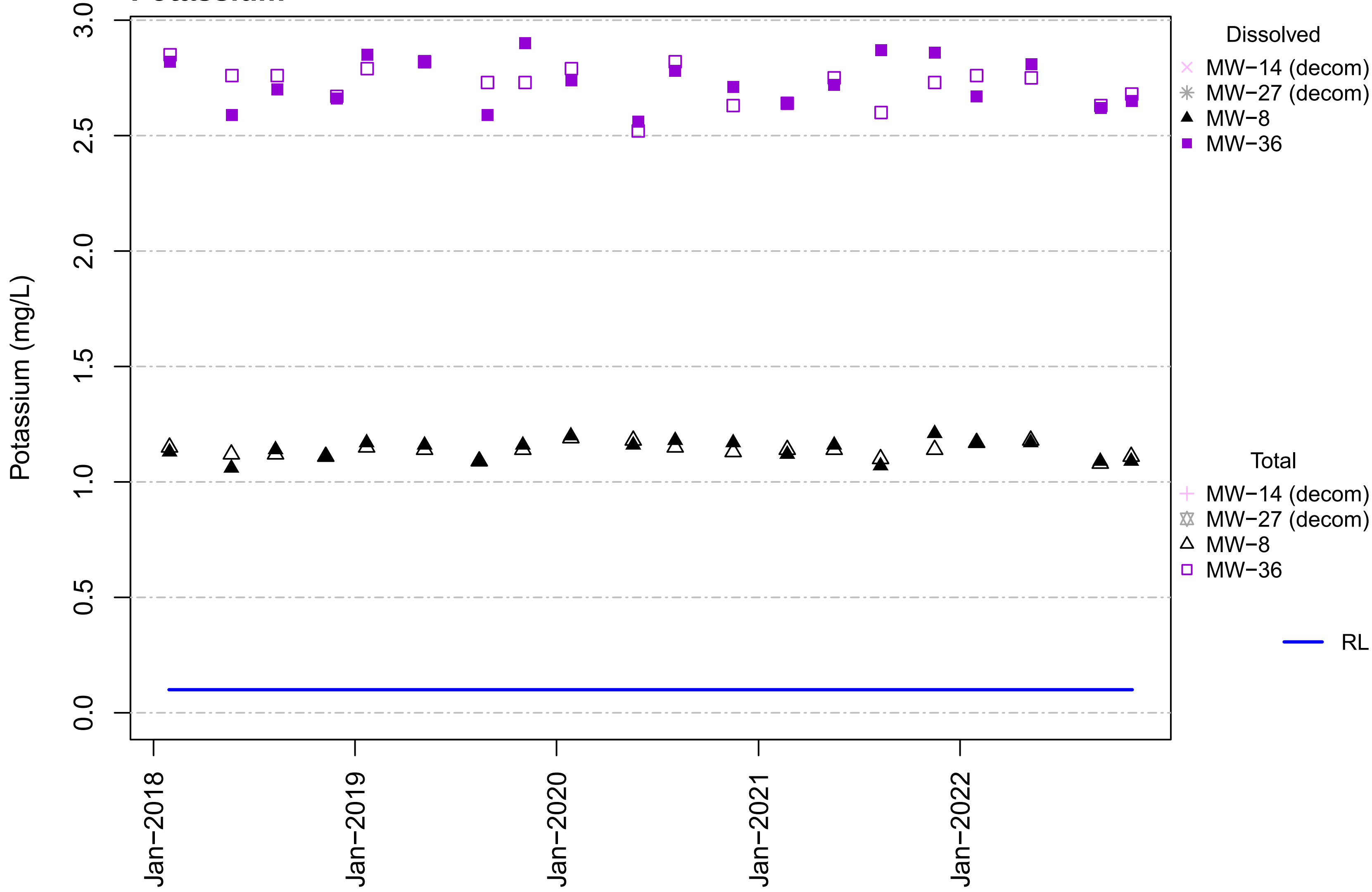
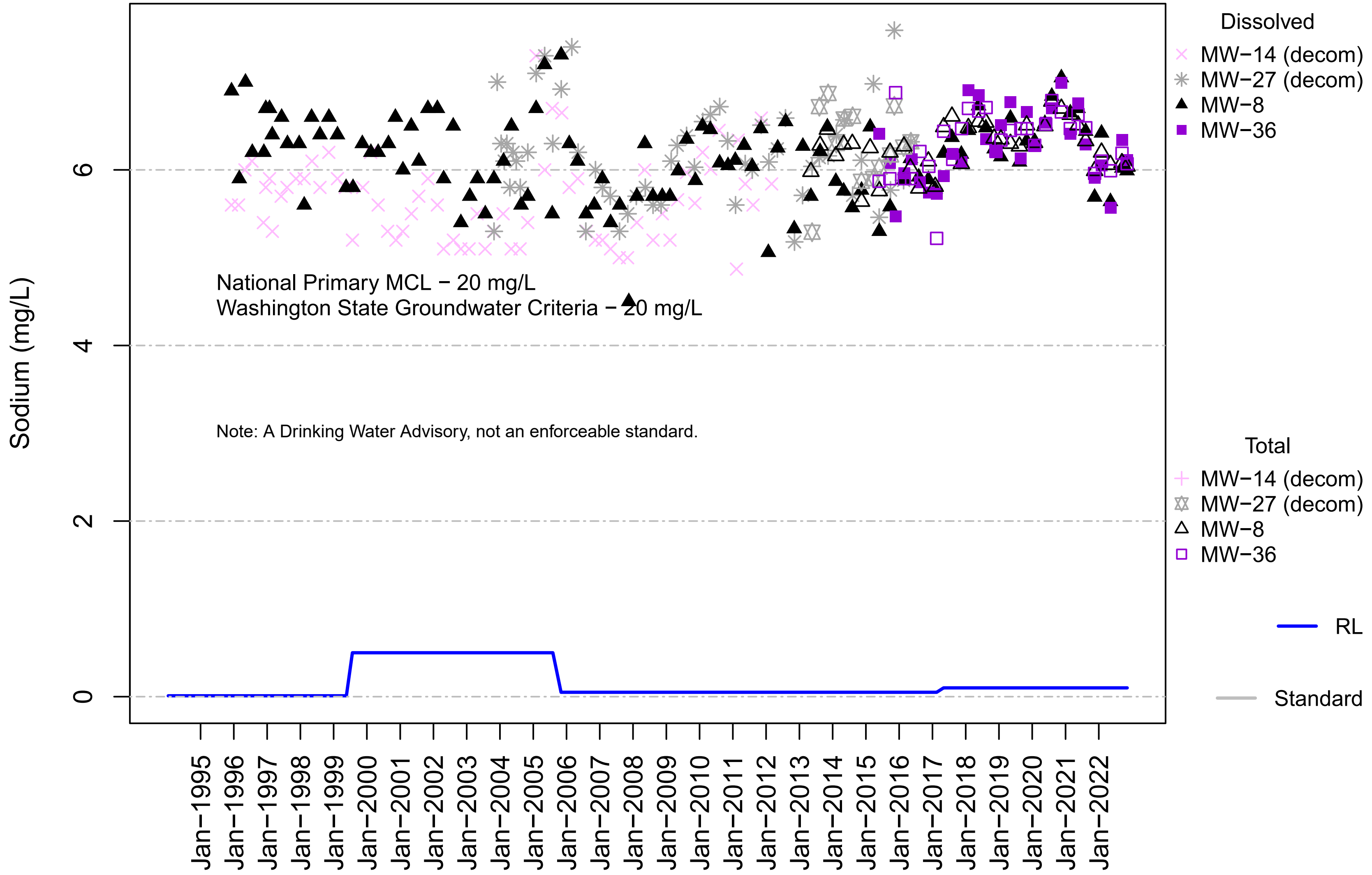


Figure E−15A
Channel Cc3
Sodium



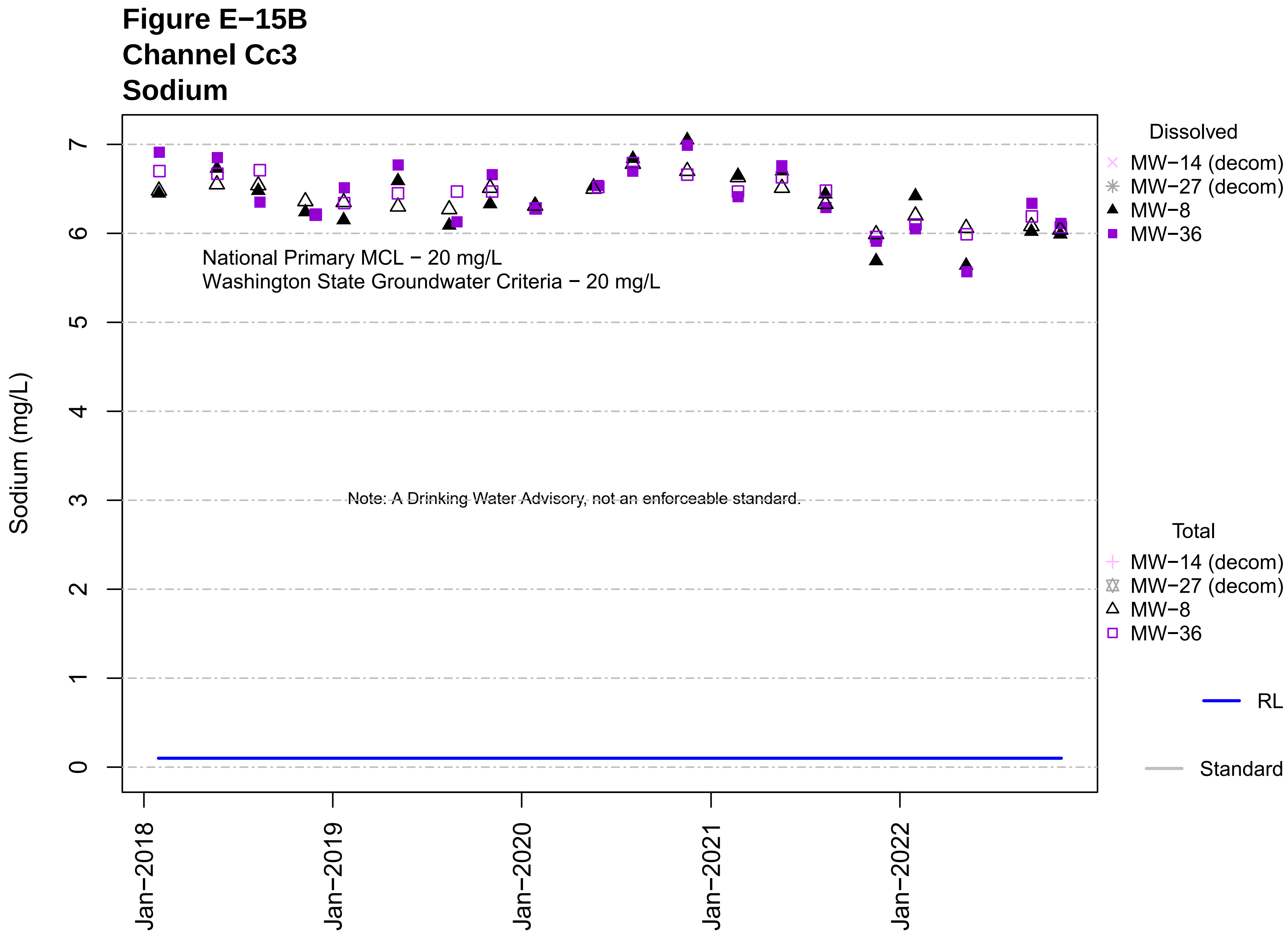


Figure E−15B
Channel Cc3
Sodium
Sodium (mg/L)
0
1
2
3
4
5
6
7
National Primary MCL − 20 mg/L
Washington State Groundwater Criteria − 20 mg/L
Note: A Drinking Water Advisory, not an enforceable standard.
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
Total
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

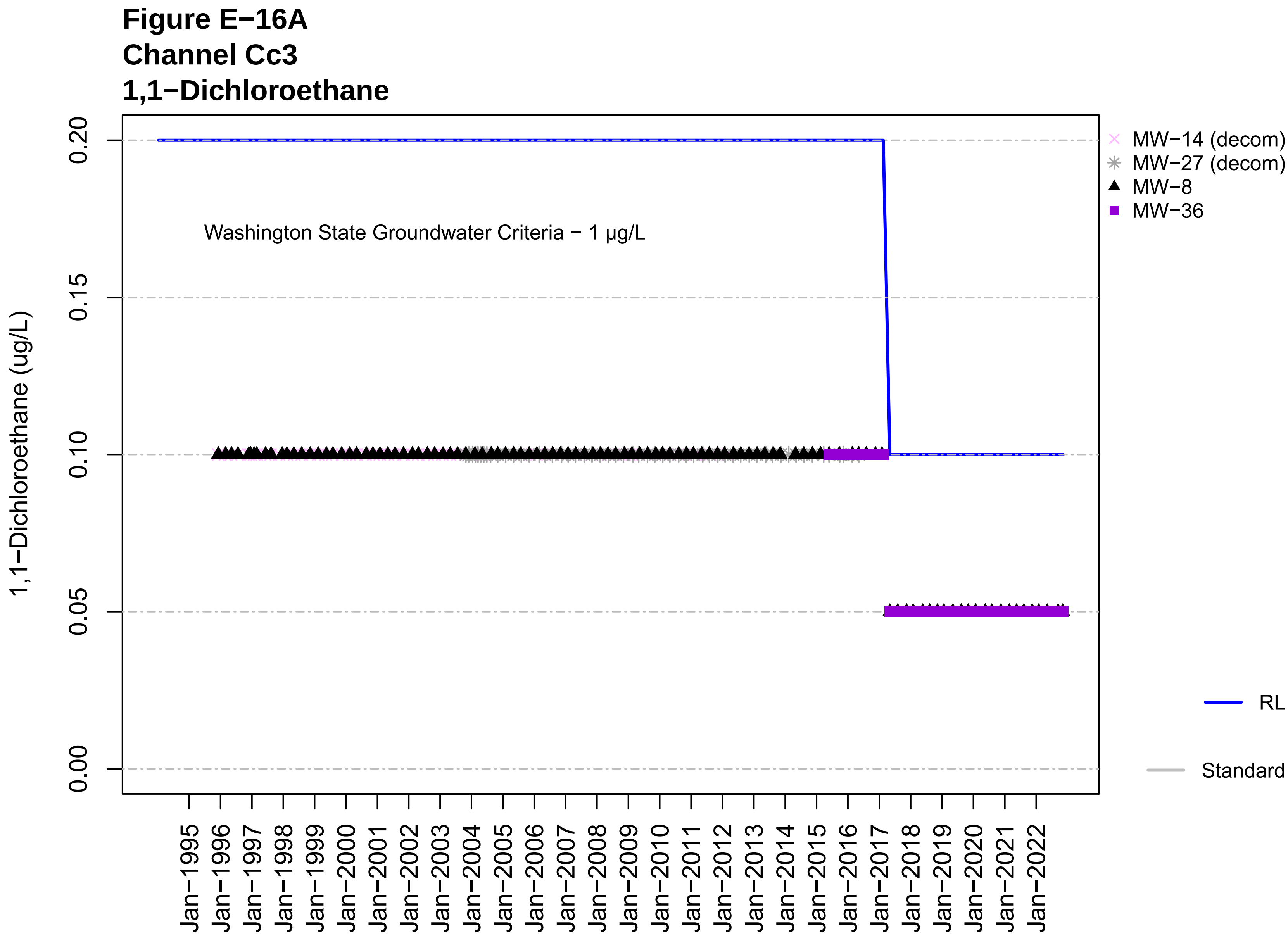


Figure E−16A
Channel Cc3
1,1−Dichloroethane
Washington State Groundwater Criteria − 1 µg/L
1,1−Dichloroethane (ug/L)
0.00
0.05
0.10
0.15
0.20
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

Figure E−16B
Channel Cc3
1,1−Dichloroethane

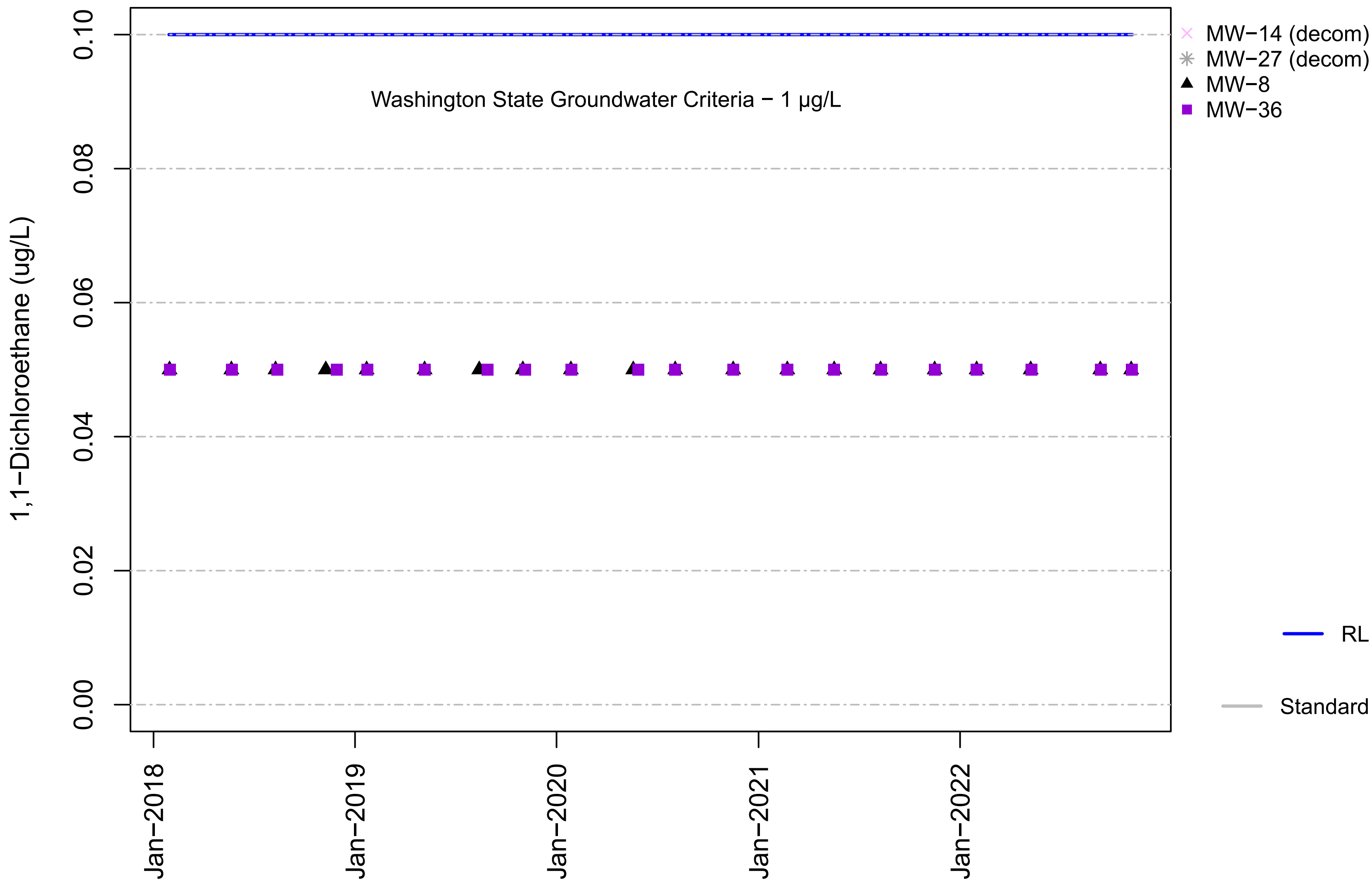


Figure E−17A
Channel Cc3
1,2−Dichloropropane

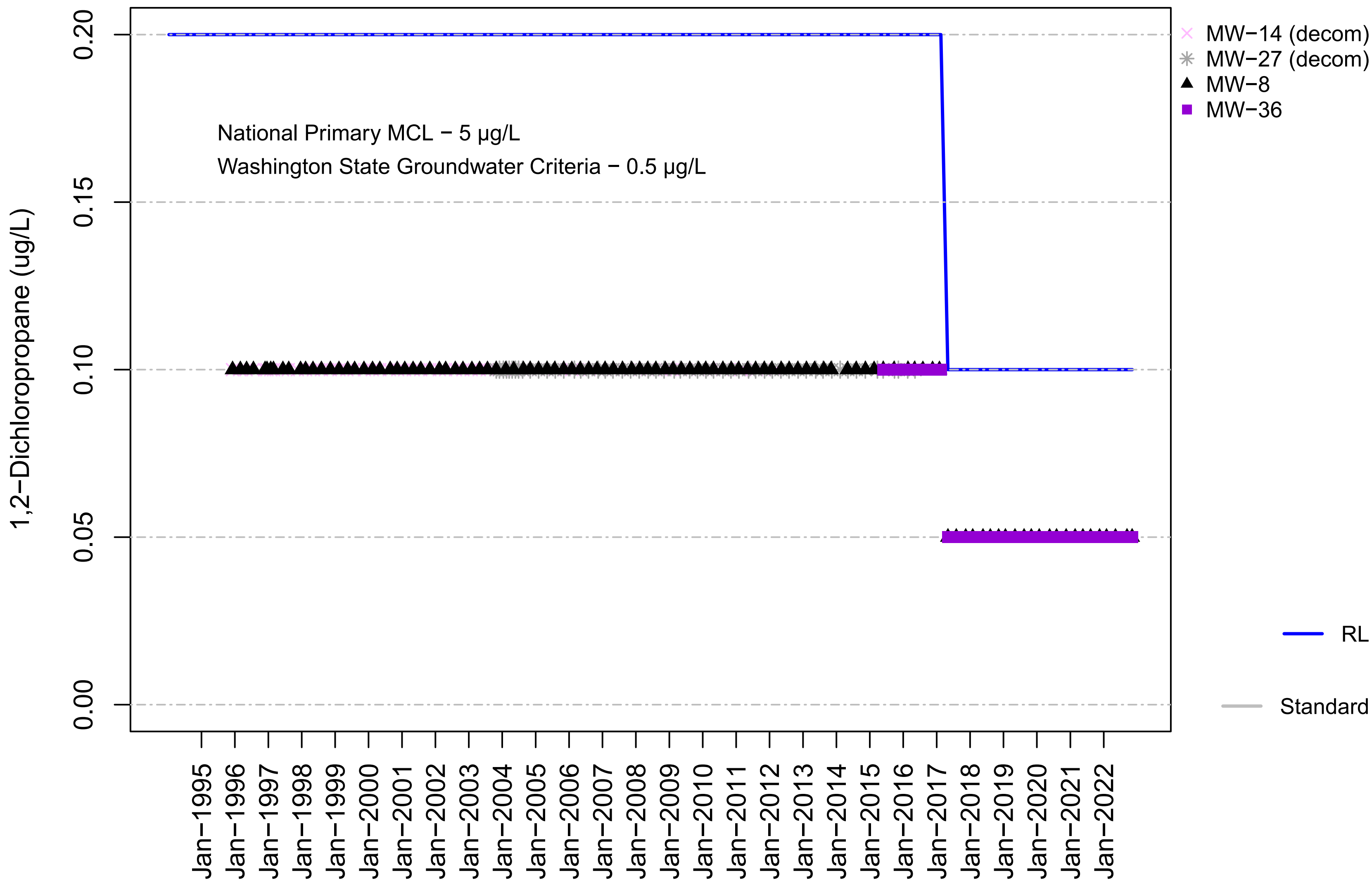


Figure E−17B
Channel Cc3
1,2−Dichloropropane

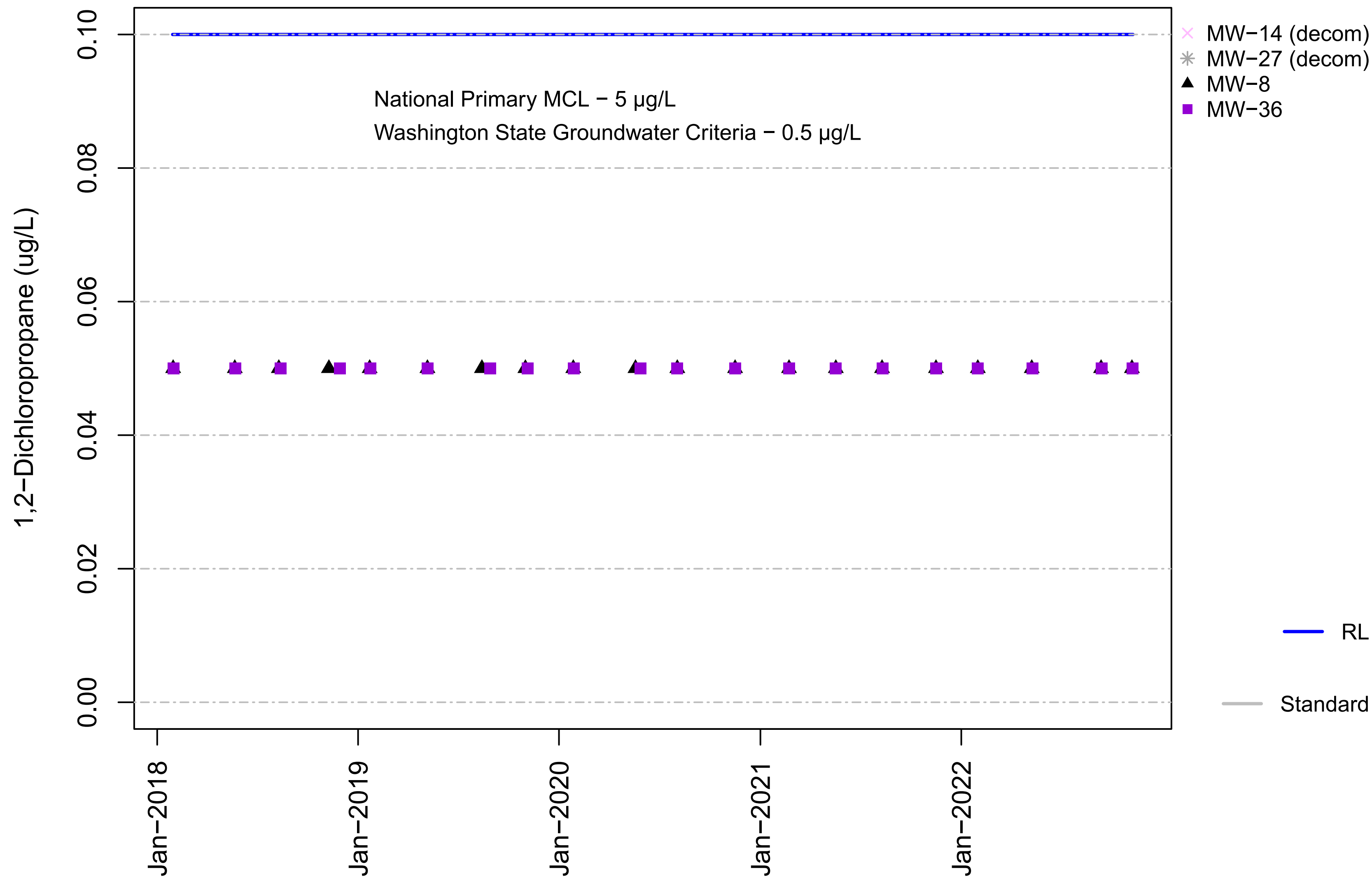


Figure E−18A
Channel Cc3
Benzene

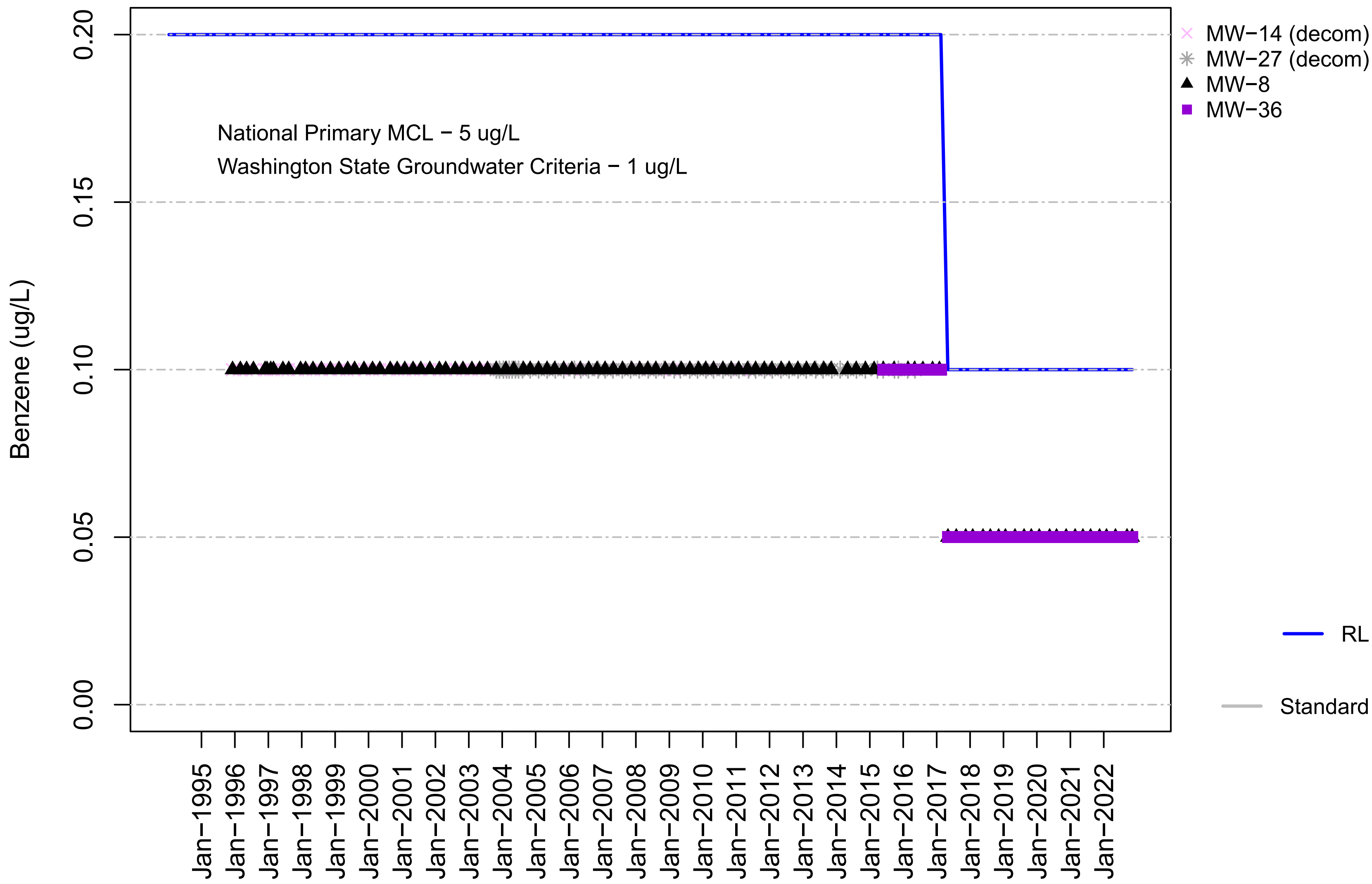


Figure E−18B
Channel Cc3
Benzene

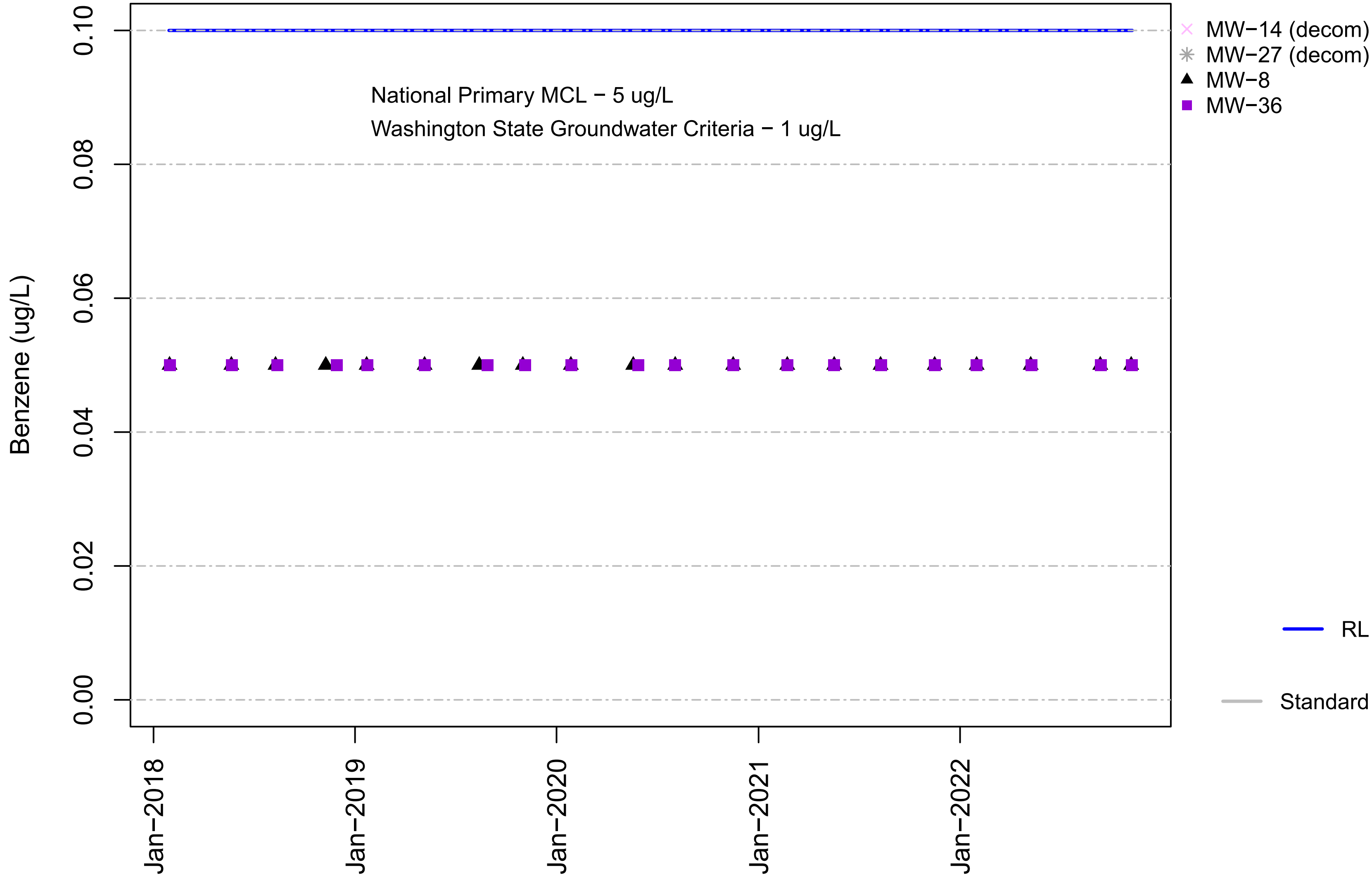


Figure E−19A
Channel Cc3
Chloroethane

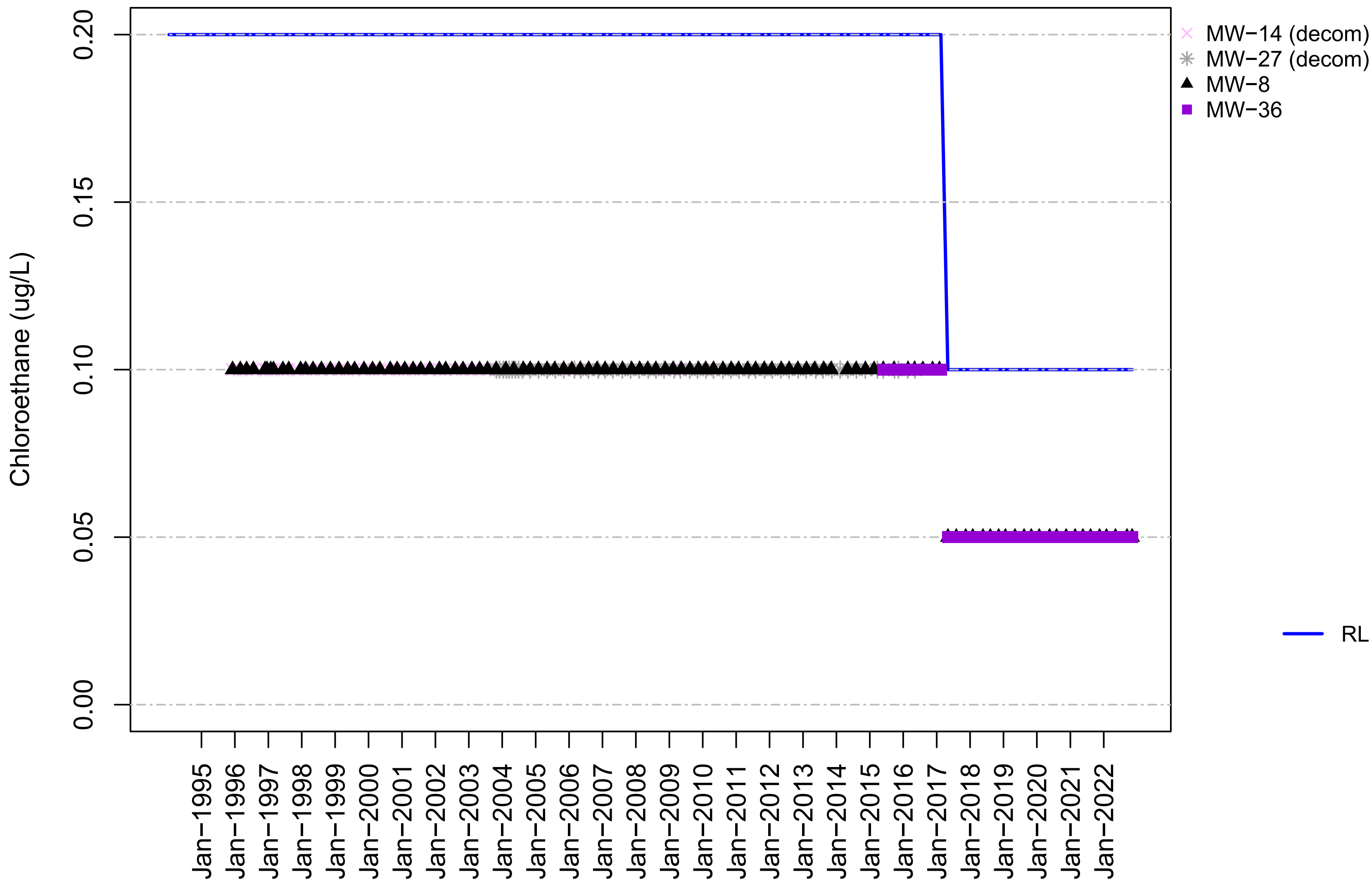


Figure E−19B
Channel Cc3
Chloroethane

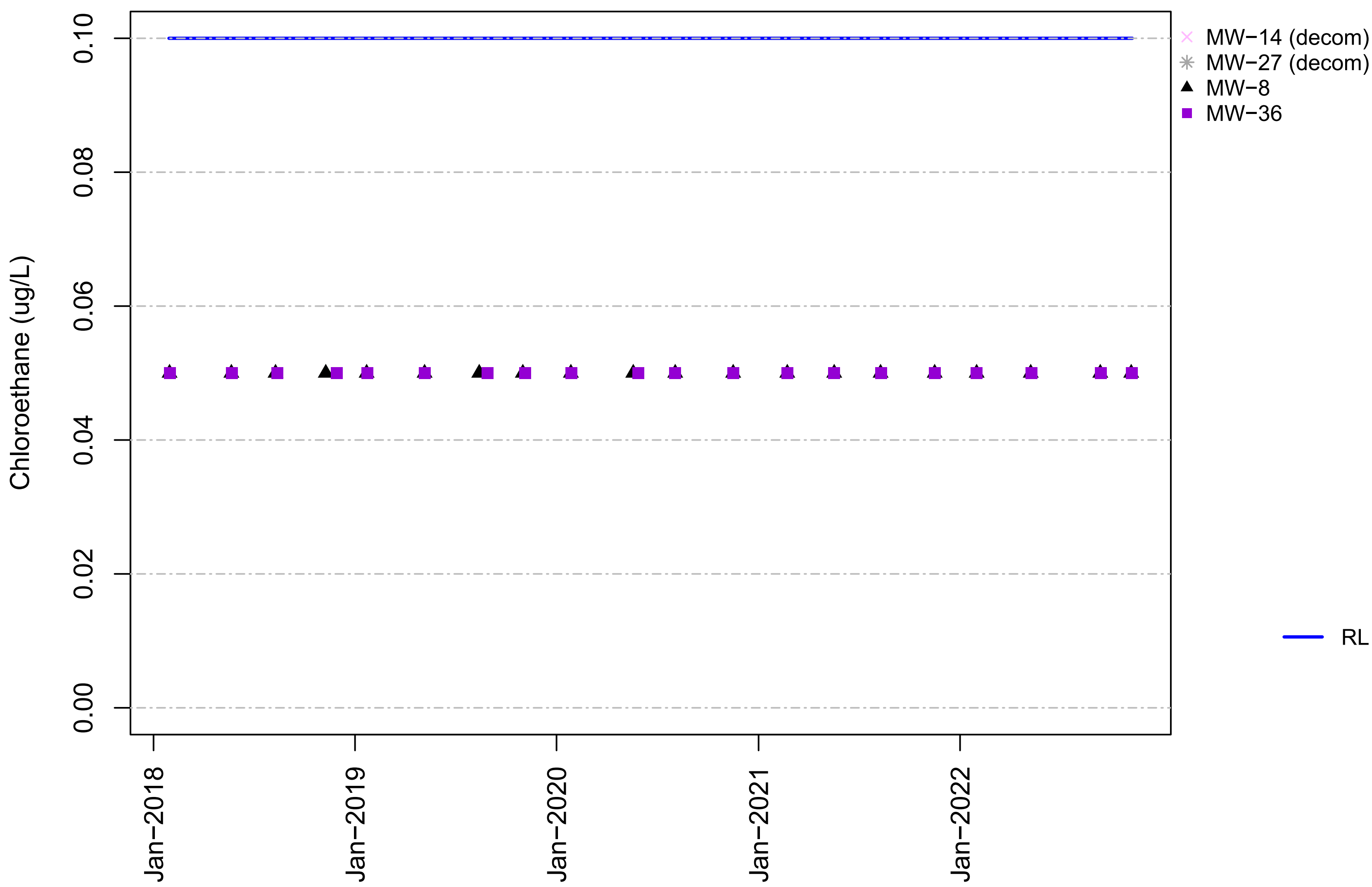


Figure E−20A
Channel Cc3
cis−1,2−Dichloroethene

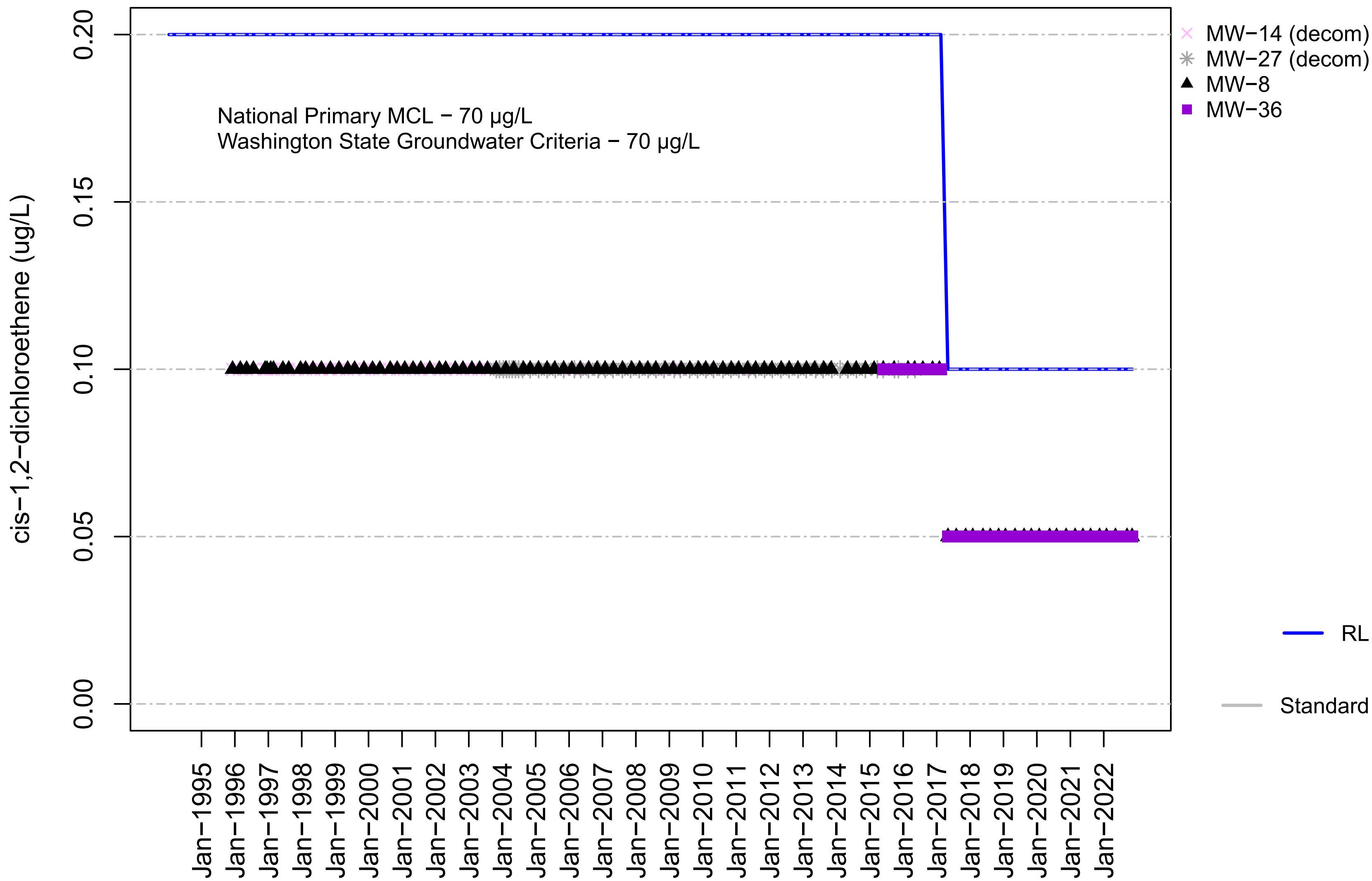


Figure E−20B
Channel Cc3
cis−1,2−Dichloroethene

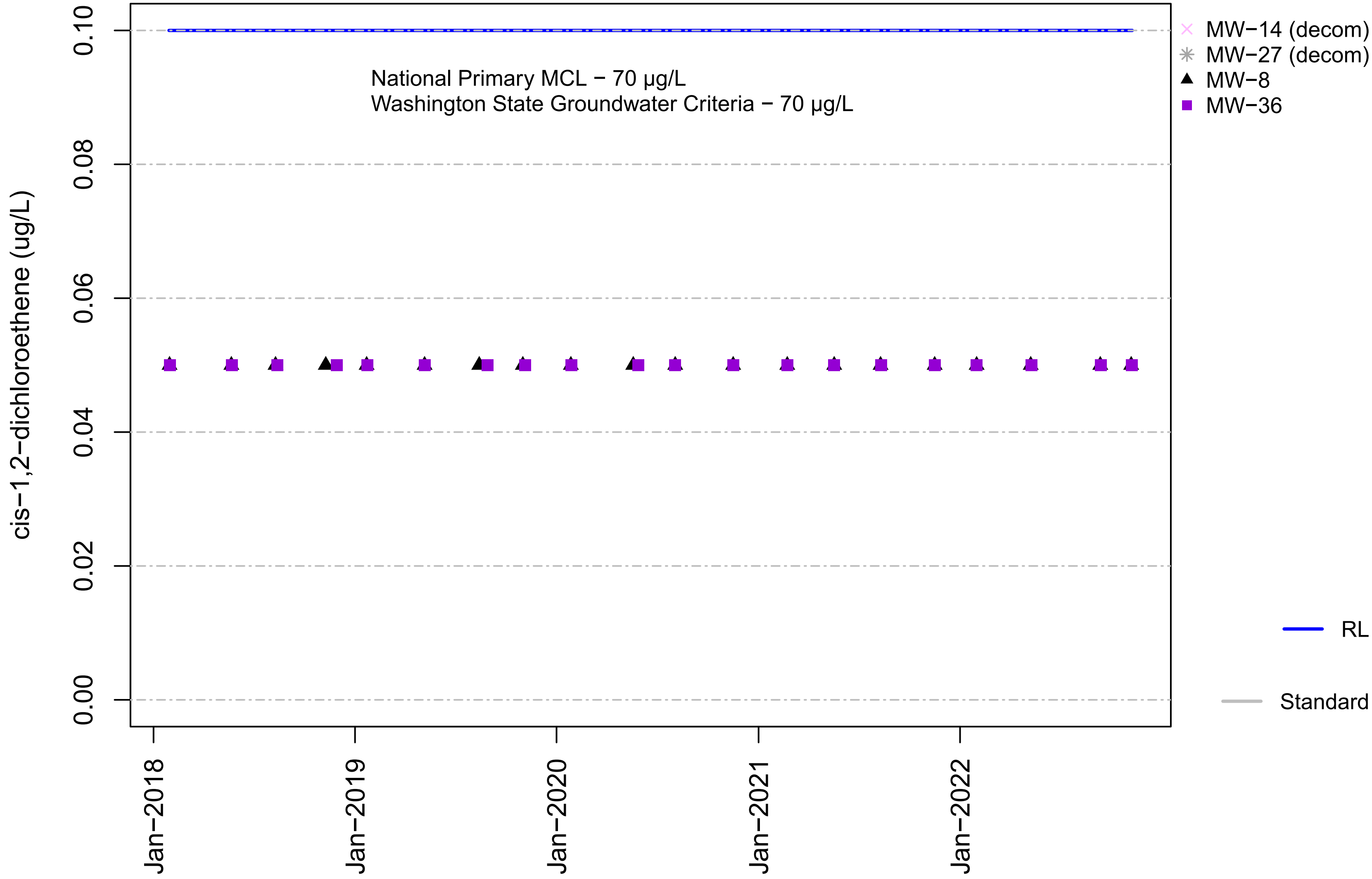


Figure E−21A
Channel Cc3
Dichlorodifluoromethane

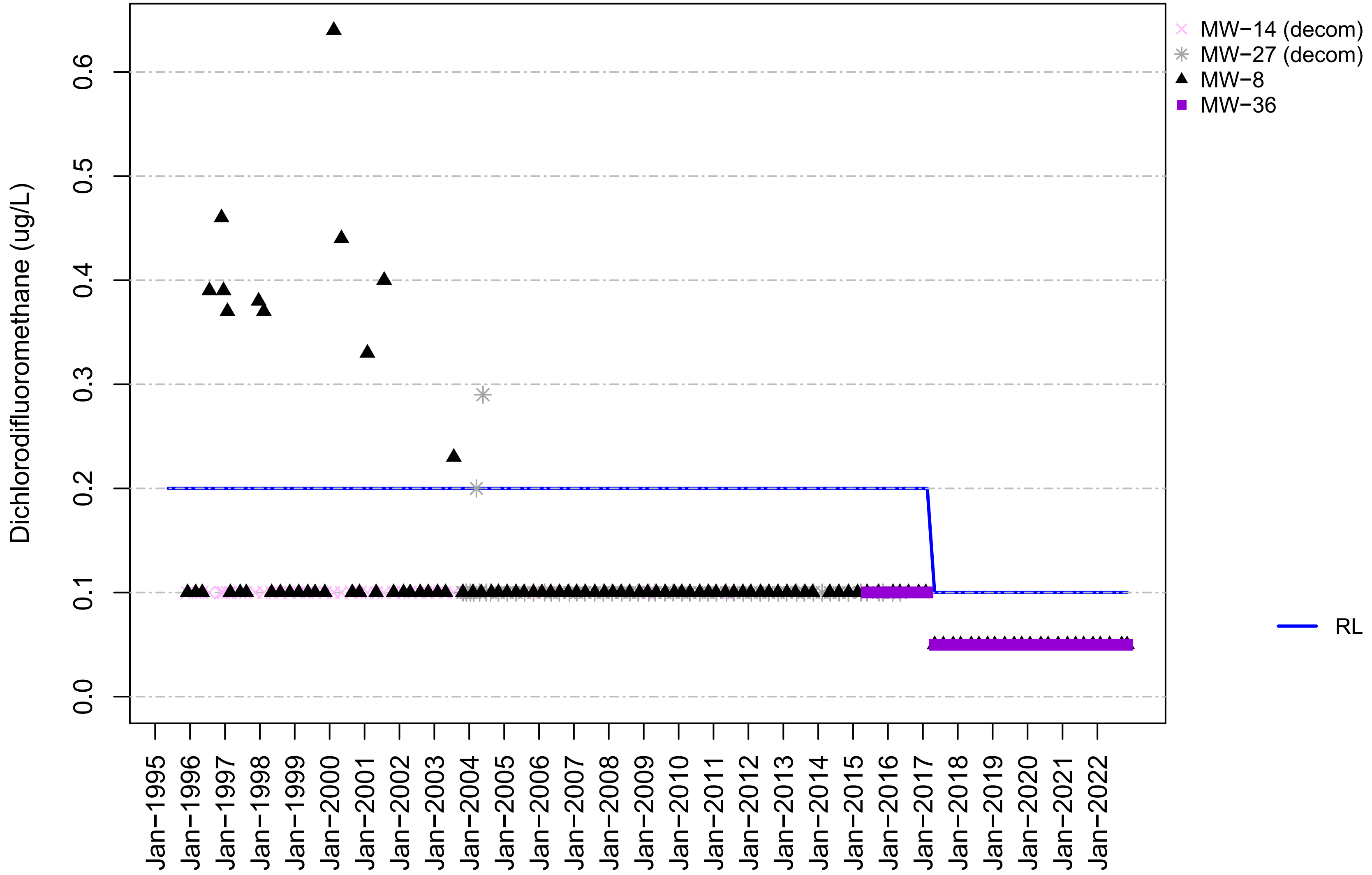


Figure E−21B
Channel Cc3
Dichlorodifluoromethane

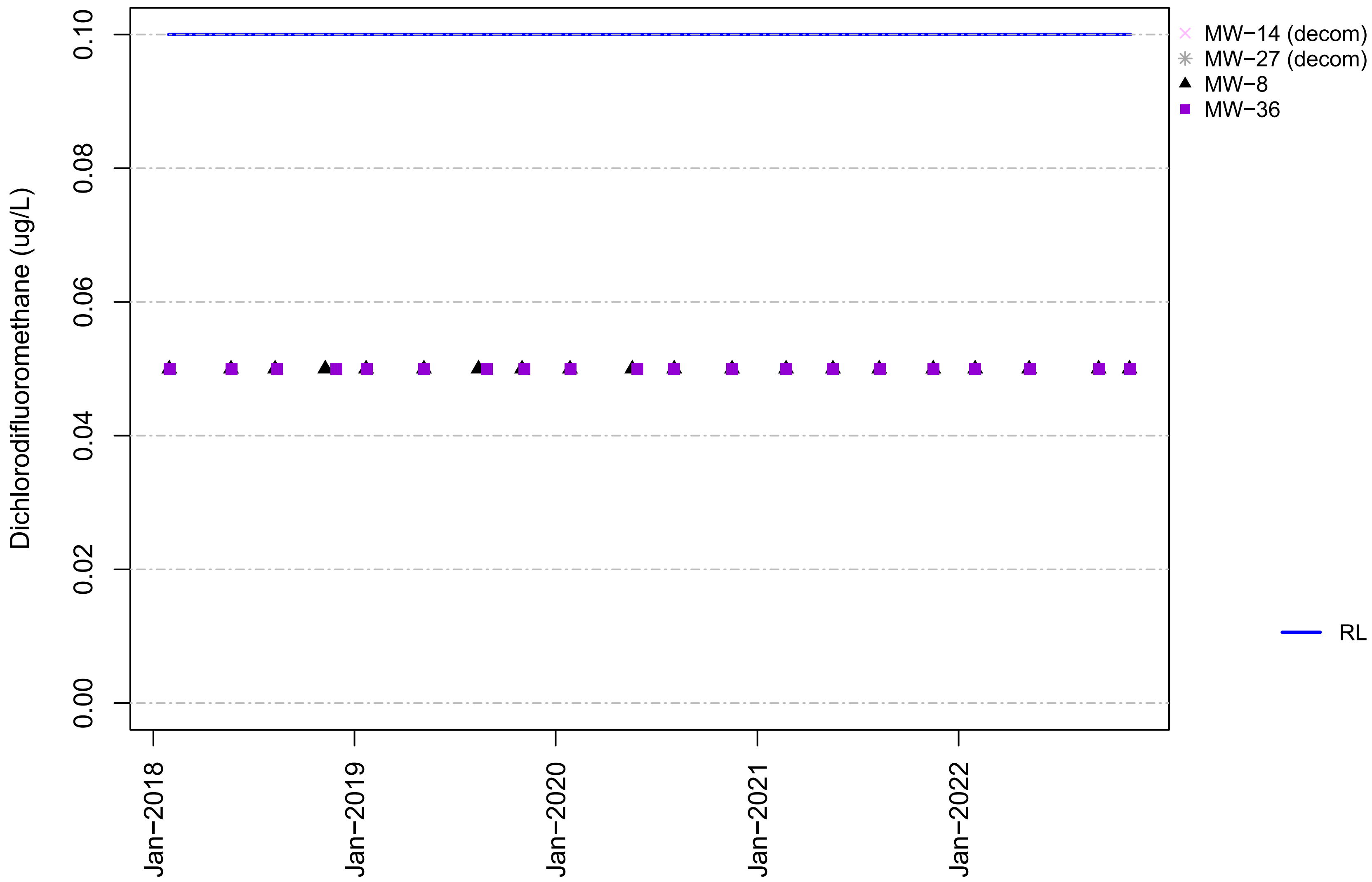
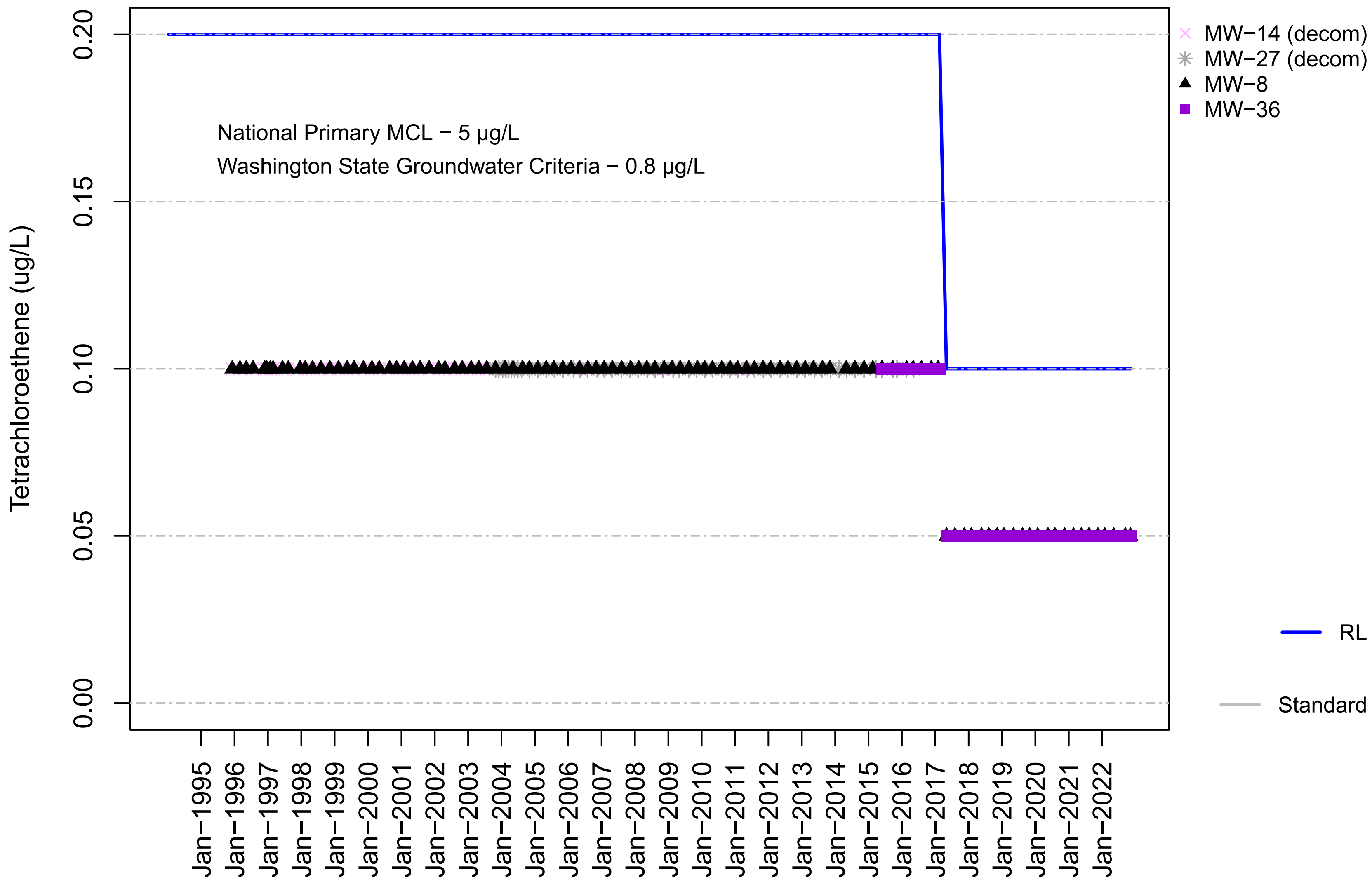


Figure E−22A
Channel Cc3
Tetrachloroethene



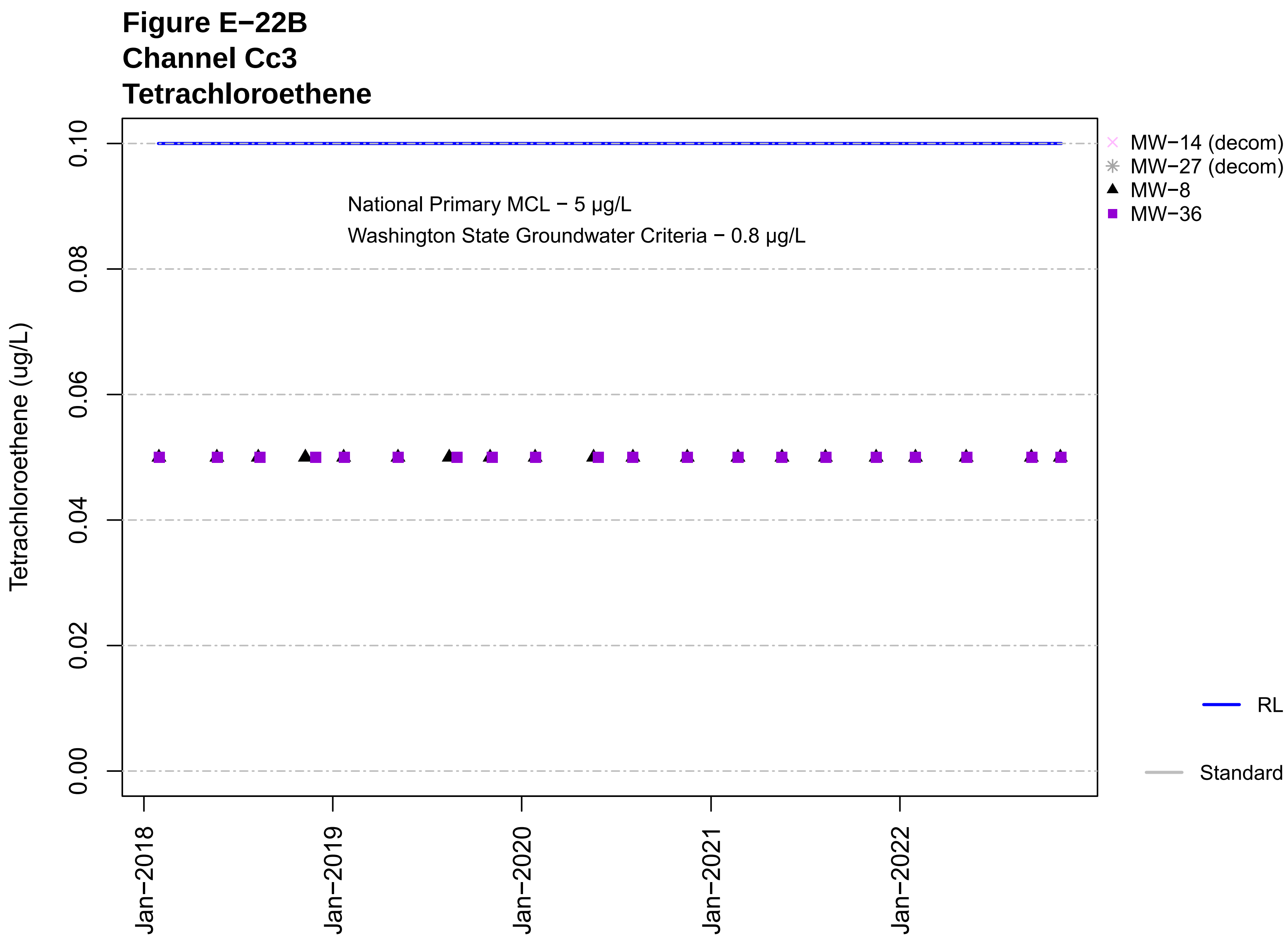


Figure E−22B
Channel Cc3
Tetrachloroethene
Tetrachloroethene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.8 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022

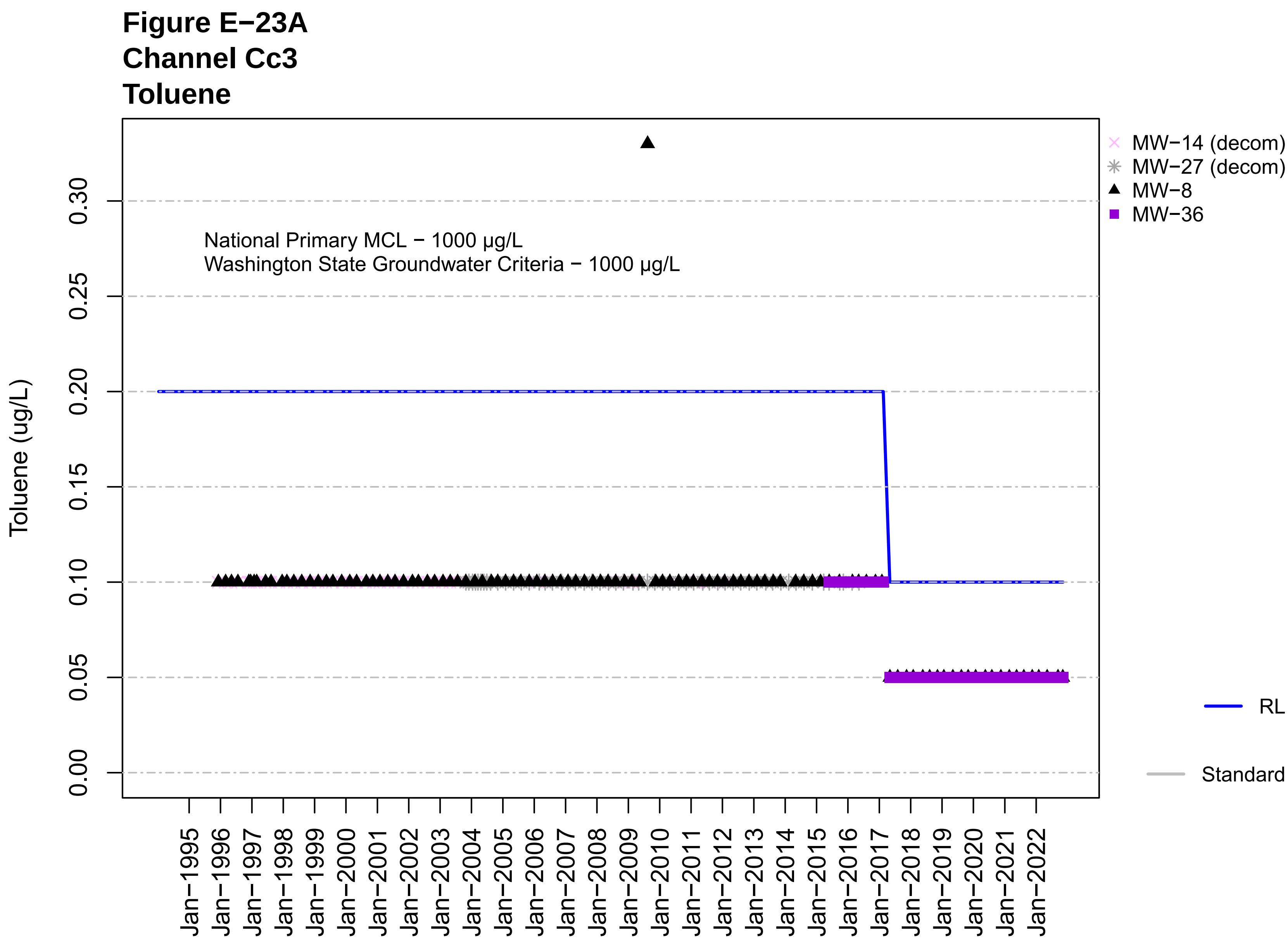


Figure E−23A
Channel Cc3
Toluene
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Toluene (ug/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

Figure E−23B
Channel Cc3
Toluene

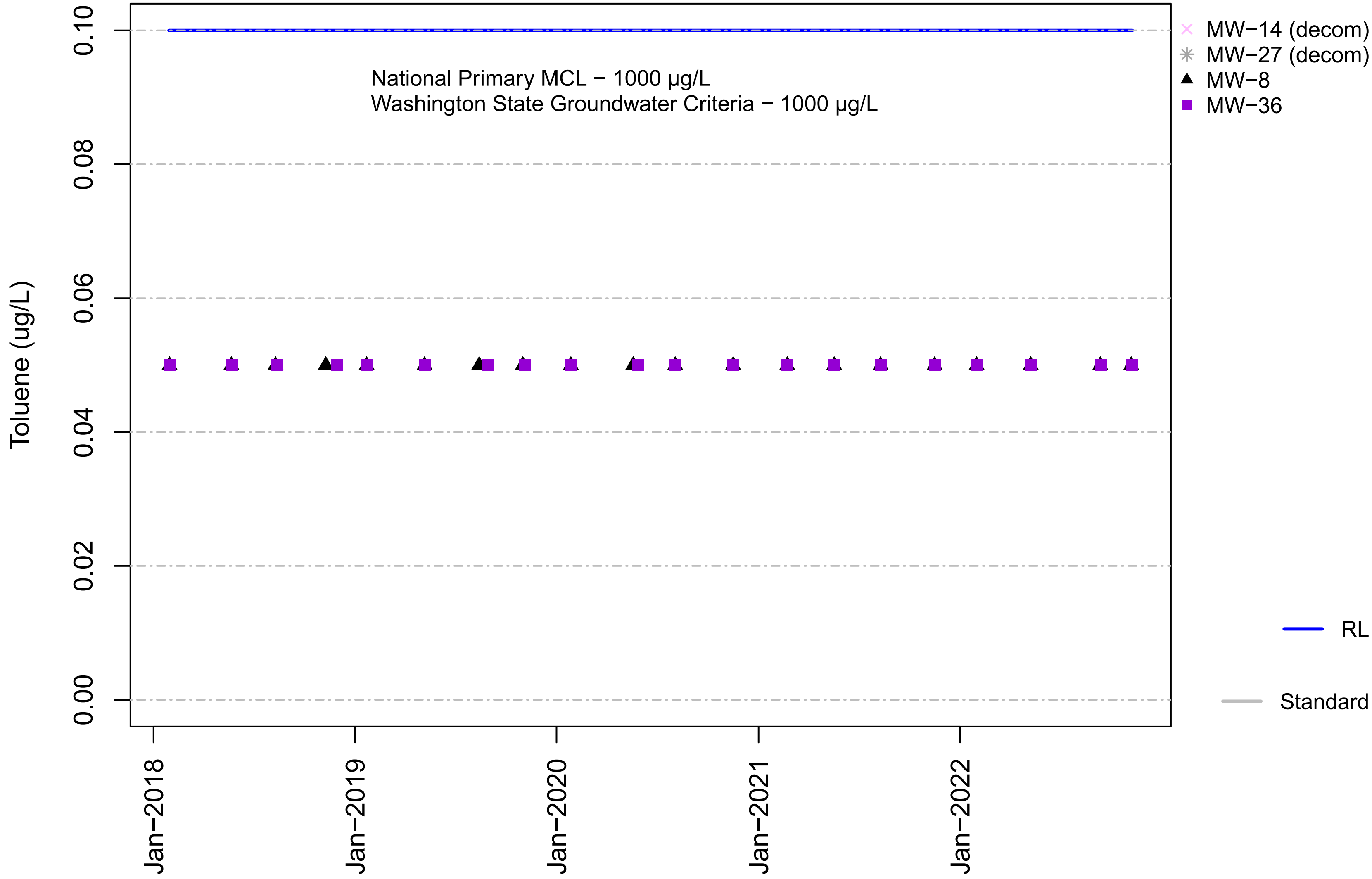
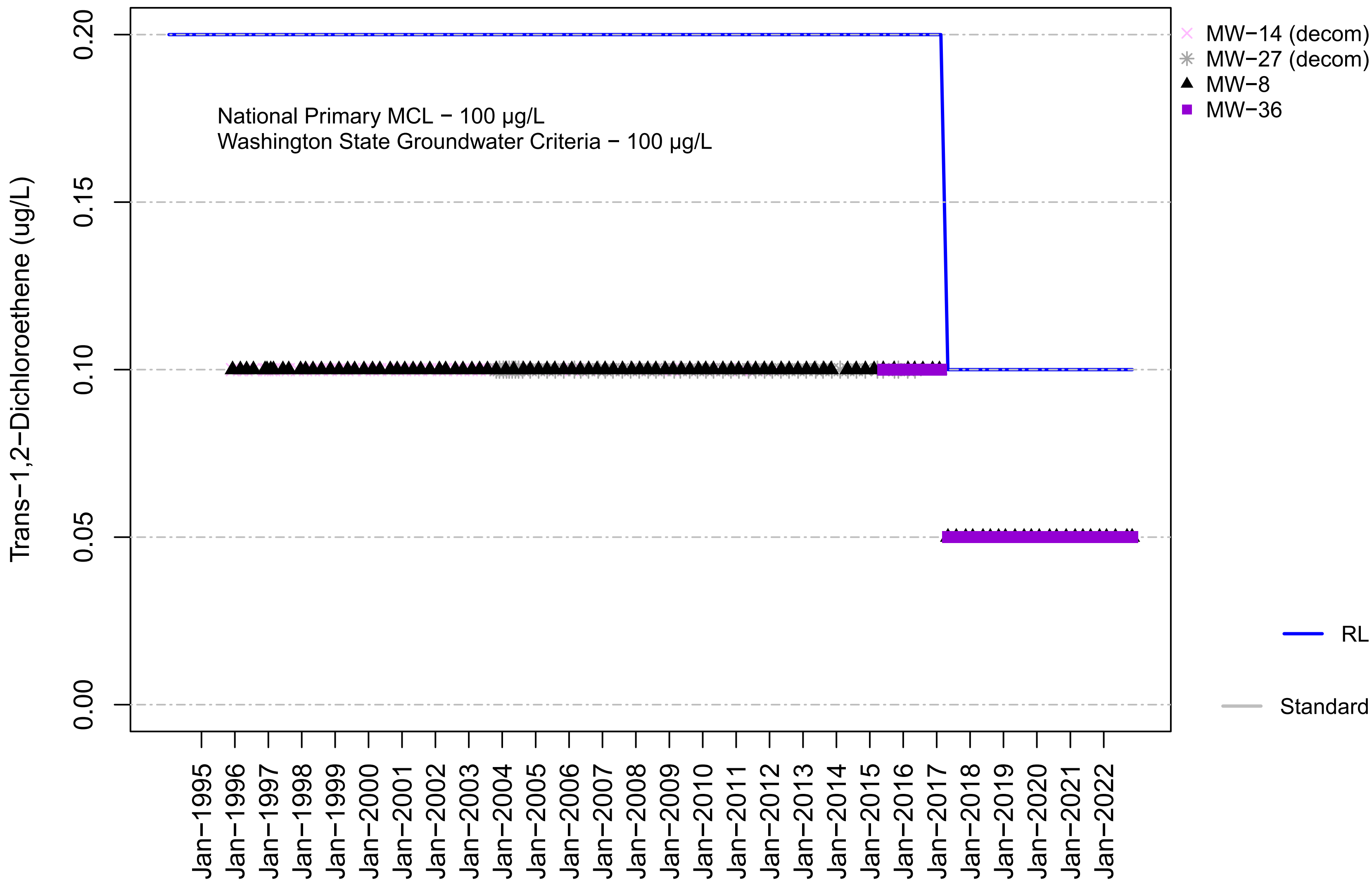


Figure E−24A
Channel Cc3
Trans−1,2−Dichloroethene



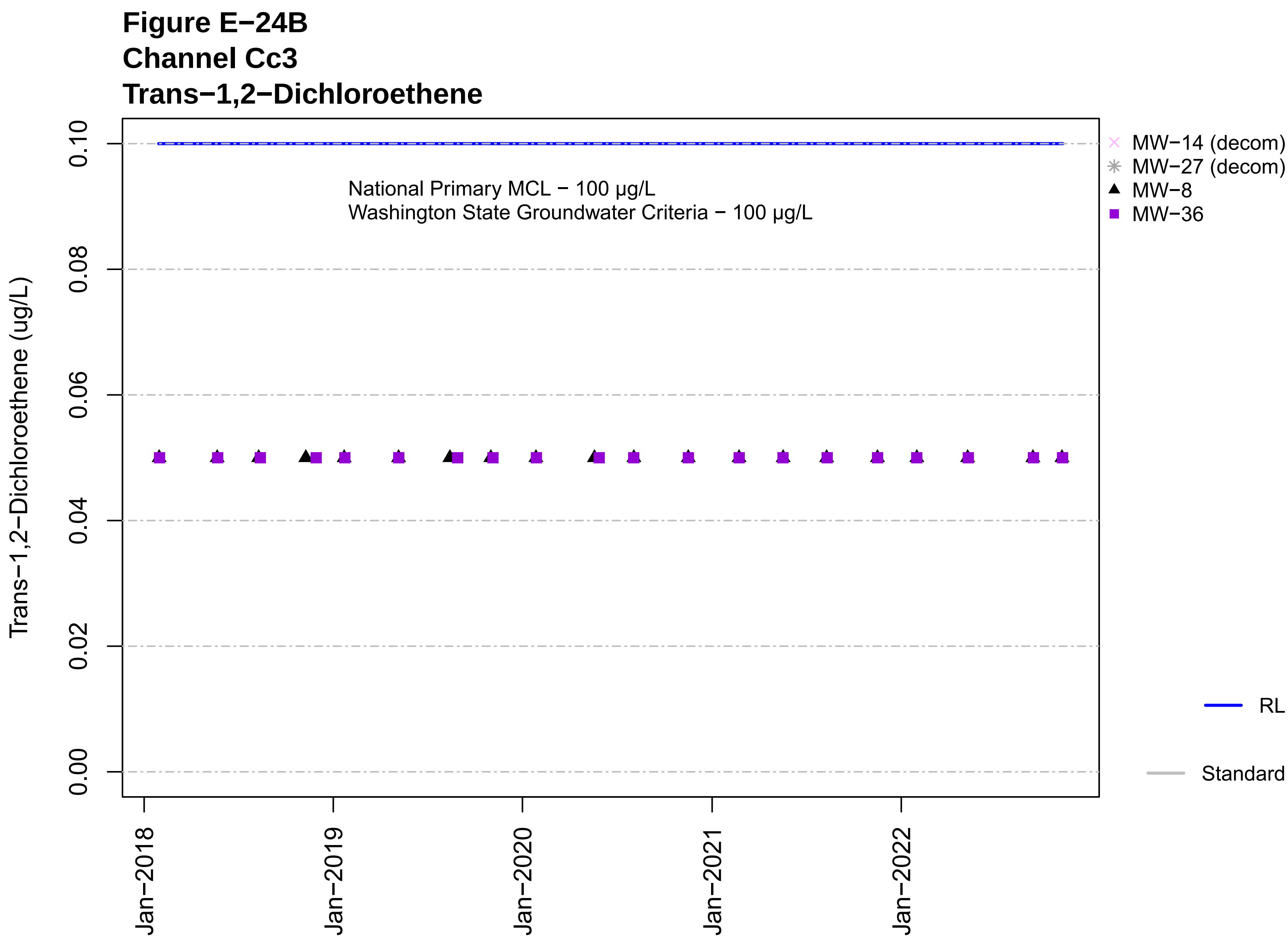


Figure E−24B
Channel Cc3
Trans−1,2−Dichloroethene
National Primary MCL − 100 µg/L
Washington State Groundwater Criteria − 100 µg/L
Trans−1,2−Dichloroethene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard

Figure E−25A
Channel Cc3
Trichloroethene

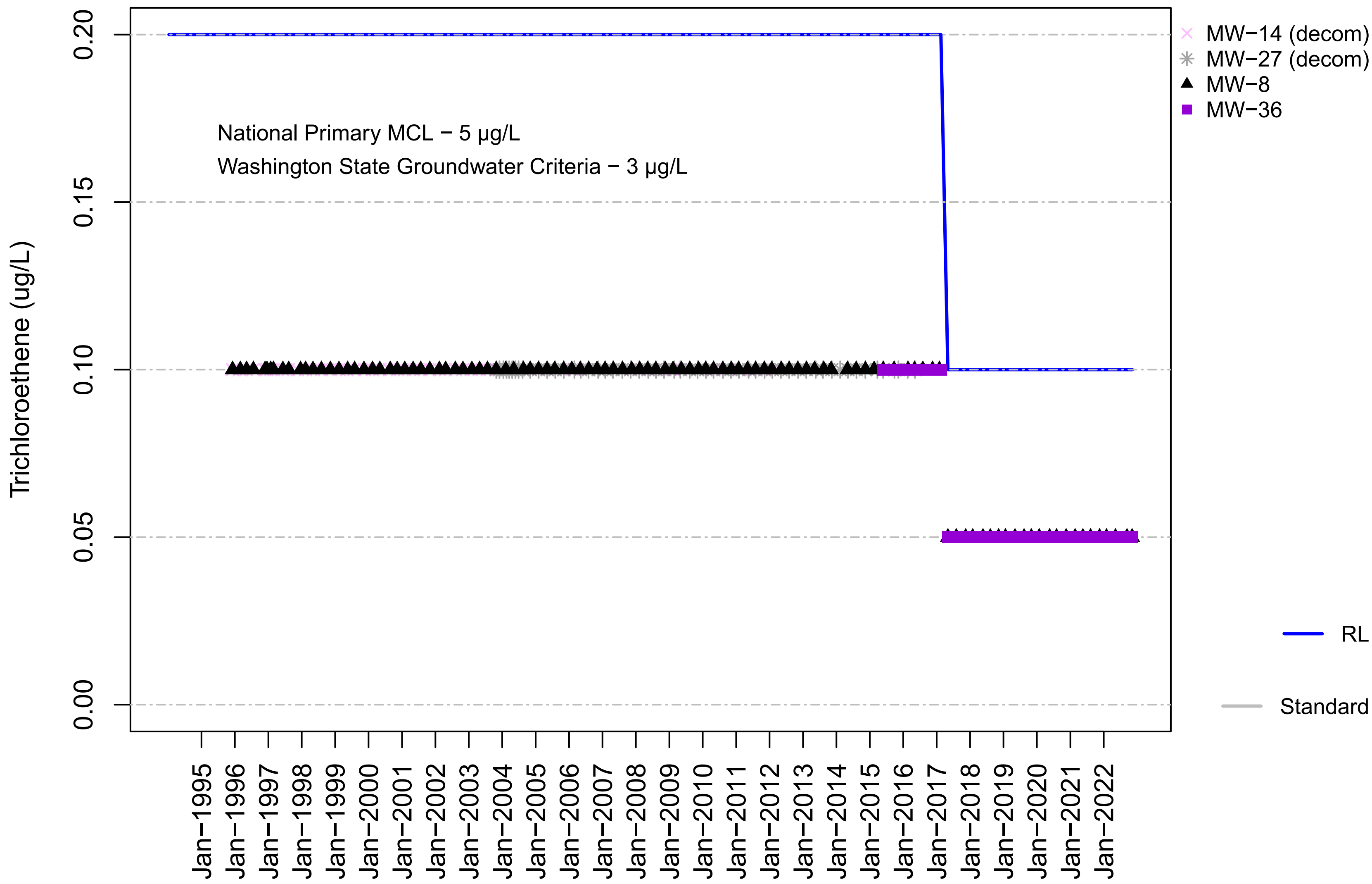


Figure E−25B
Channel Cc3
Trichloroethene

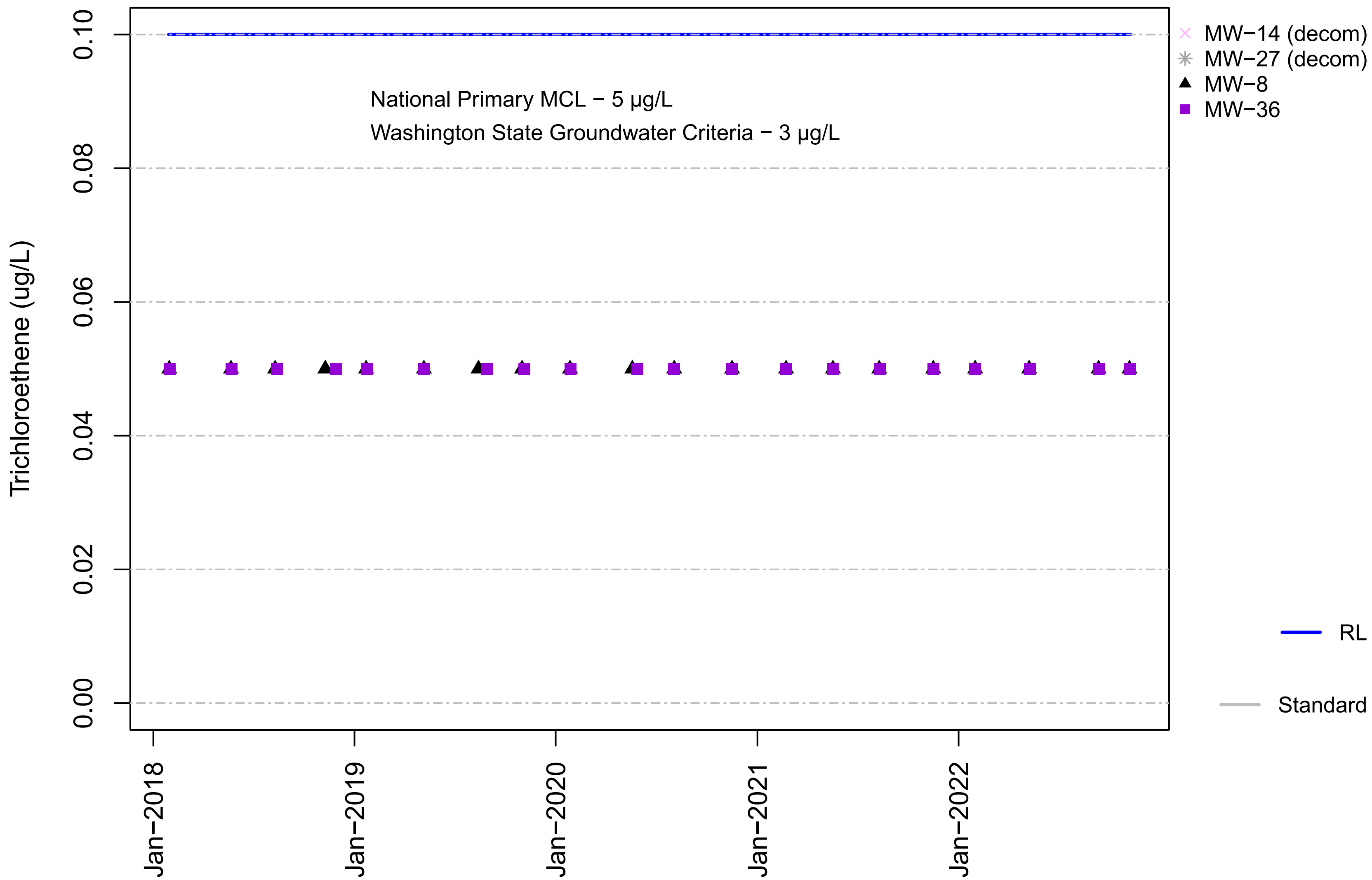


Figure E−26A
Channel Cc3
Trichlorofluoromethane

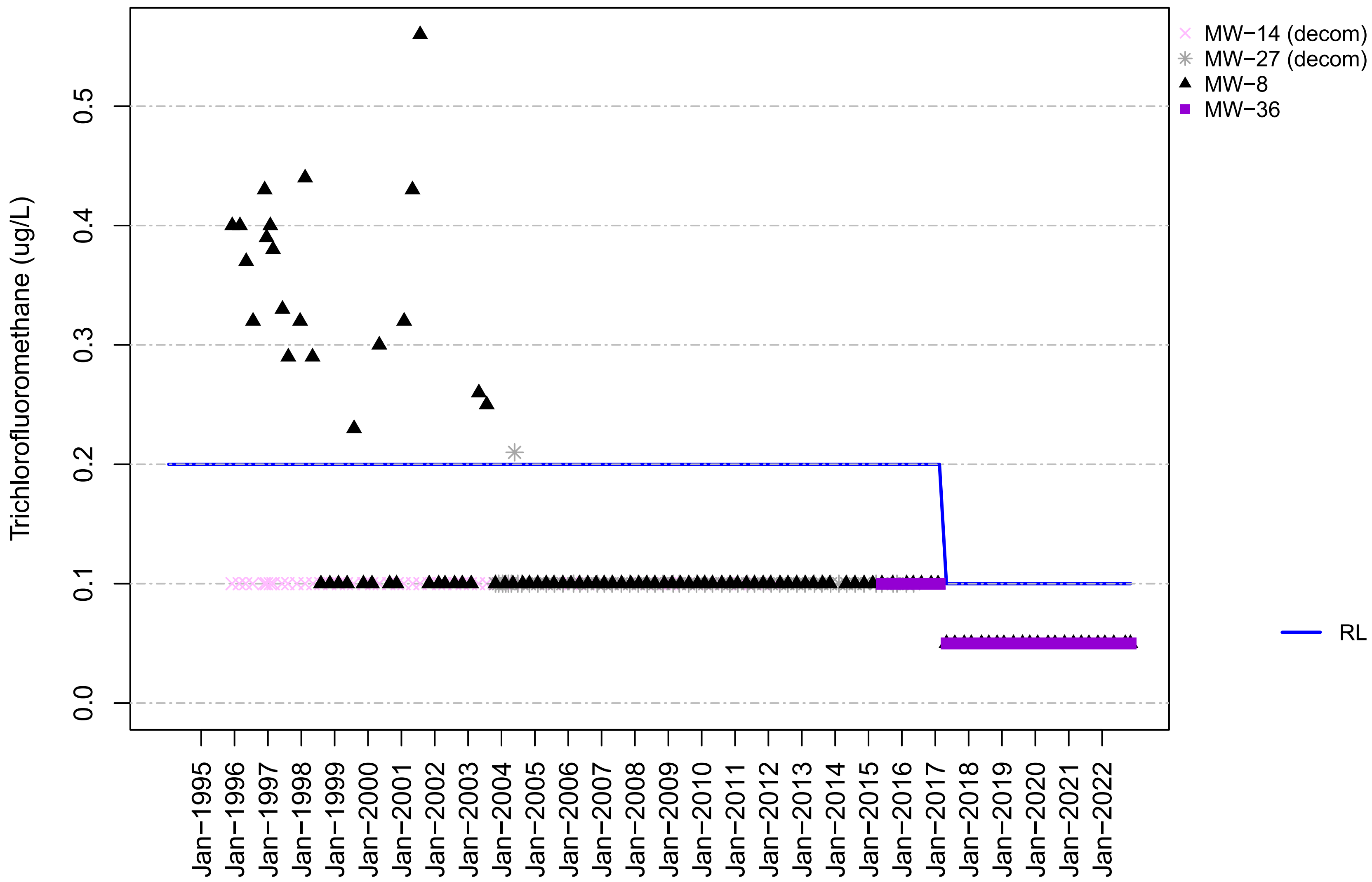
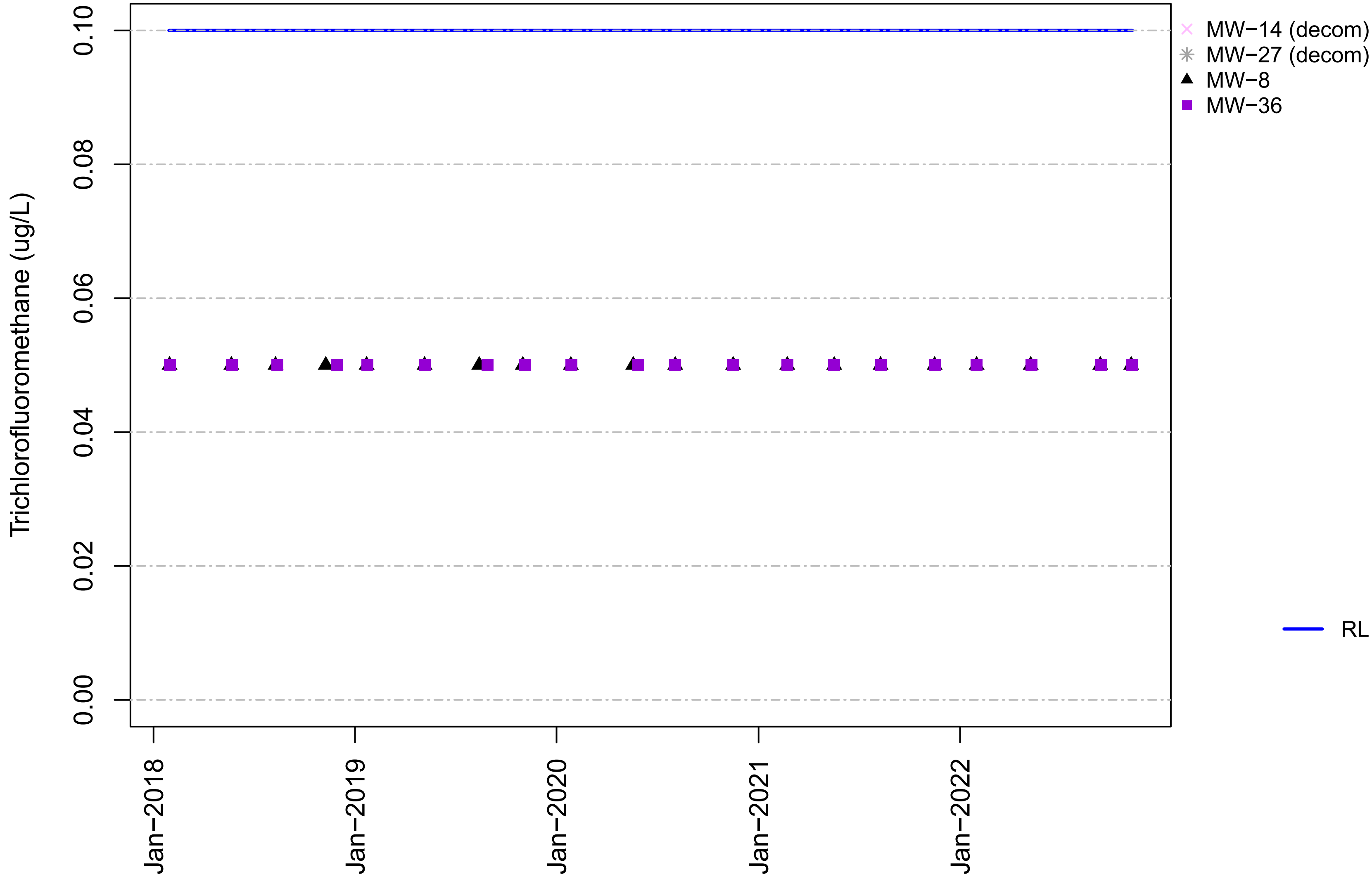


Figure E−26B
Channel Cc3
Trichlorofluoromethane



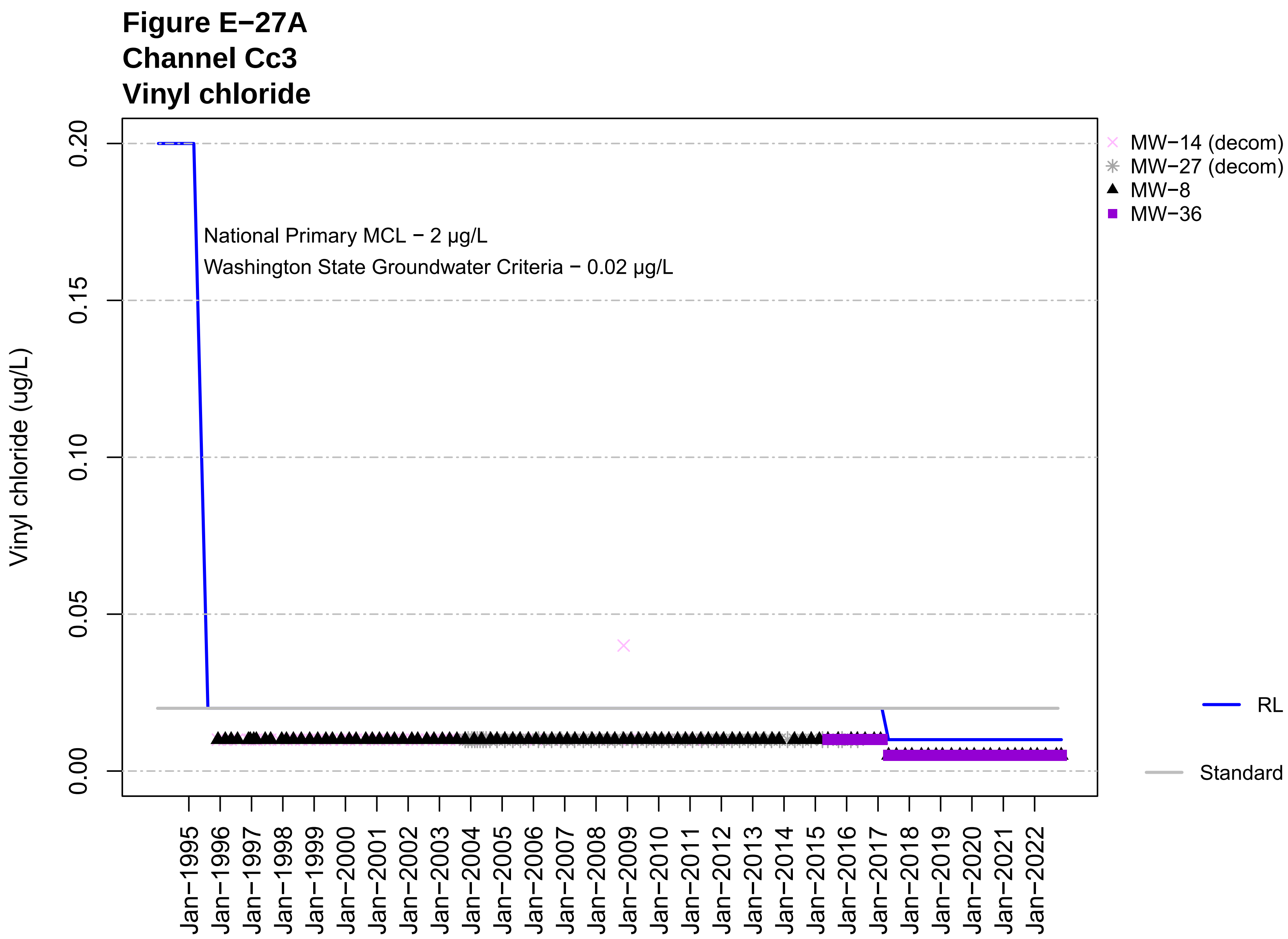
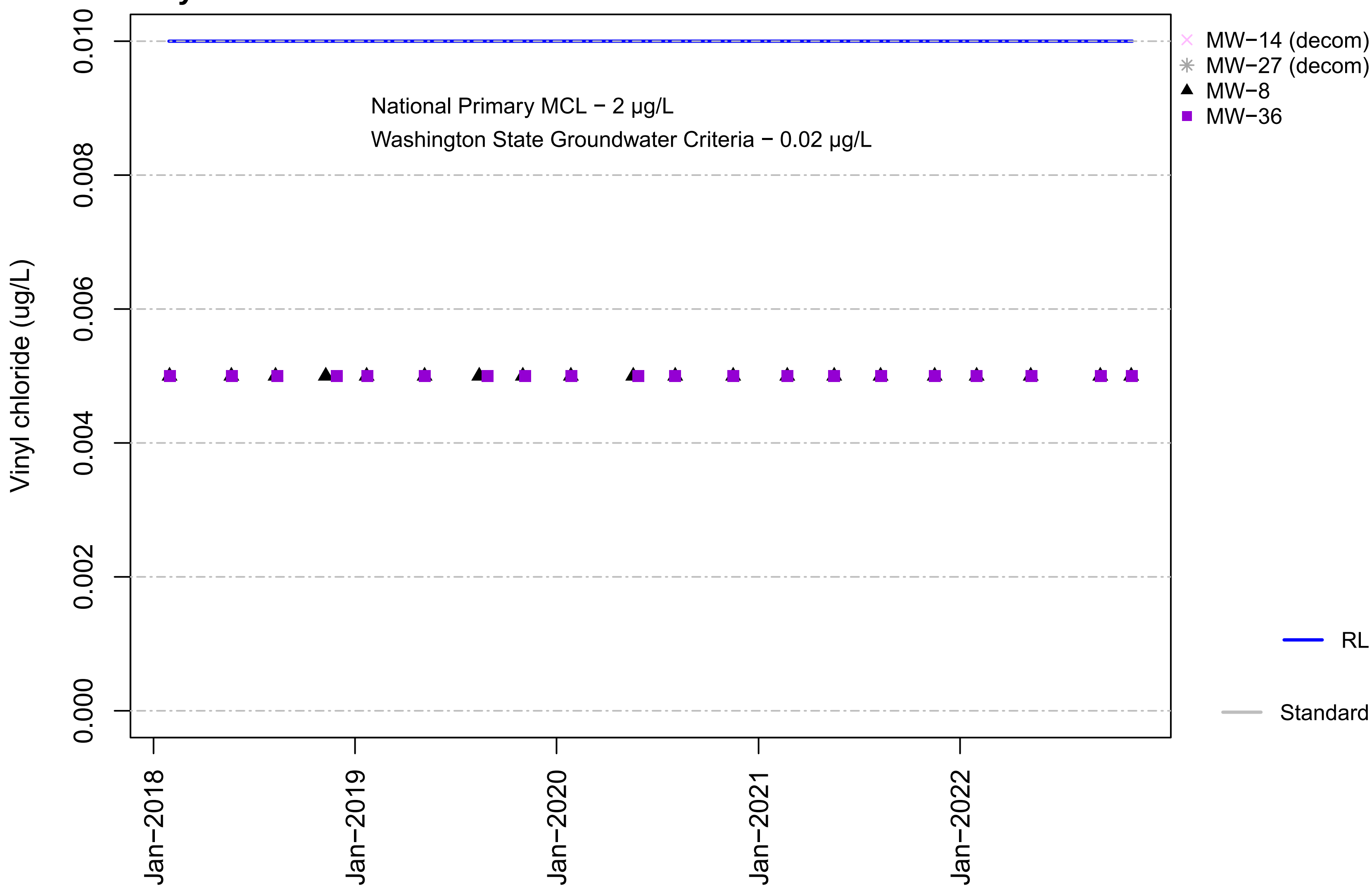


Figure E−27A
Channel Cc3
Vinyl chloride
Vinyl chloride (ug/L)
0.20
0.15
0.10
0.05
0.00
National Primary MCL − 2 µg/L
Washington State Groundwater Criteria − 0.02 µg/L
MW−14 (decom)
MW−27 (decom)
MW−8
MW−36
RL
Standard
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
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
Jan−2022

Figure E−27B
Channel Cc3
Vinyl chloride



Appendix F

Time Concentration Plots for
Groundwater in Unit D Aquifer

Figure F−1A
Unit D
Field pH

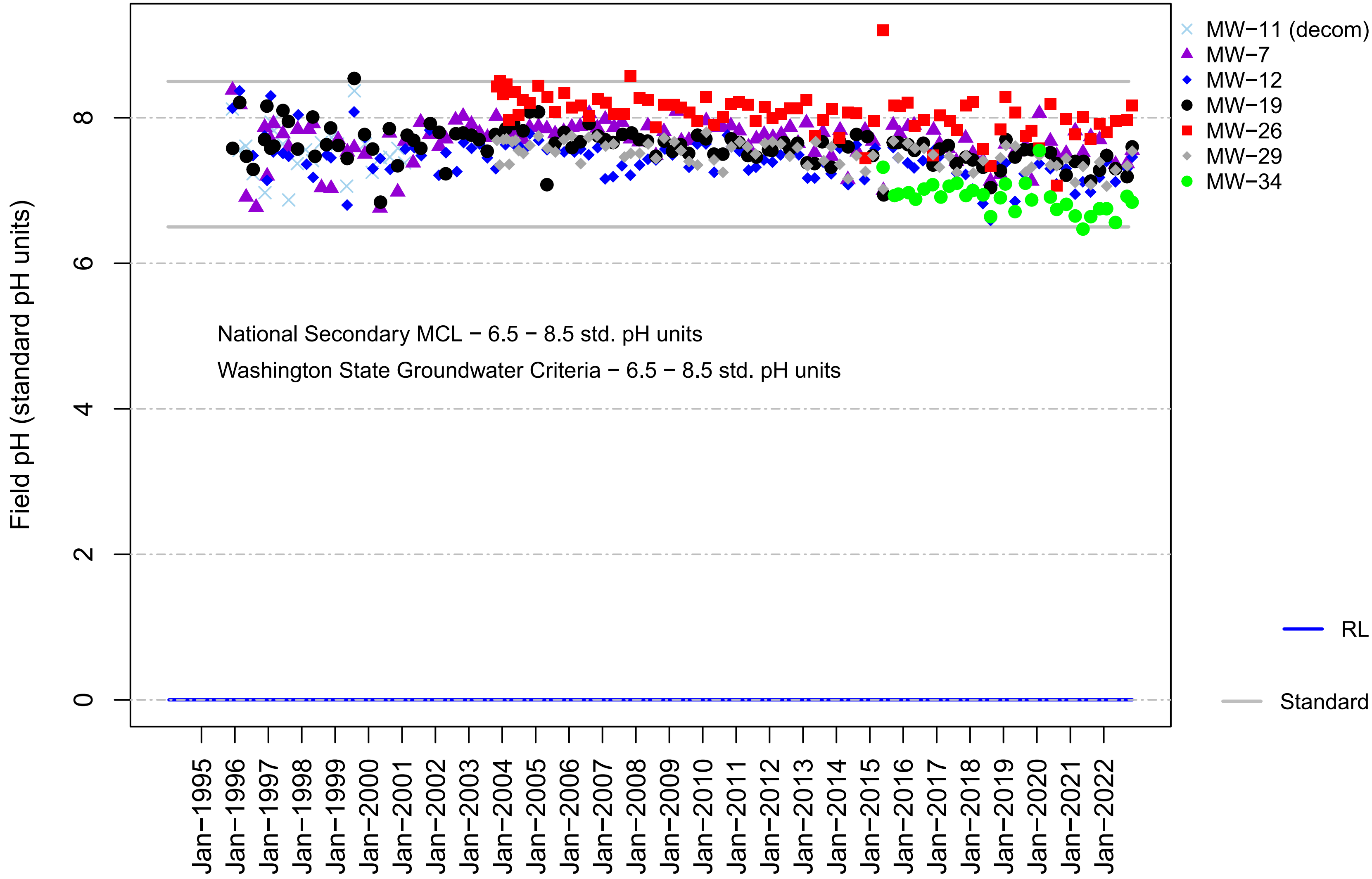


Figure F−1B
Unit D
Field pH

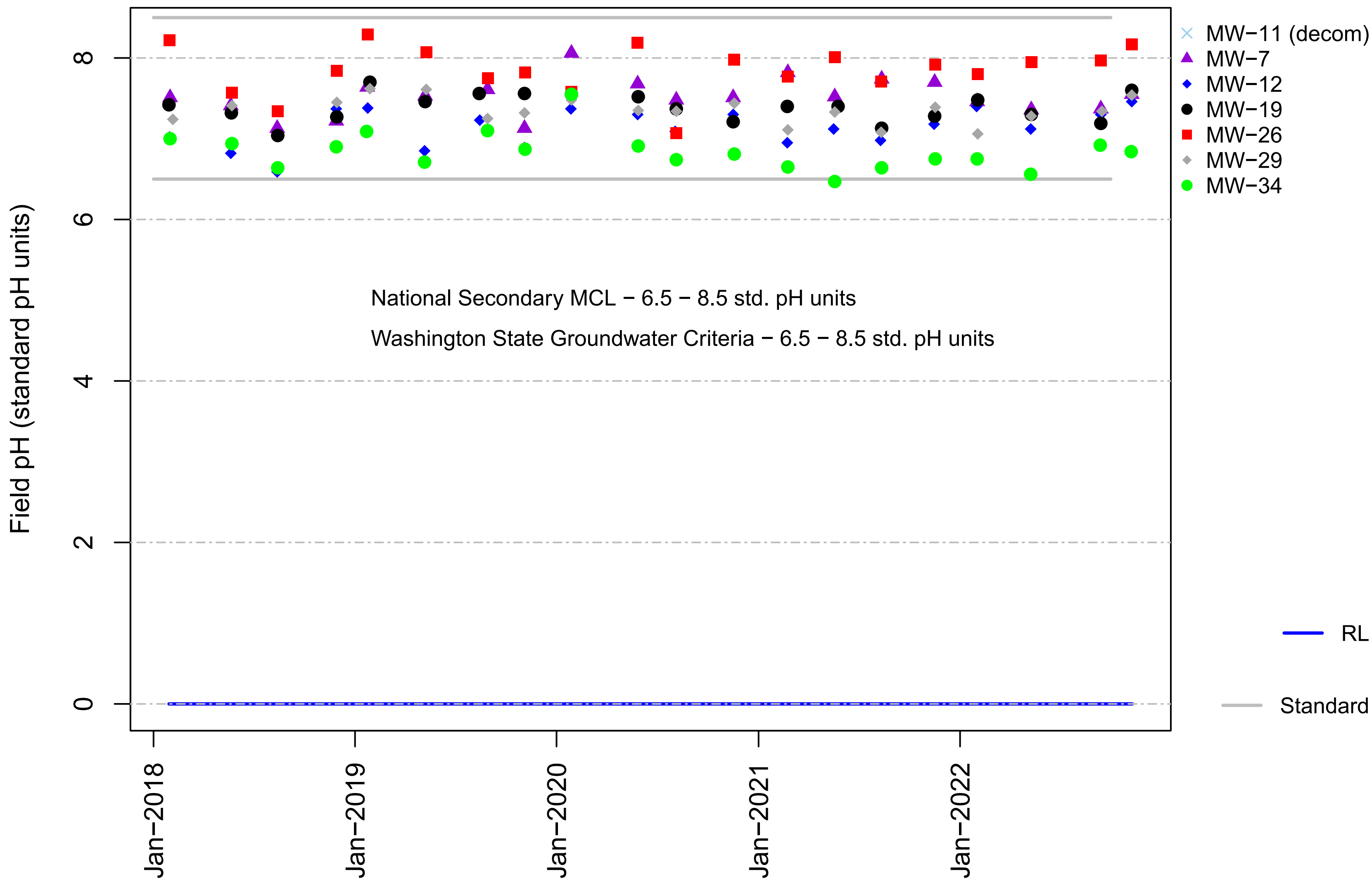


Figure F−2A
Unit D
Field Specific Conductance

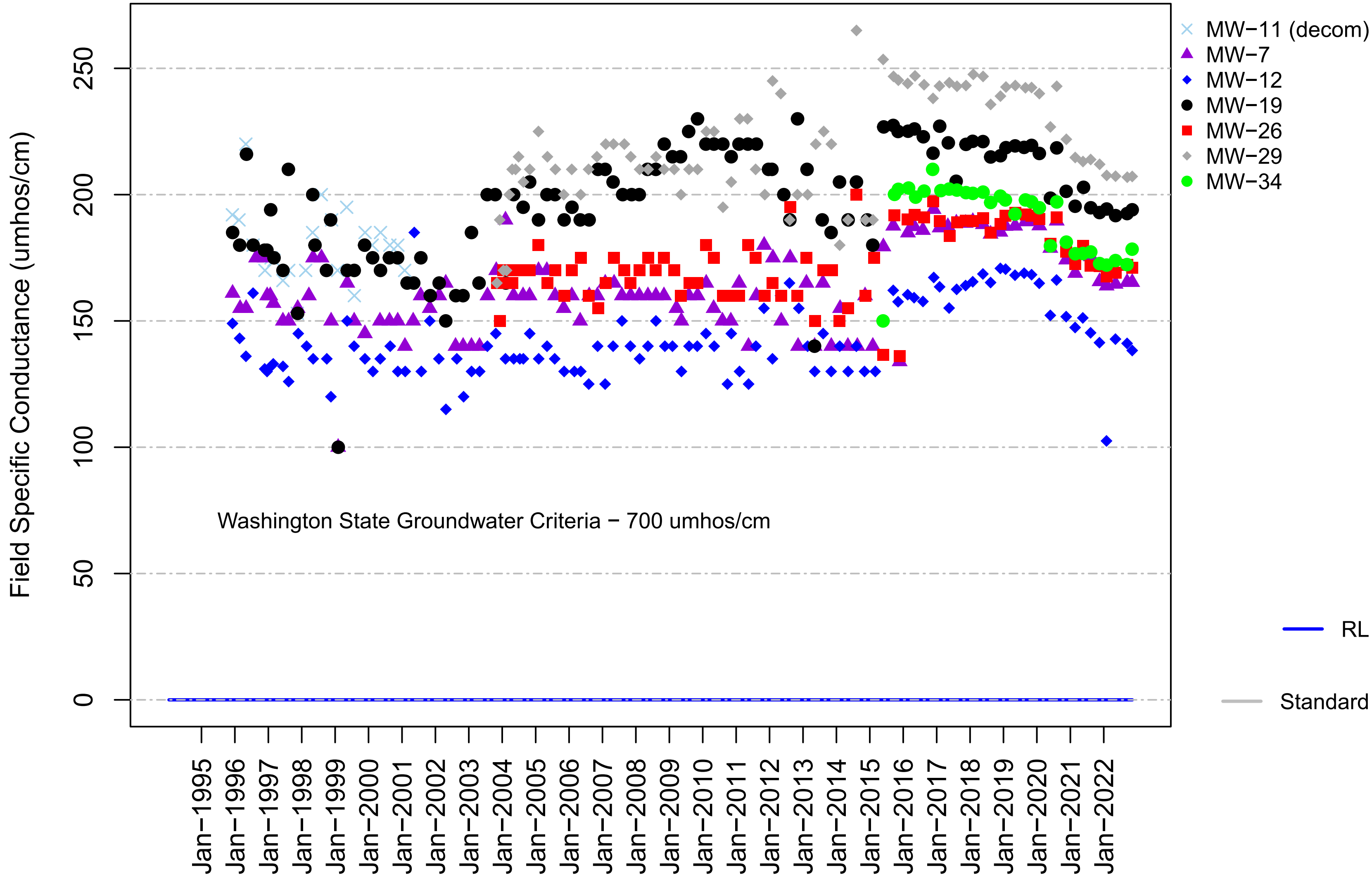


Figure F−2B
Unit D
Field Specific Conductance

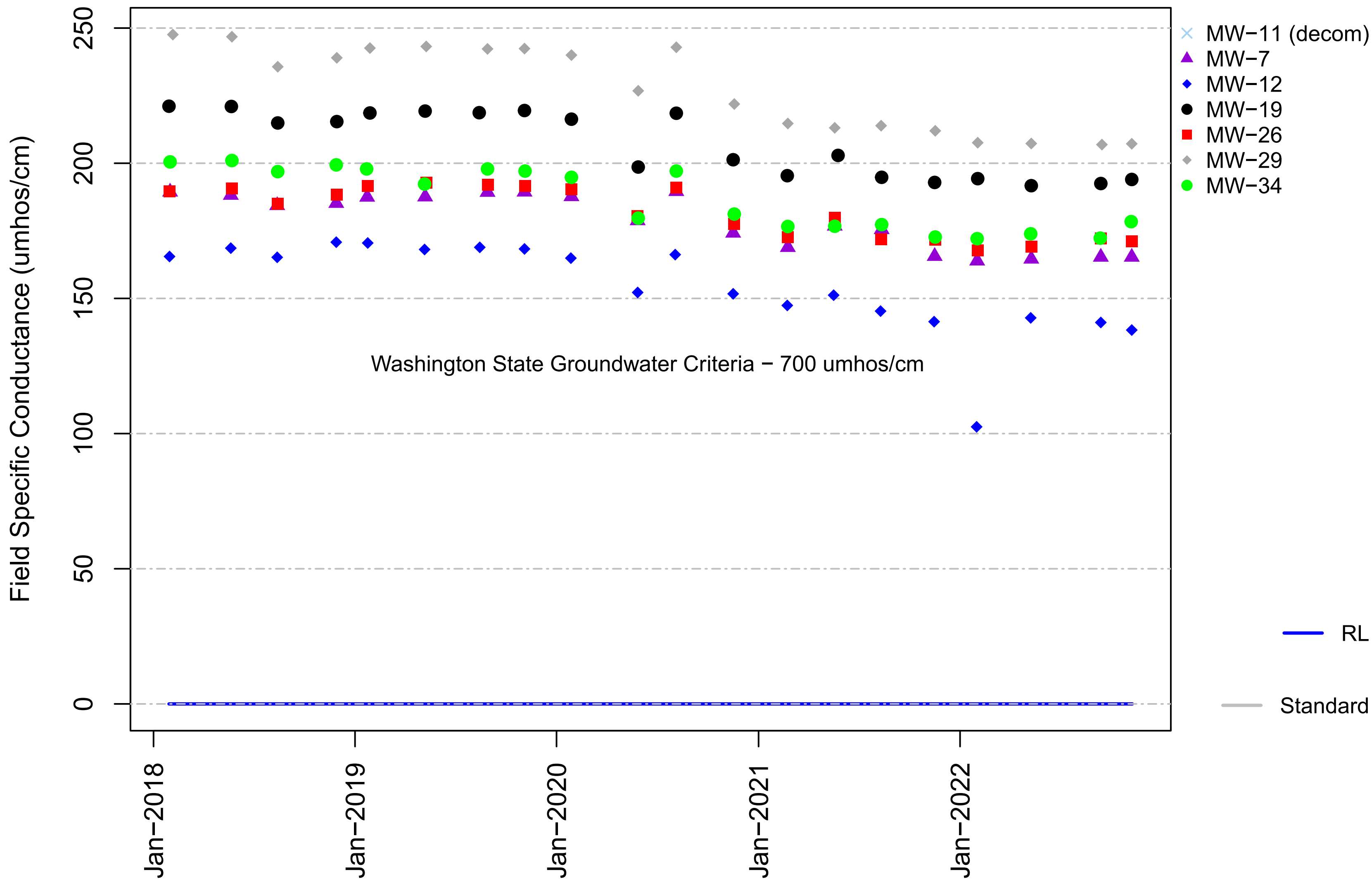


Figure F−3A
Unit D
Alkalinity

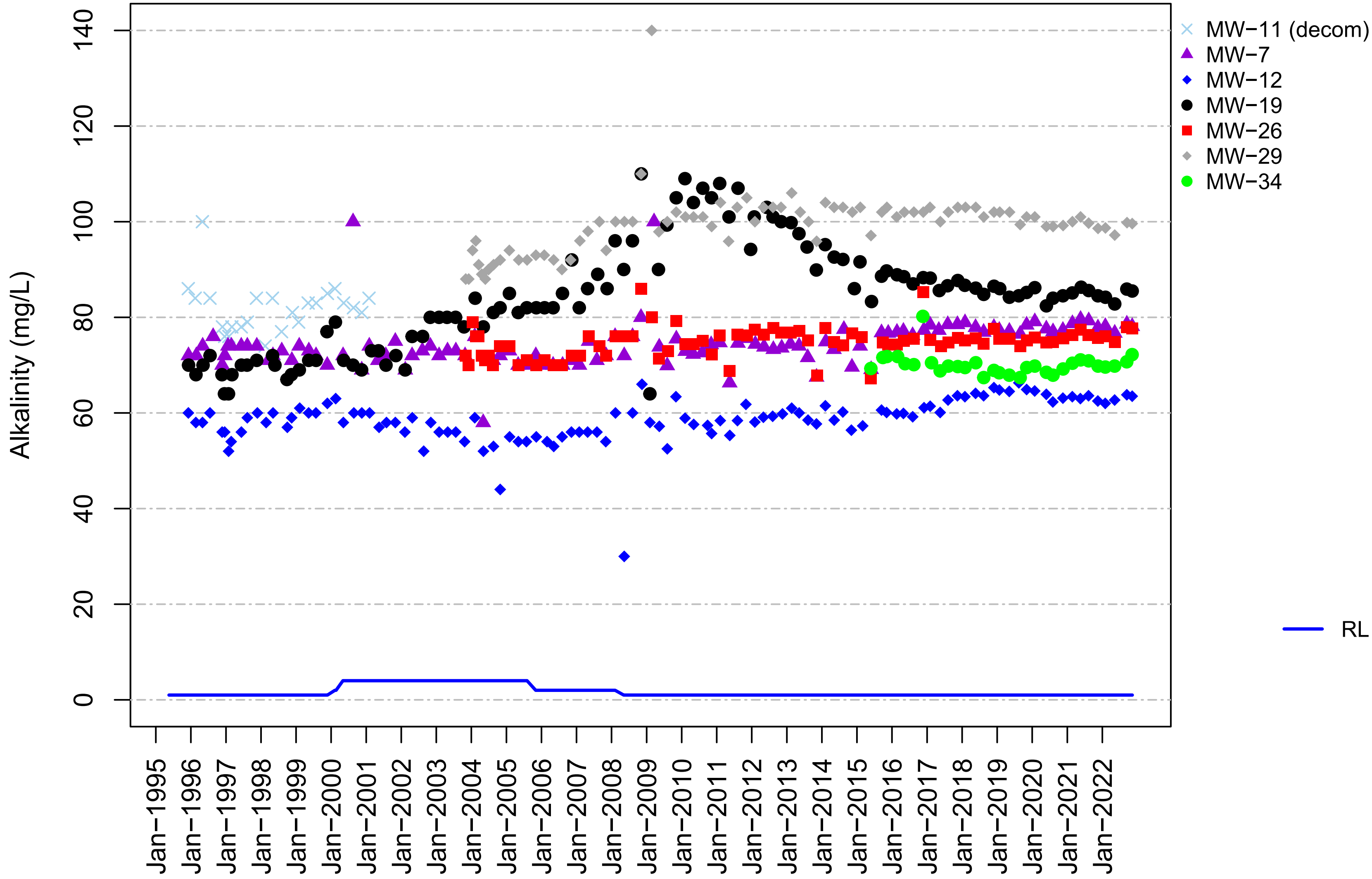


Figure F−3B
Unit D
Alkalinity

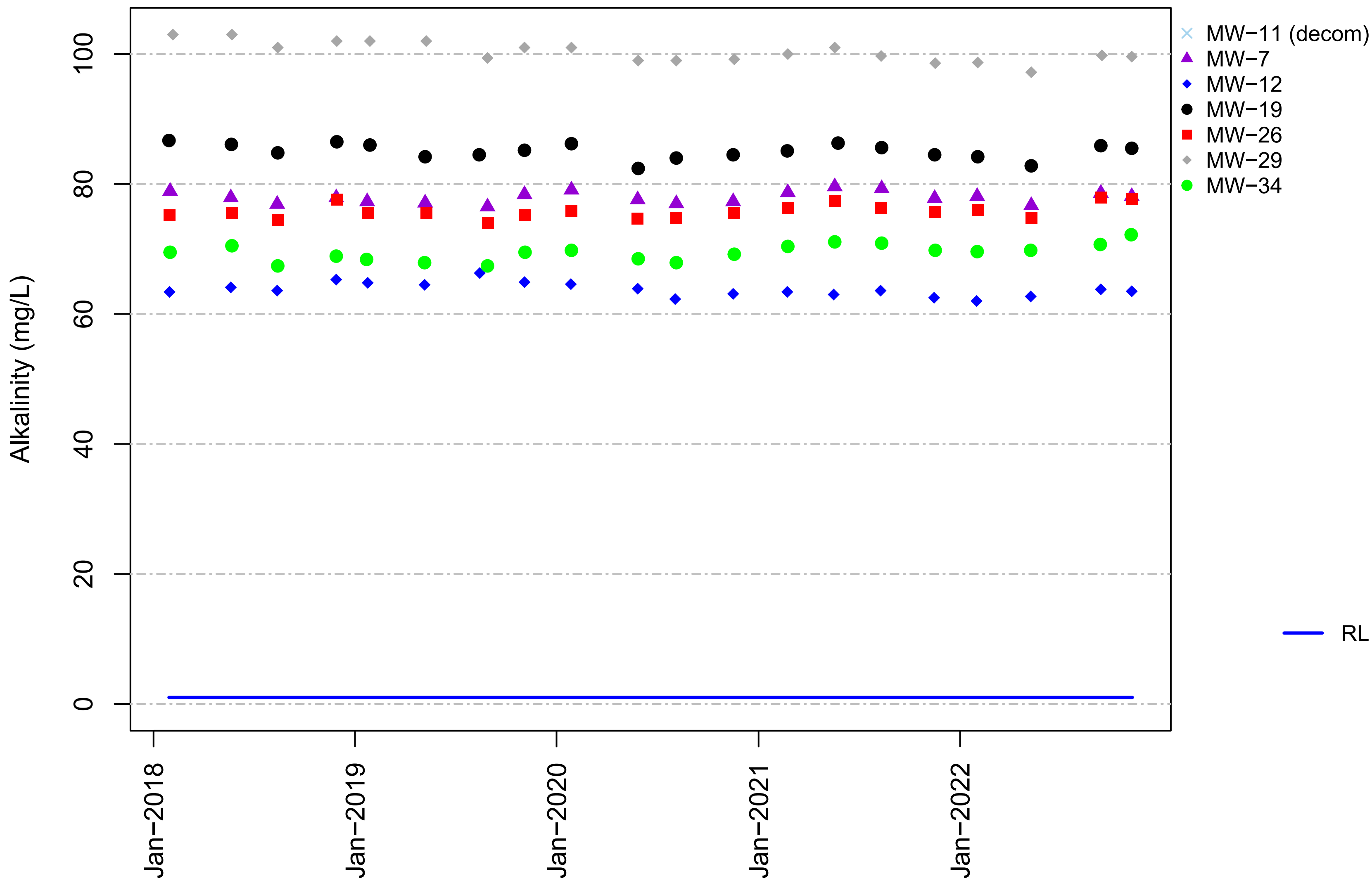


Figure F−4A
Unit D
Ammonia

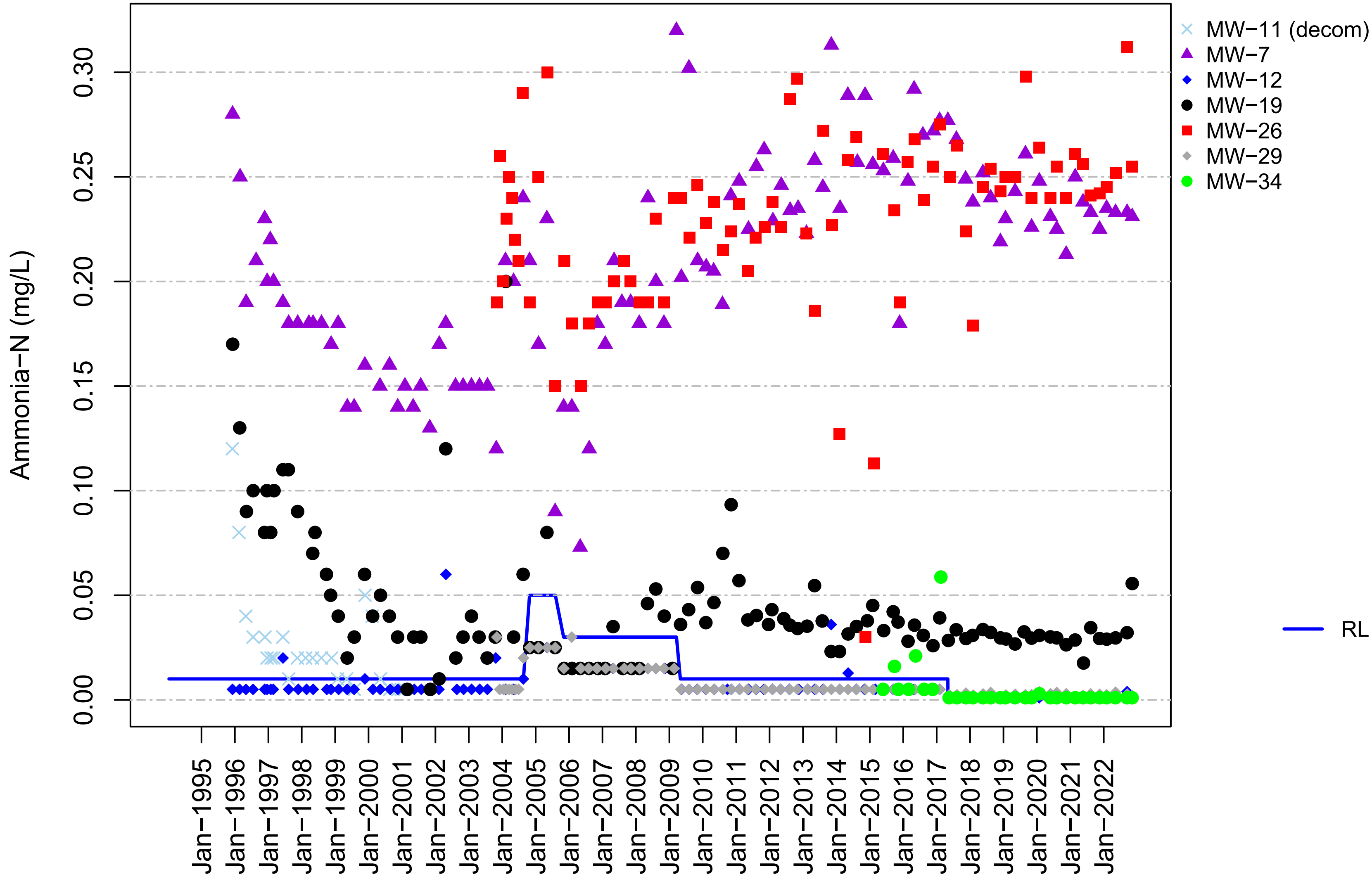
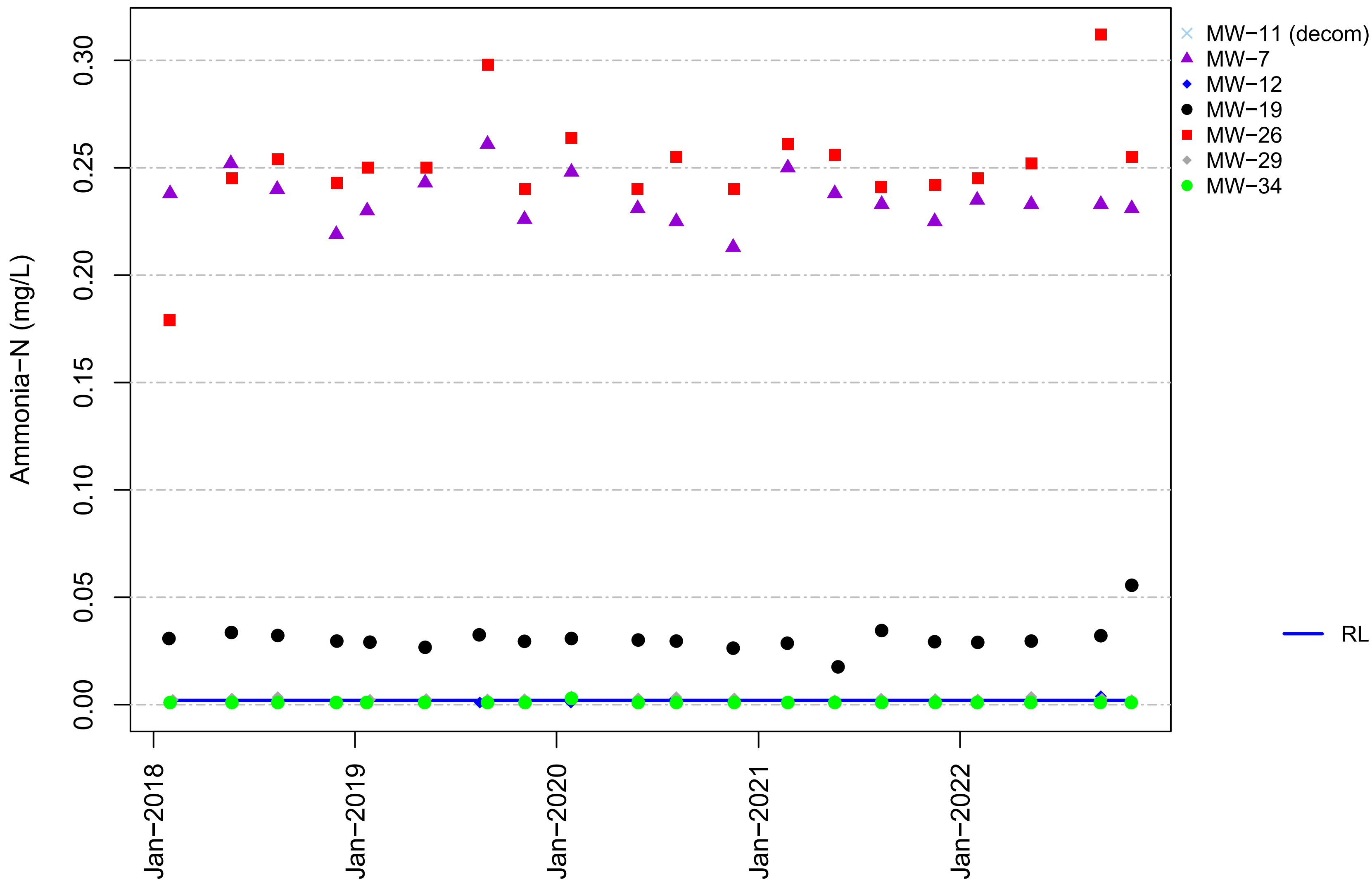


Figure F−4B
Unit D
Ammonia



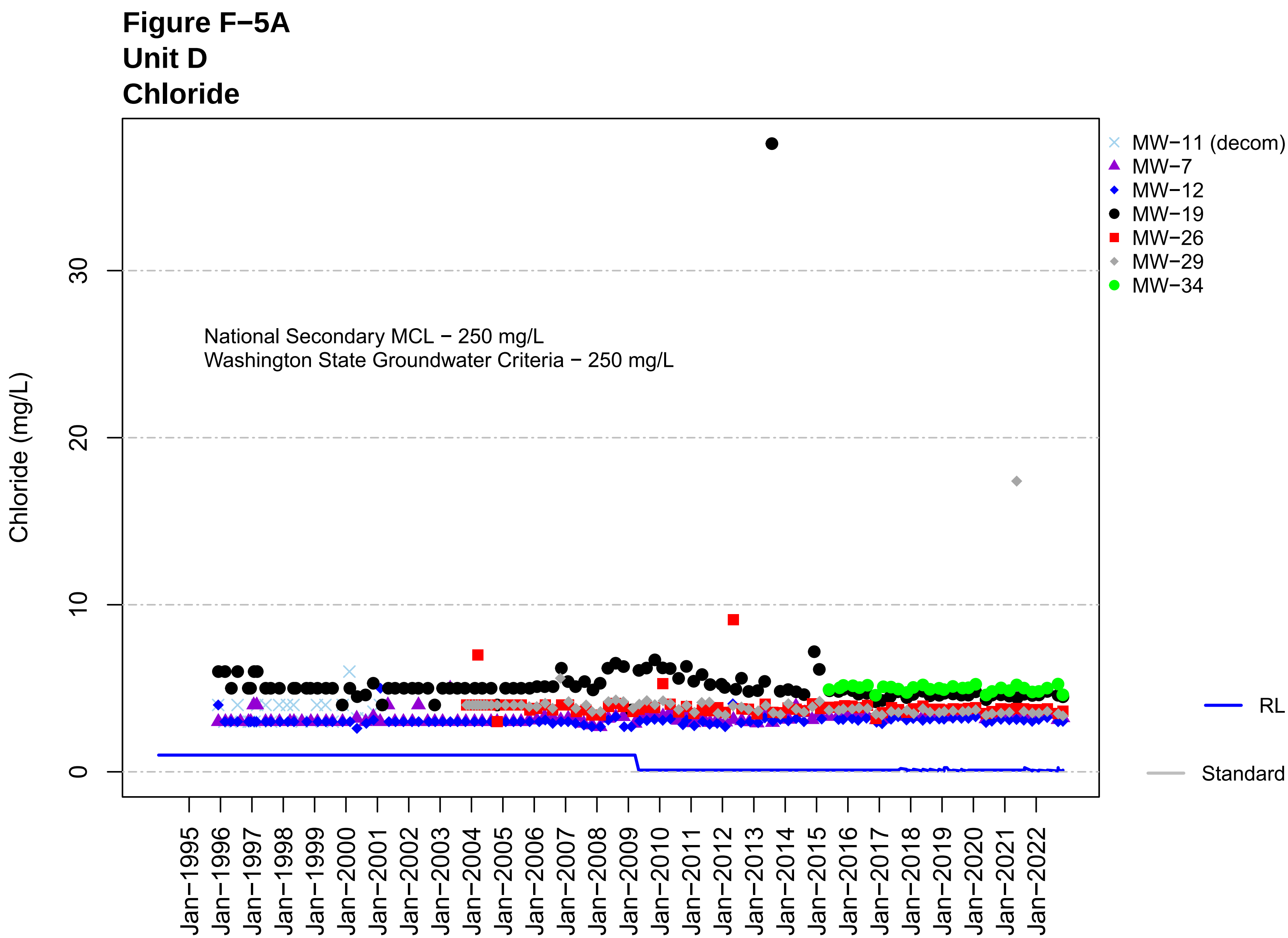


Figure F−5A
Unit D
Chloride
Chloride (mg/L)
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
0
10
20
30
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
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
Jan−2022

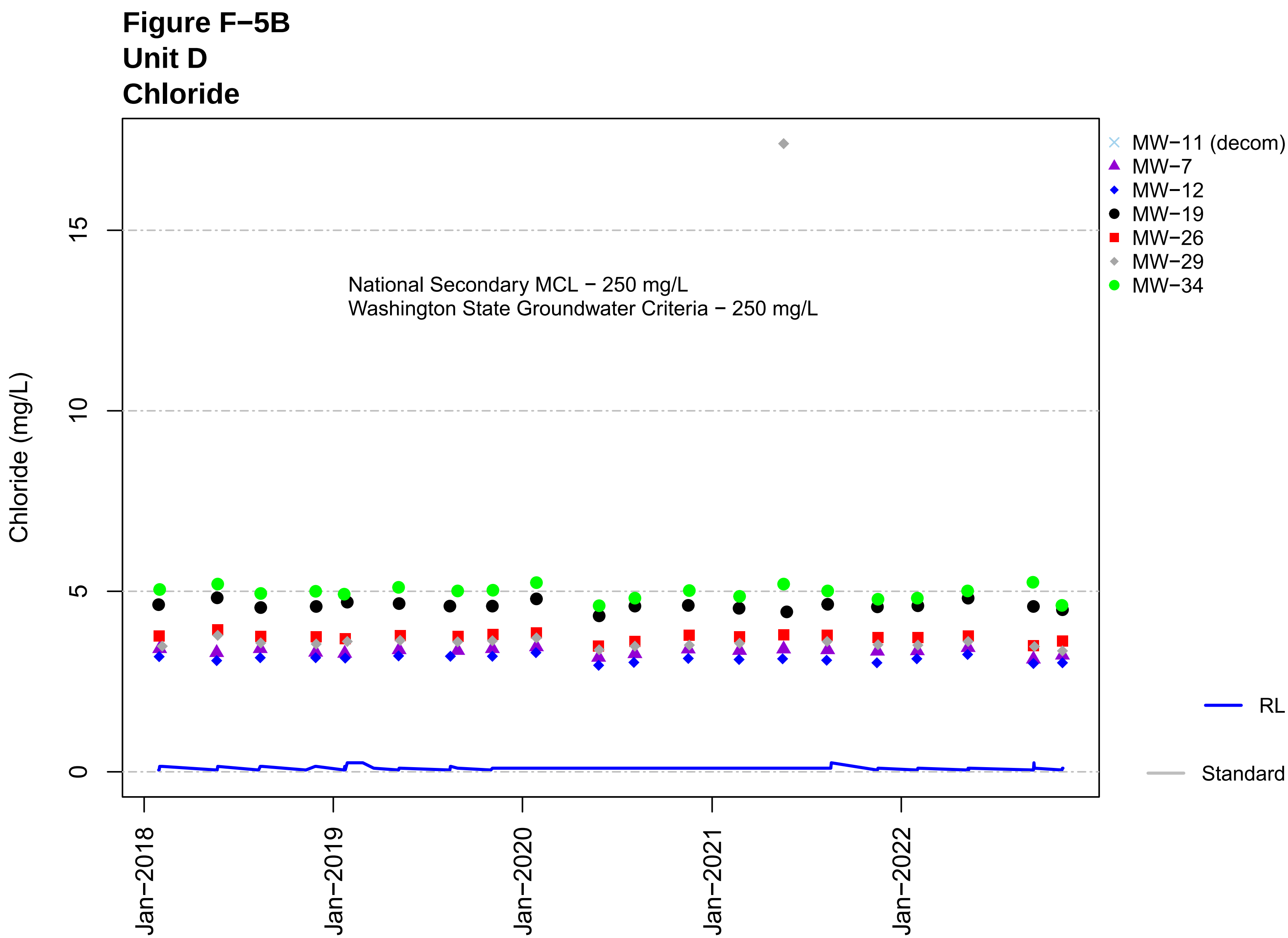


Figure F−5B
Unit D
Chloride
Chloride (mg/L)
0
5
10
15
National Secondary MCL − 250 mg/L
Washington State Groundwater Criteria − 250 mg/L
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022

Figure F−6A
Unit D
Nitrate

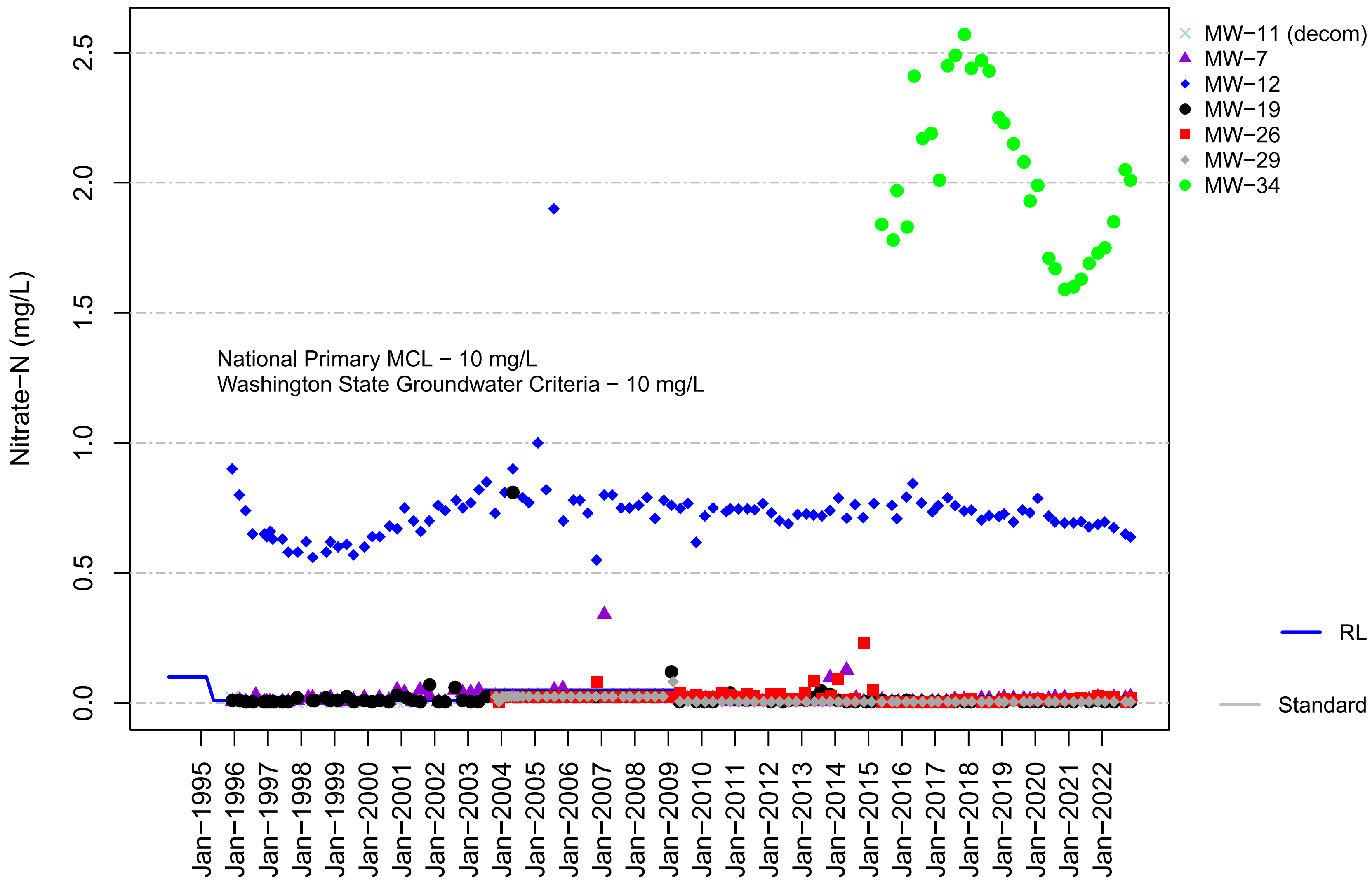


Figure F−6B
Unit D
Nitrate

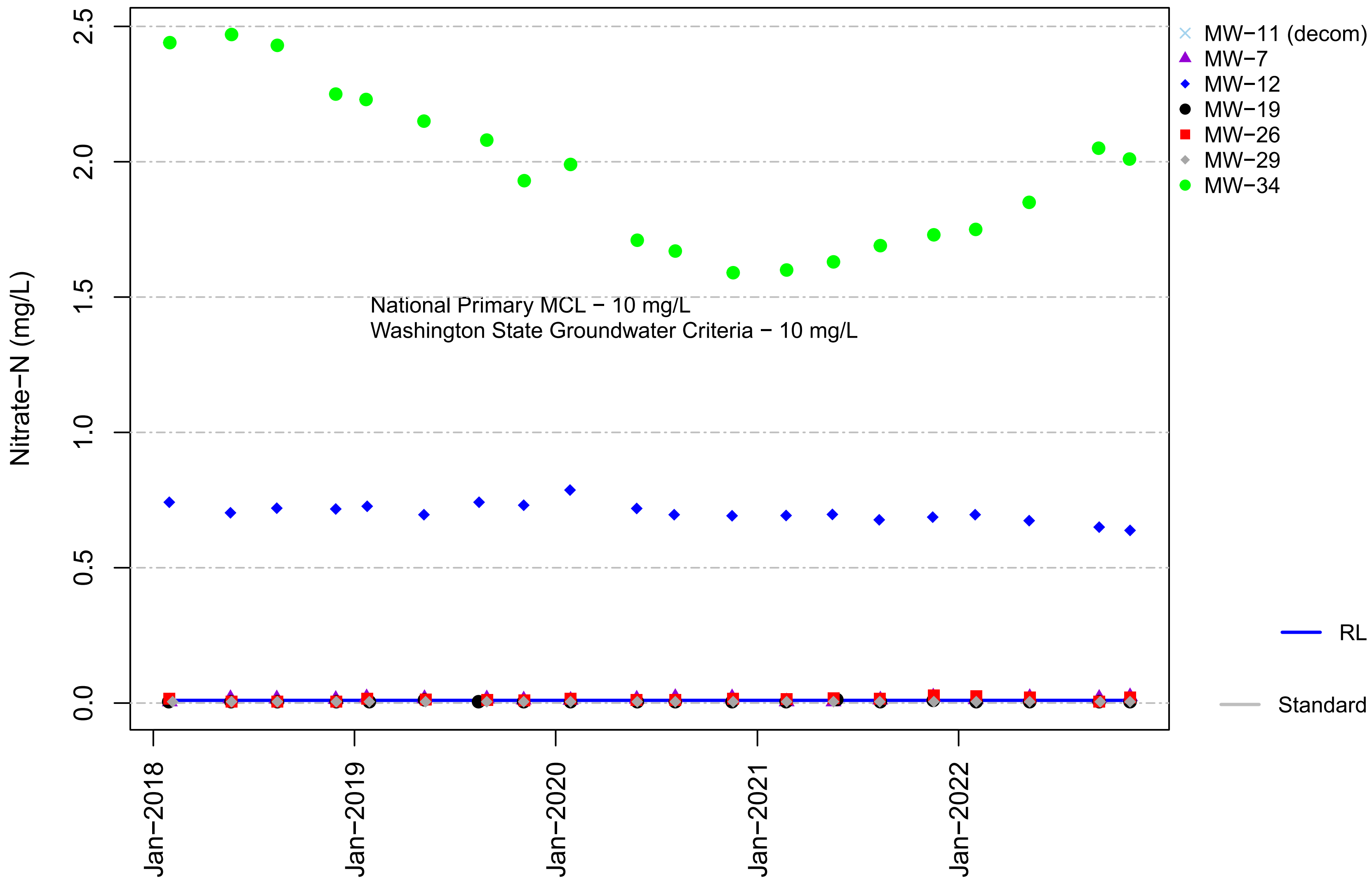


Figure F−7A
Unit D
Sulfate

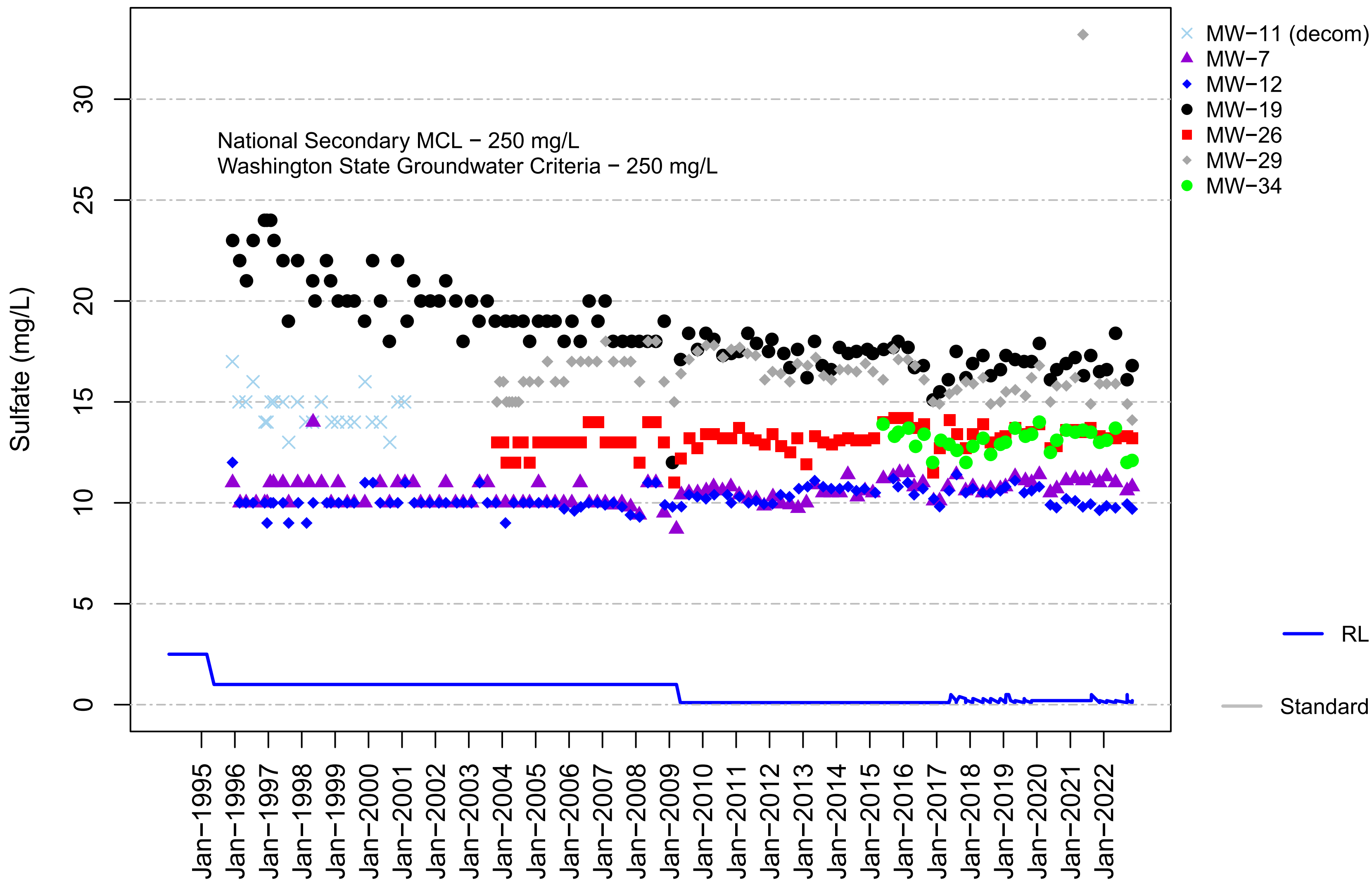


Figure F−7B
Unit D
Sulfate

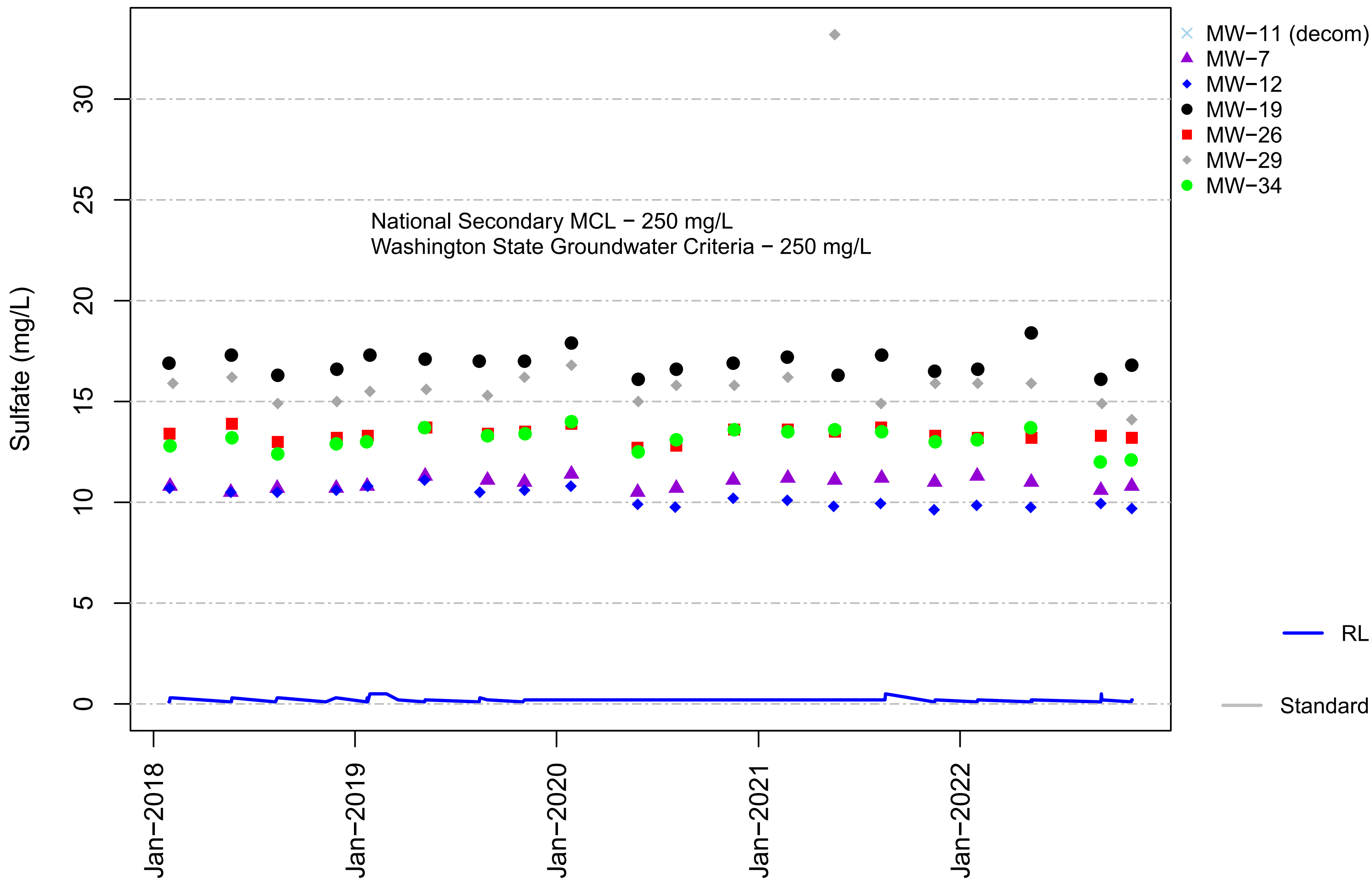


Figure F−8A
Unit D
Total Dissolved Solids

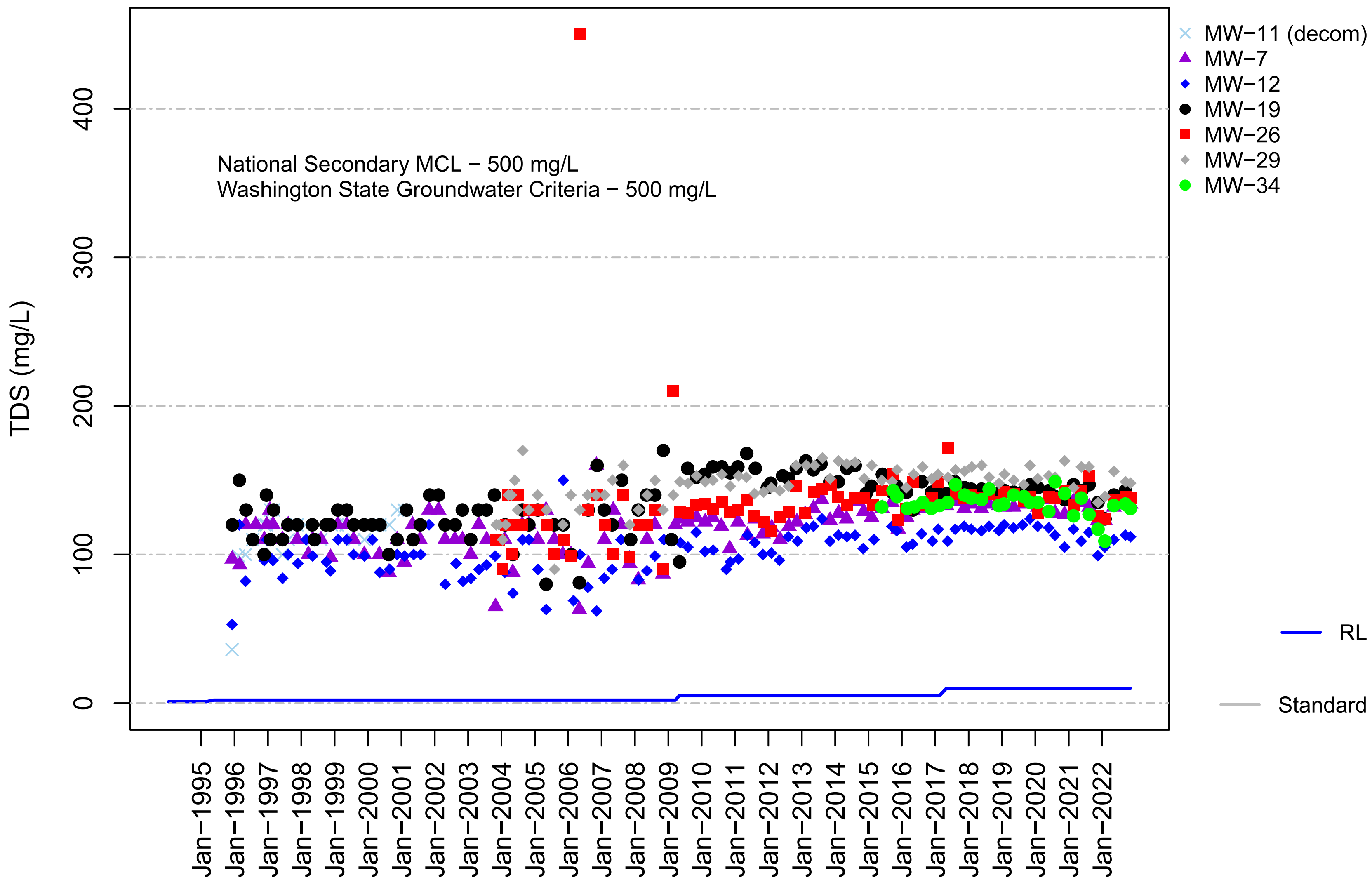
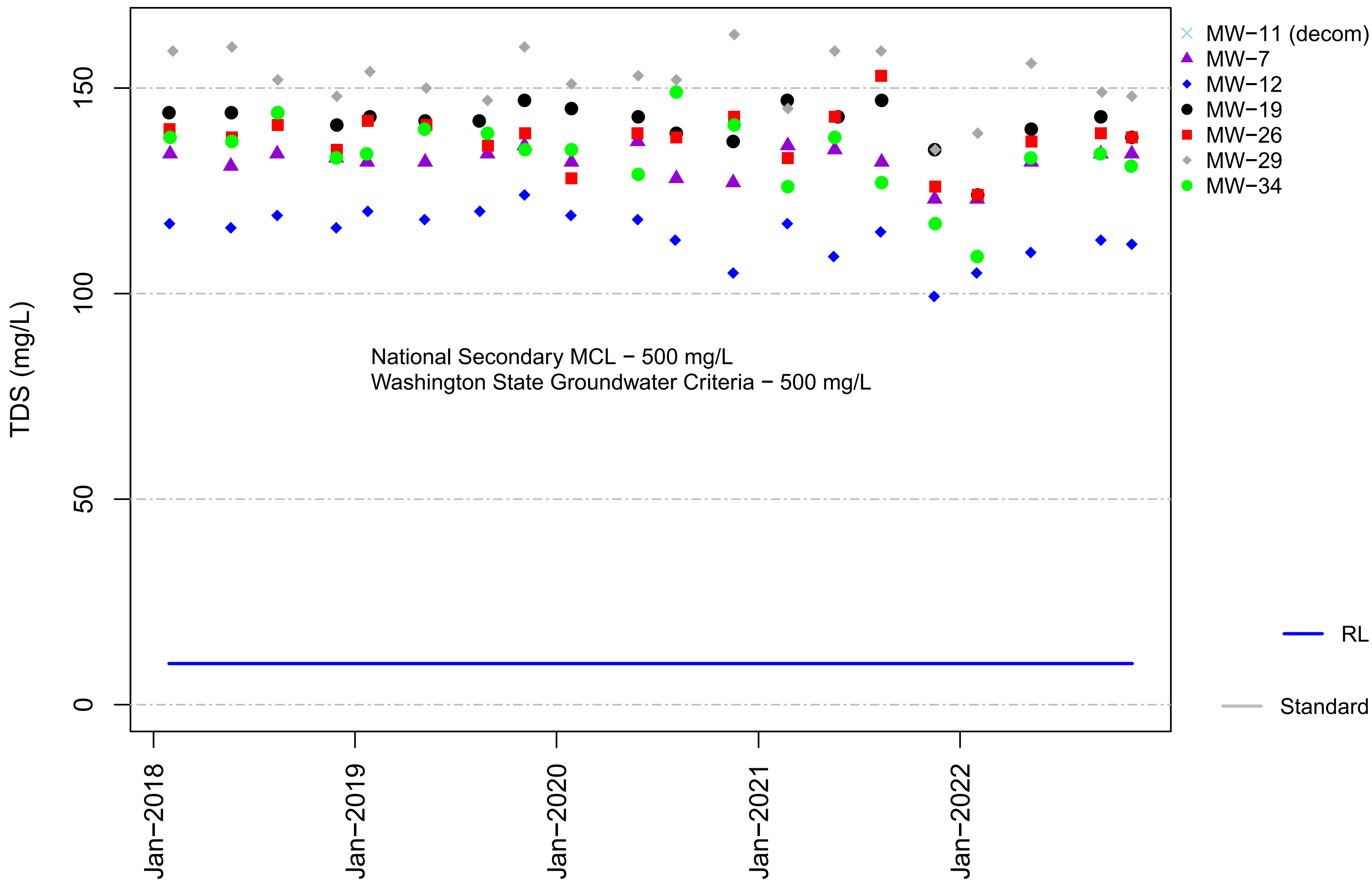


Figure F−8B
Unit D
Total Dissolved Solids



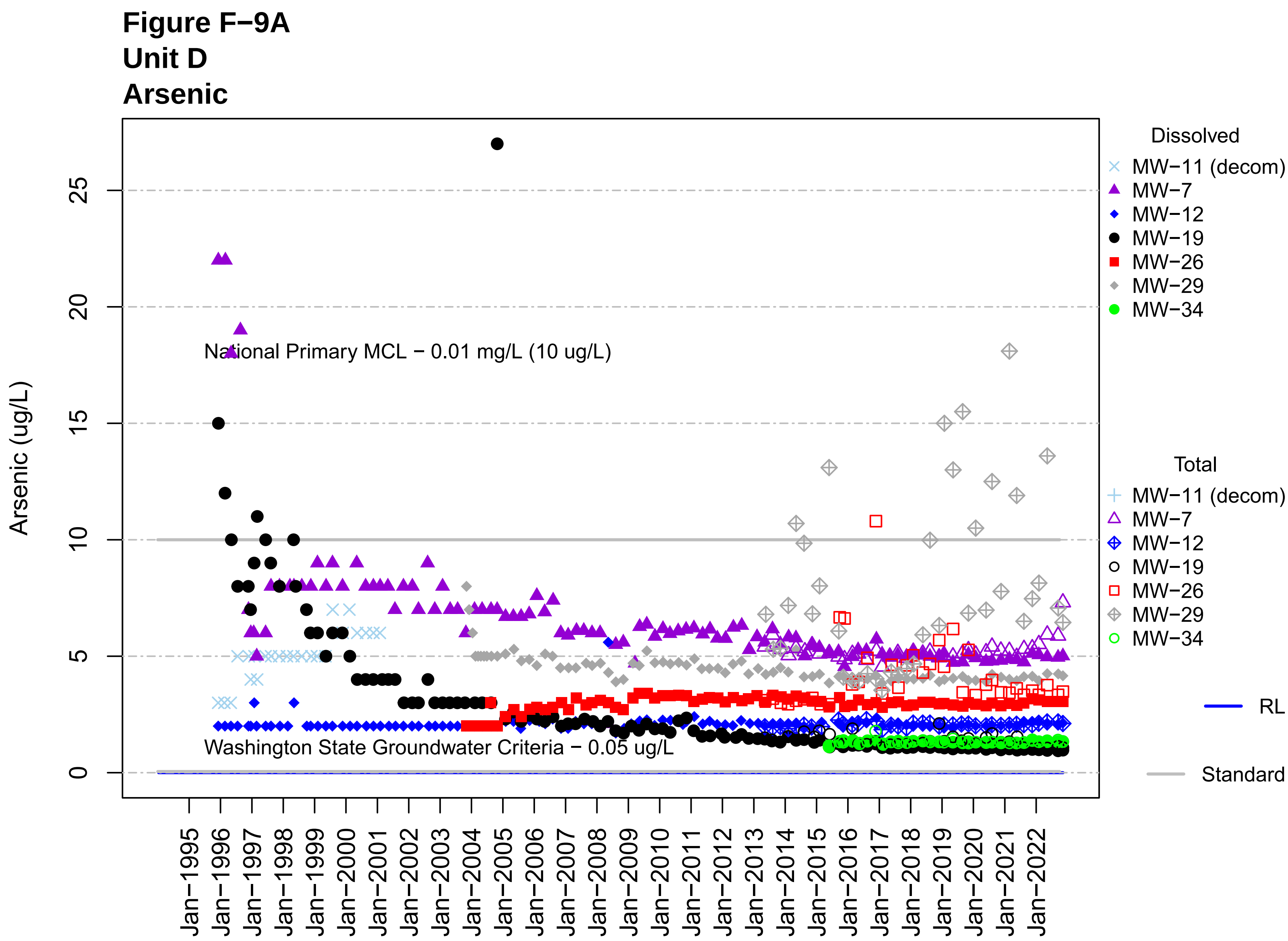


Figure F−9A
Unit D
Arsenic
Arsenic (ug/L)
0
5
10
15
20
25
National Primary MCL − 0.01 mg/L (10 ug/L)
Washington State Groundwater Criteria − 0.05 ug/L
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
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

Figure F−9B
Unit D
Arsenic

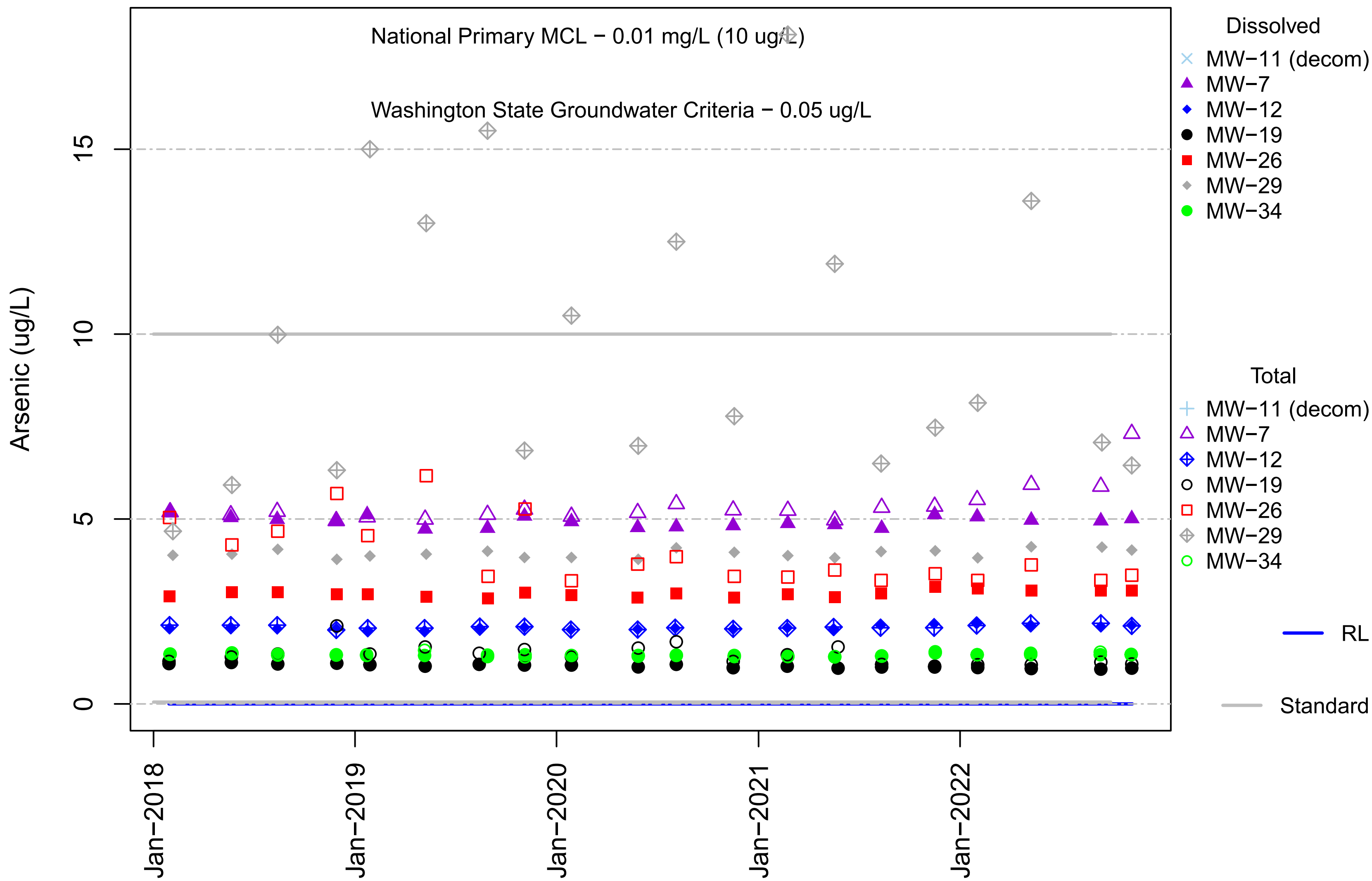


Figure F−10A
Unit D
Calcium

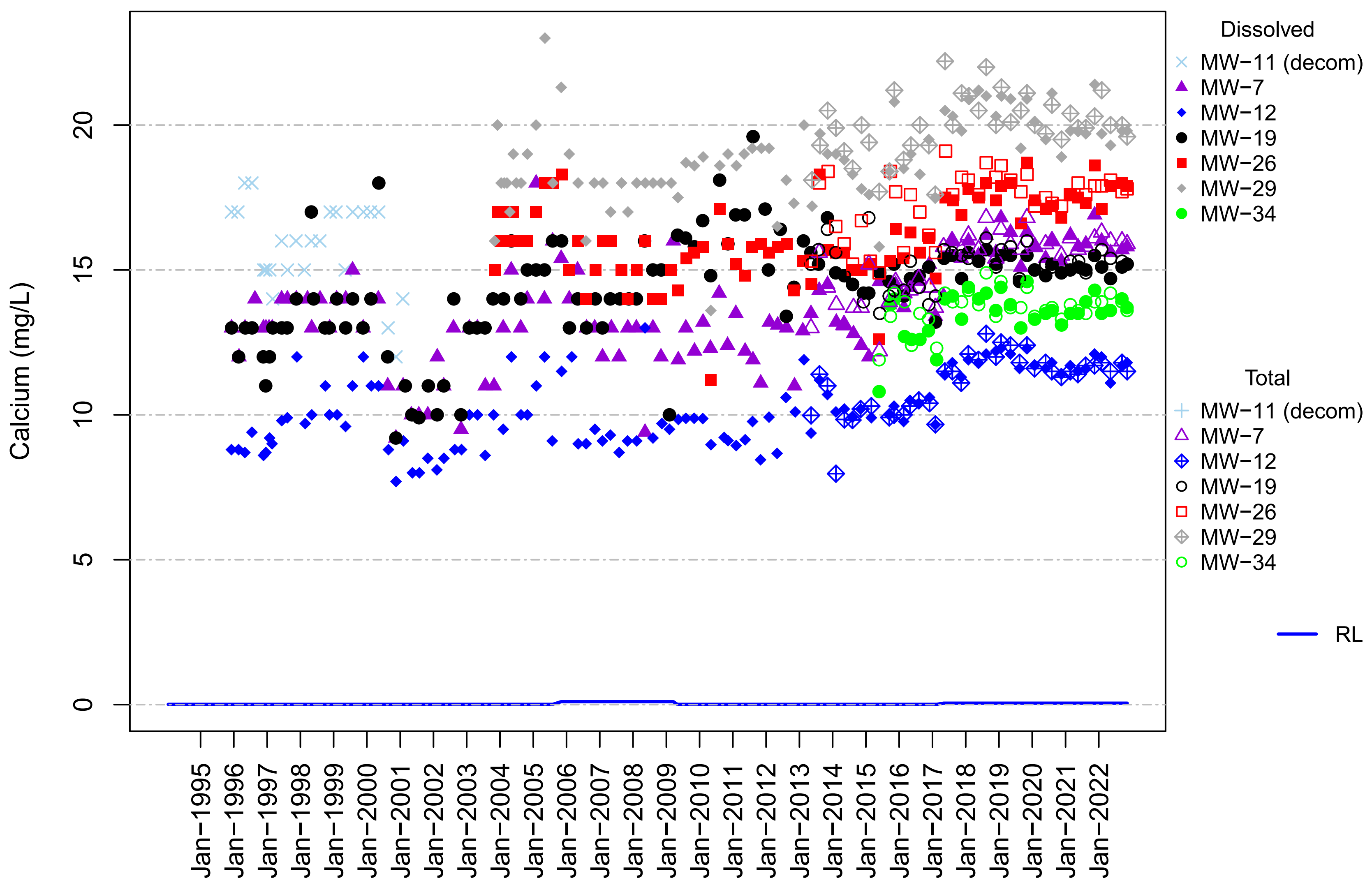


Figure F−10B
Unit D
Calcium

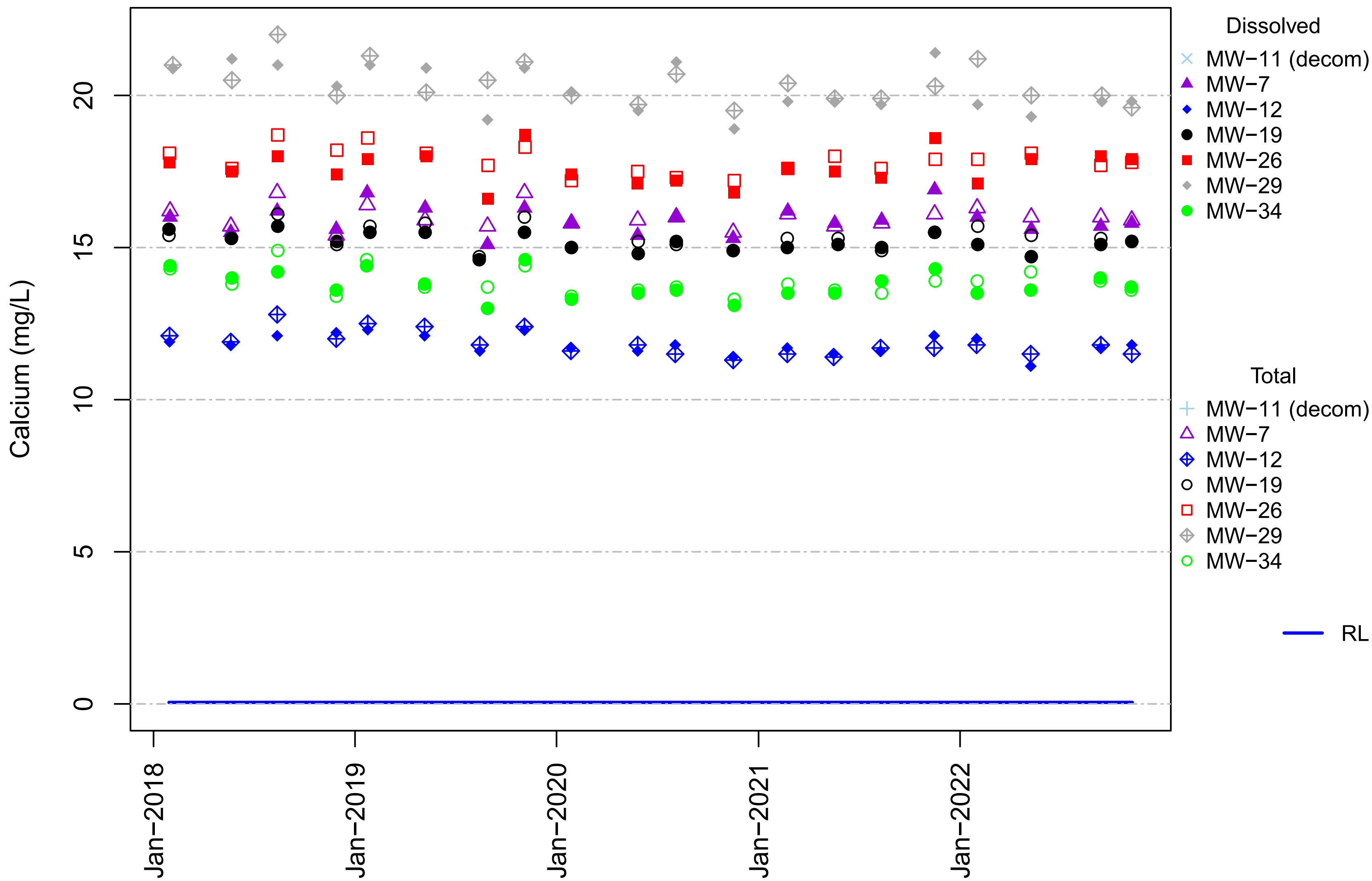
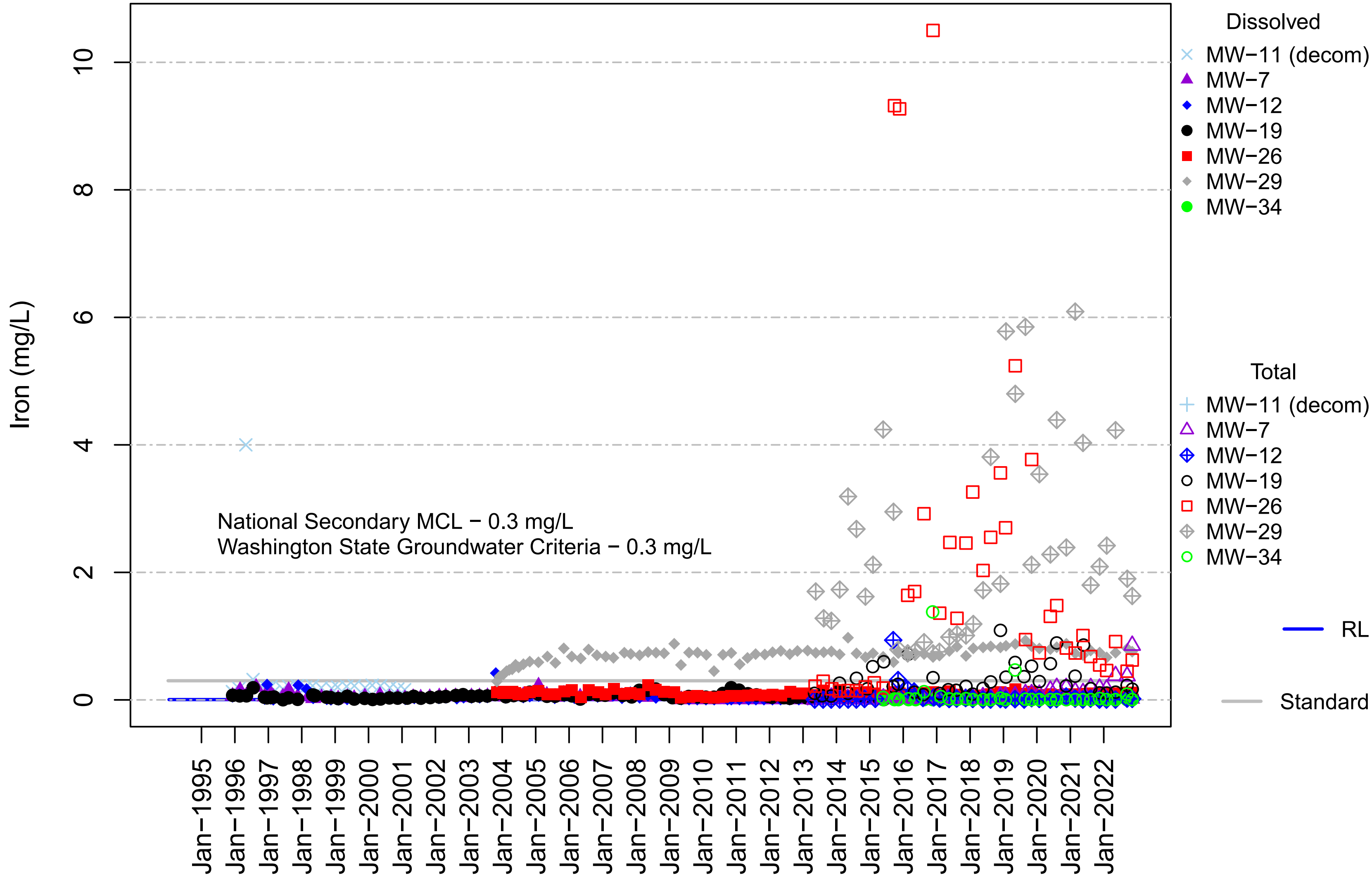


Figure F−11A
Unit D
Iron



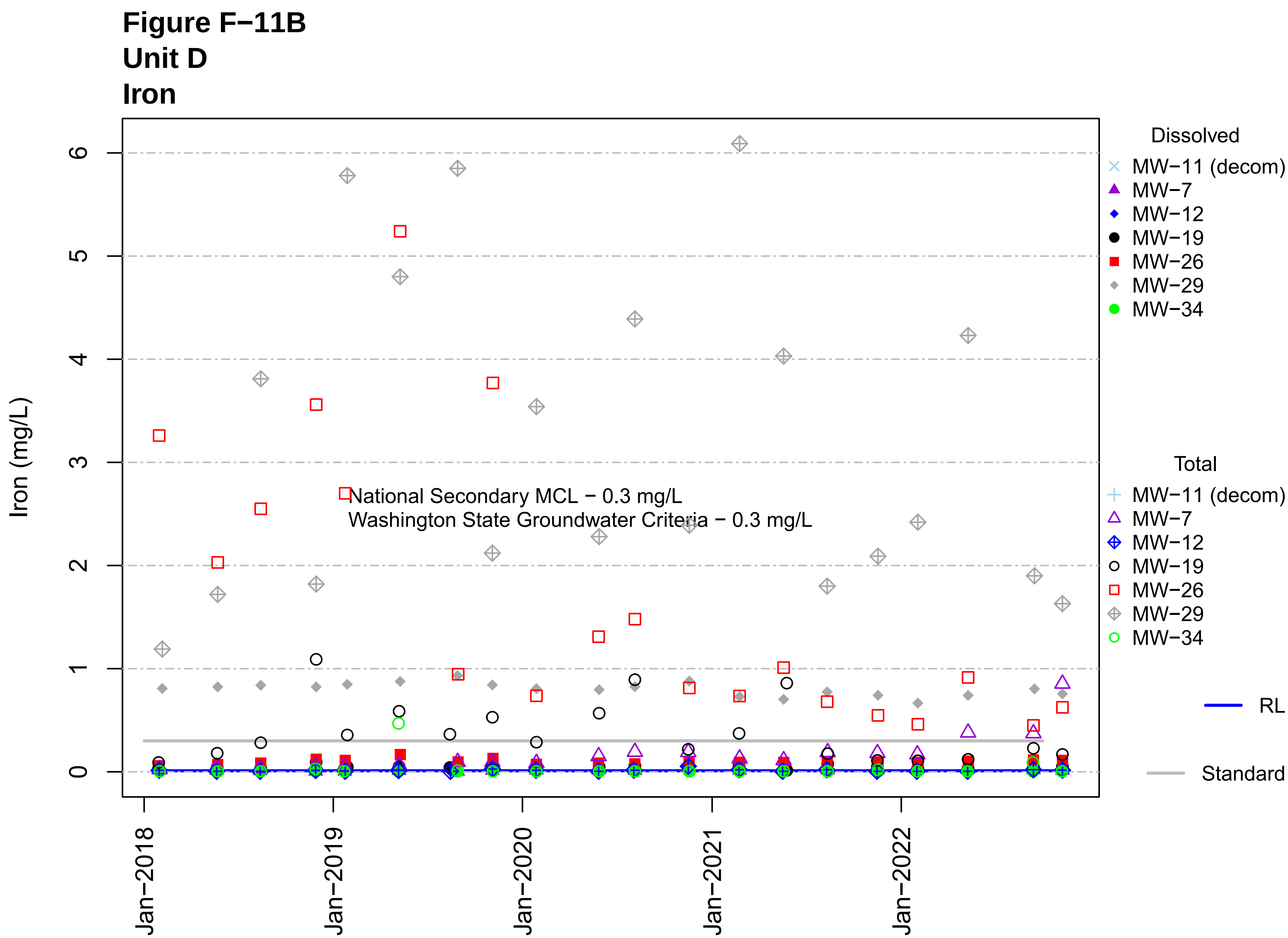
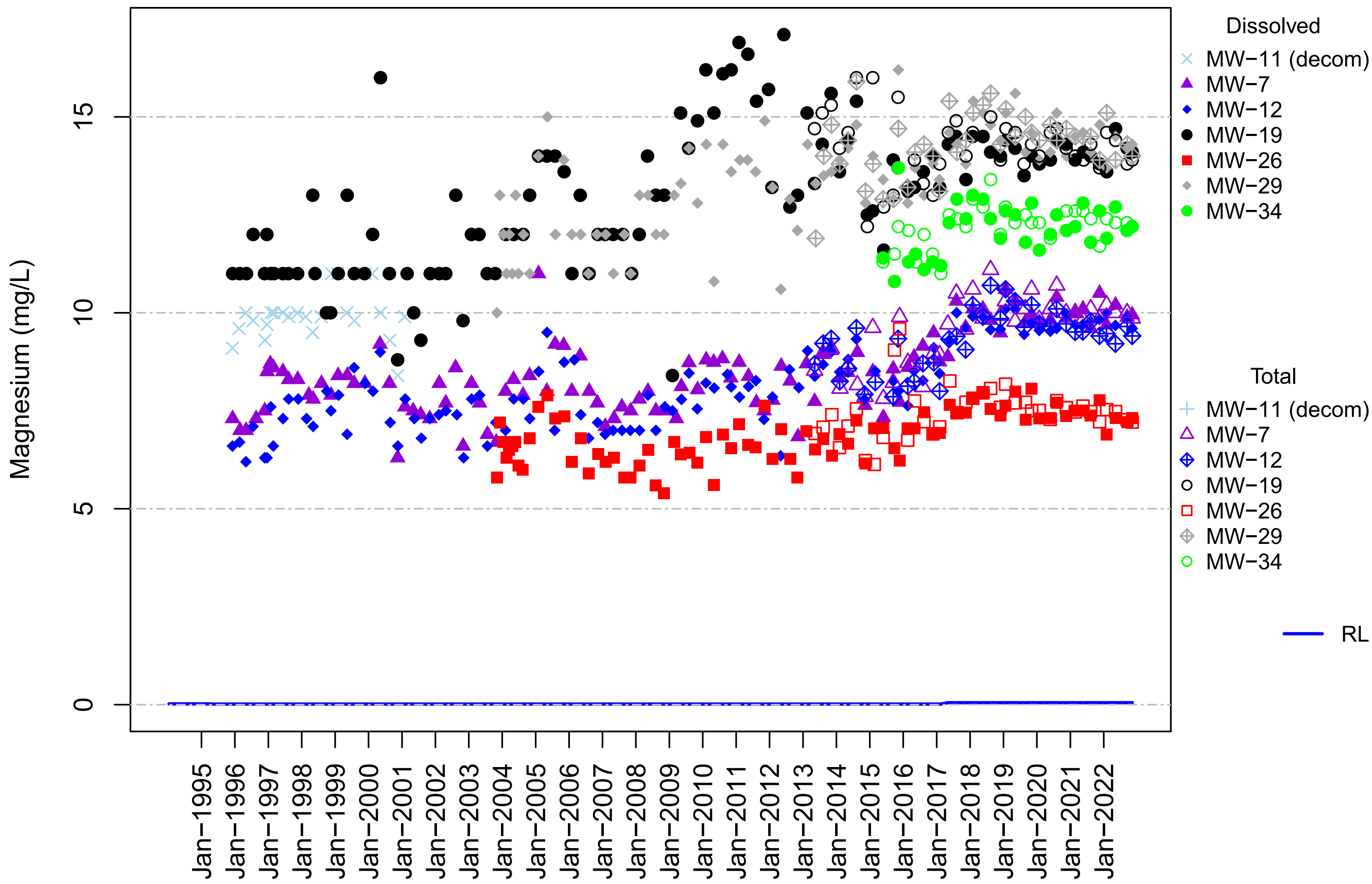


Figure F−11B
Unit D
Iron
Iron (mg/L)
0
1
2
3
4
5
6
National Secondary MCL − 0.3 mg/L
Washington State Groundwater Criteria − 0.3 mg/L
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

Figure F−12A
Unit D
Magnesium



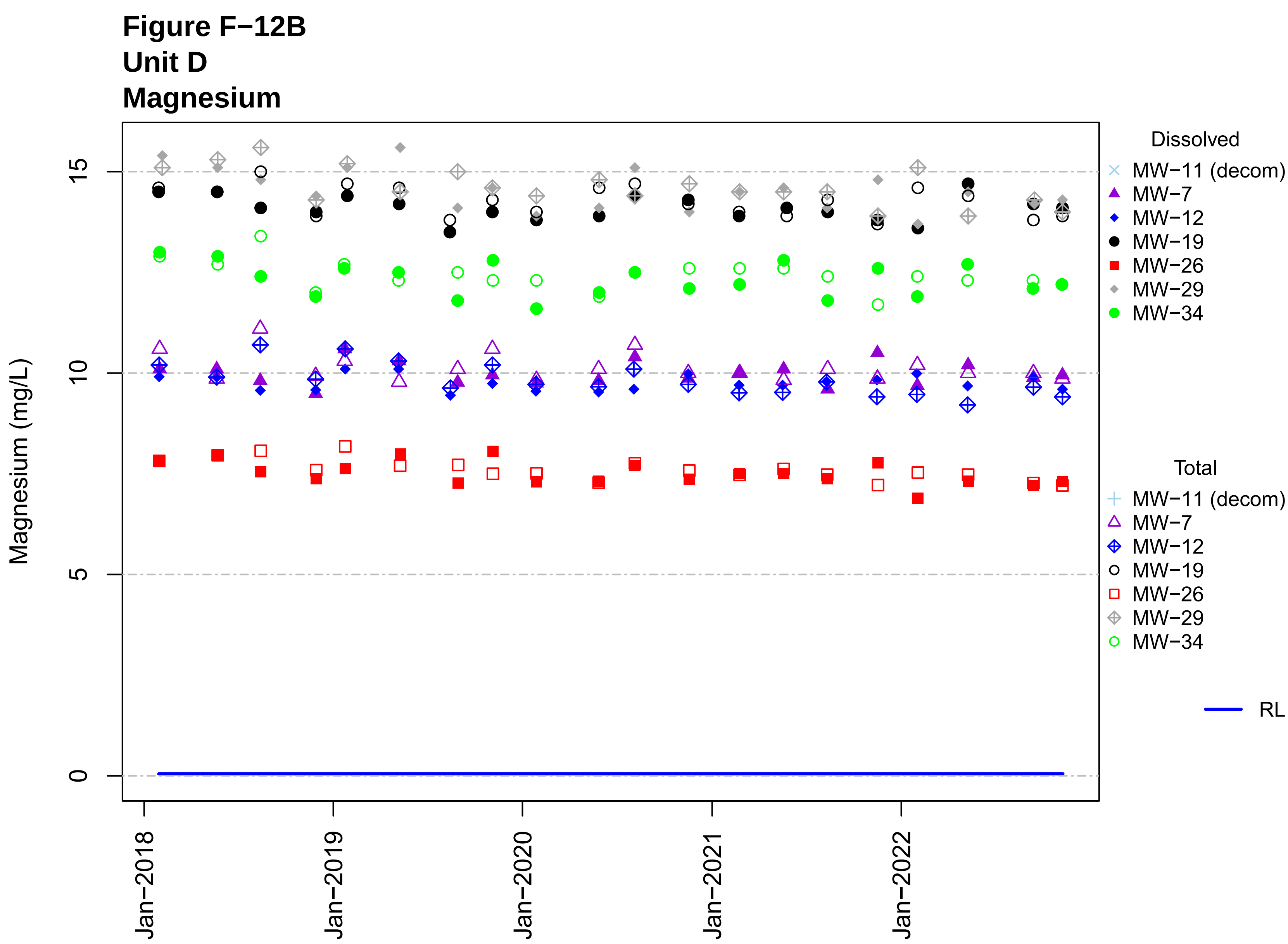


Figure F−12B
Unit D
Magnesium
Magnesium (mg/L)
0
5
10
15
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

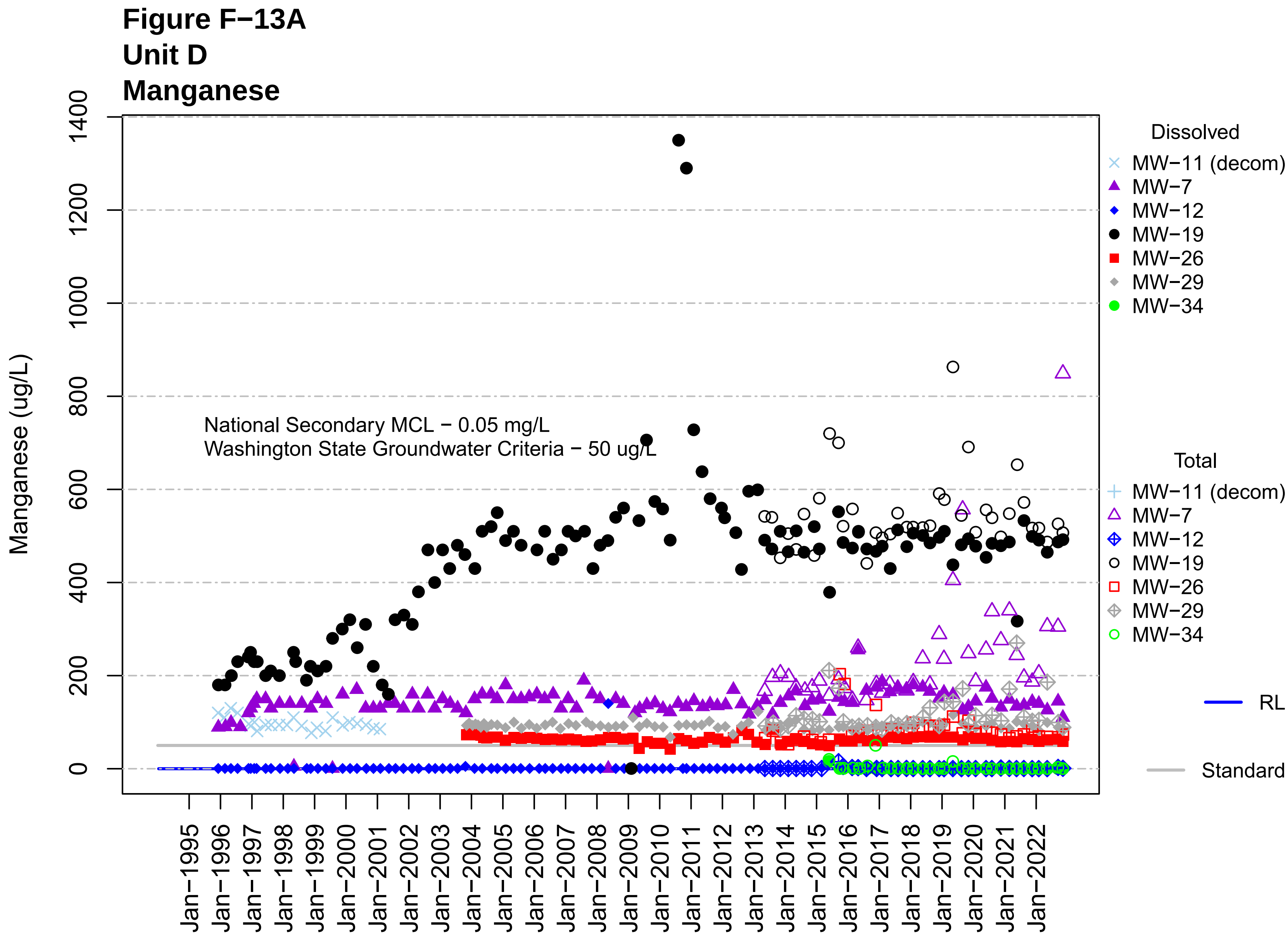


Figure F−13A
Unit D
Manganese
Manganese (ug/L)
National Secondary MCL − 0.05 mg/L
Washington State Groundwater Criteria − 50 ug/L
Dissolved
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
Total
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard
0
200
400
600
800
1000
1200
1400
Jan−1995
Jan−1996
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
Jan−2022

Figure F−13B
Unit D
Manganese

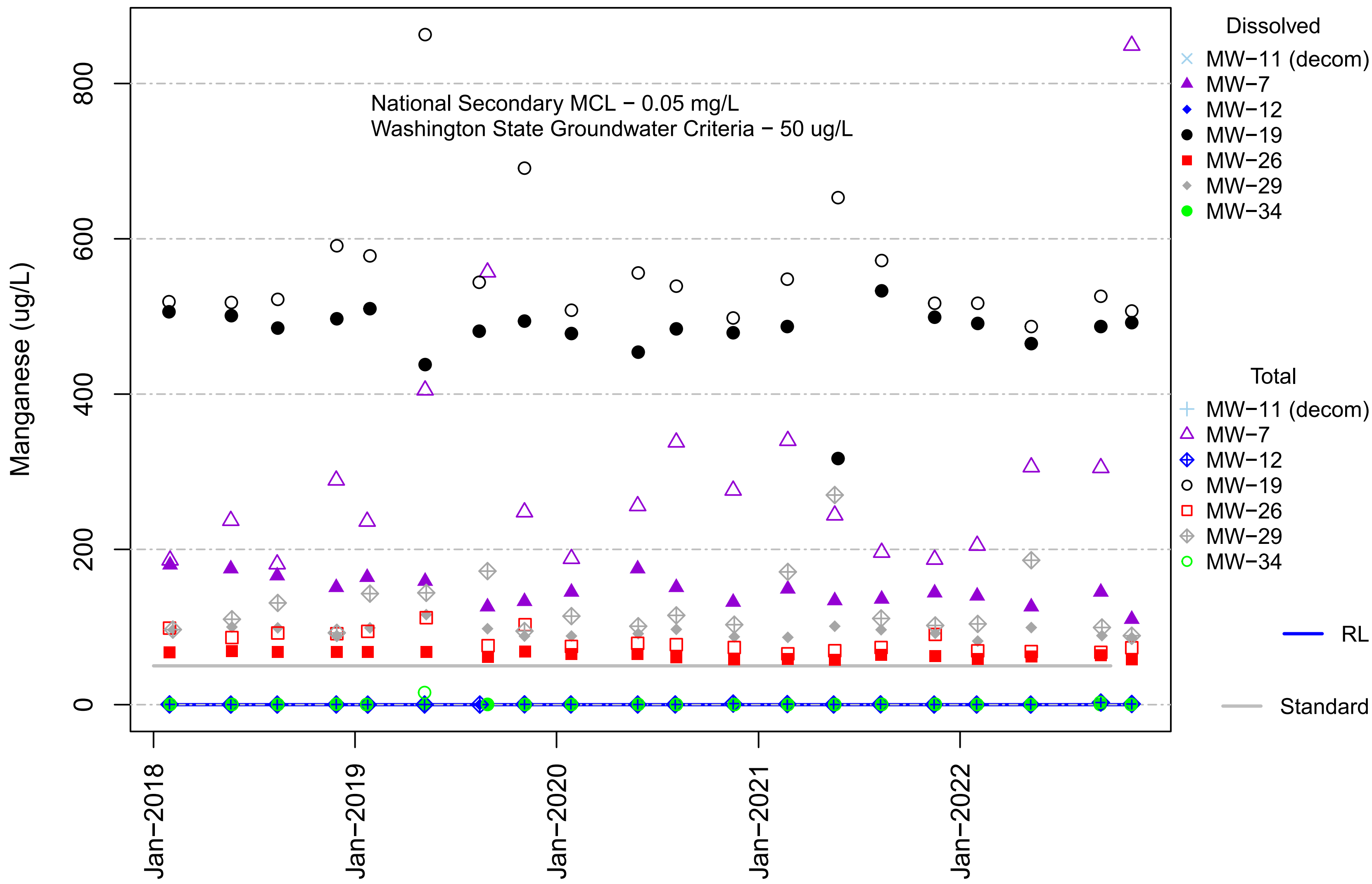


Figure F−14A
Unit D
Potassium

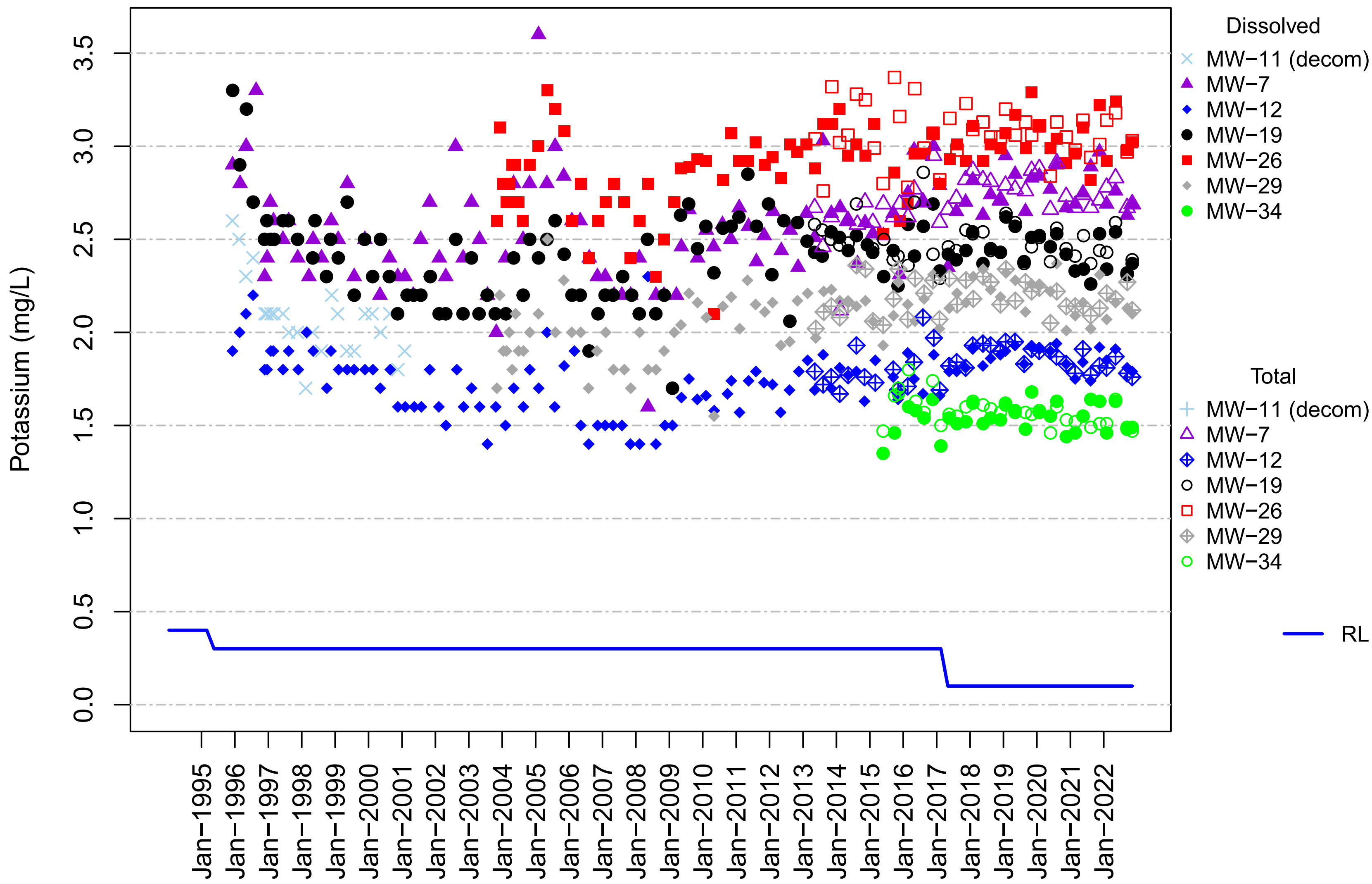


Figure F−14B
Unit D
Potassium

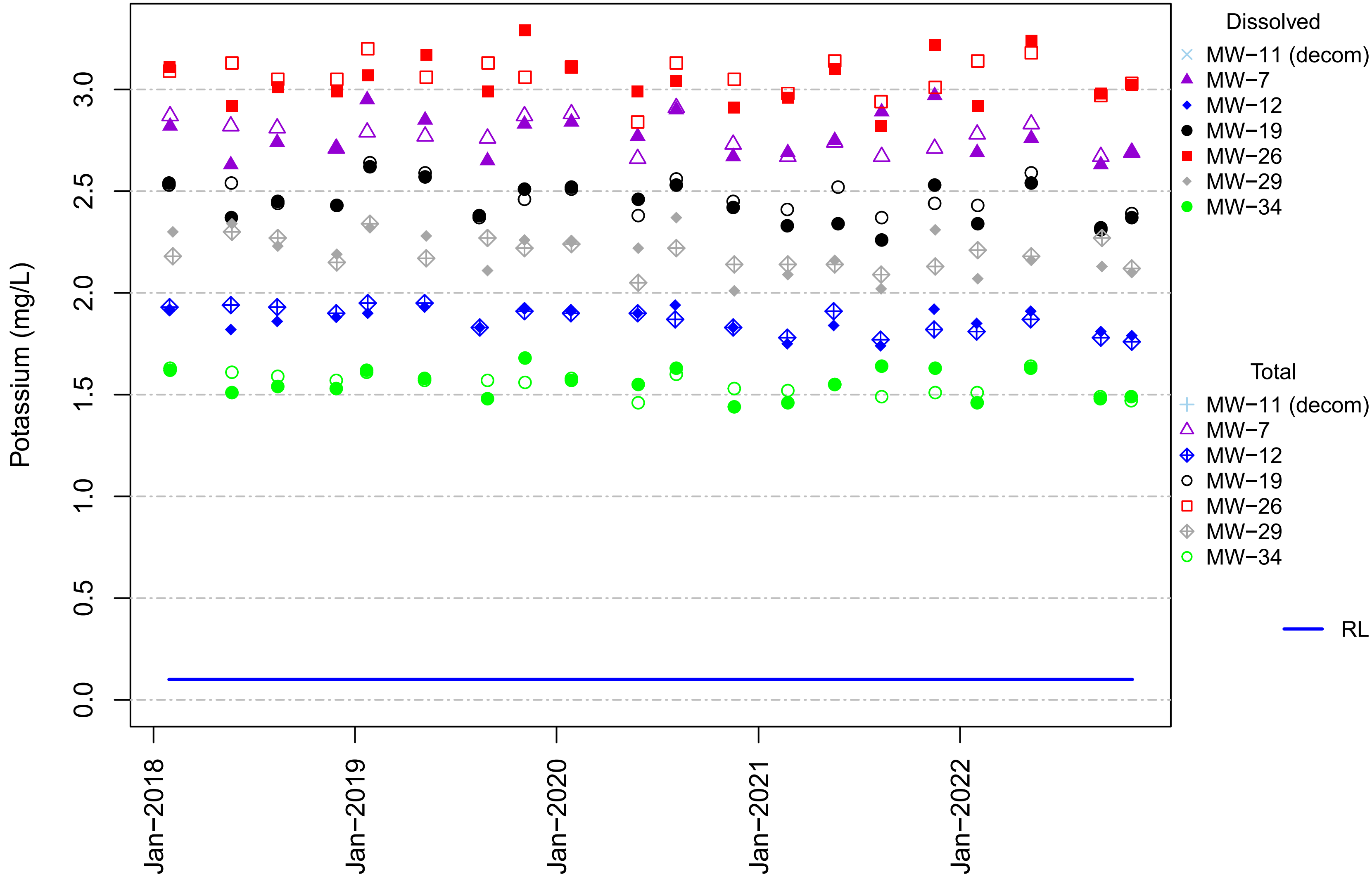


Figure F−15A
Unit D
Sodium

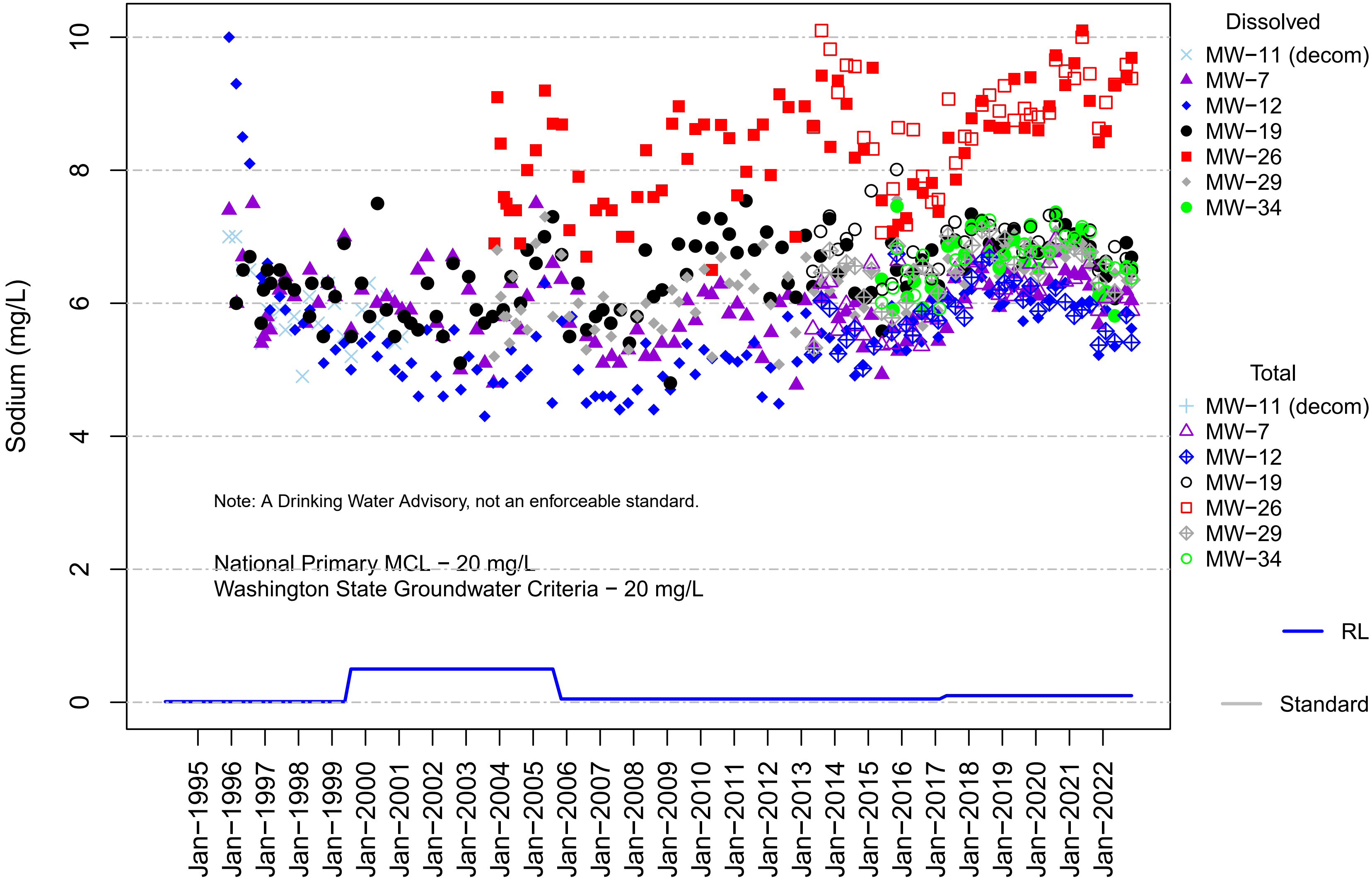


Figure F−15B
Unit D
Sodium

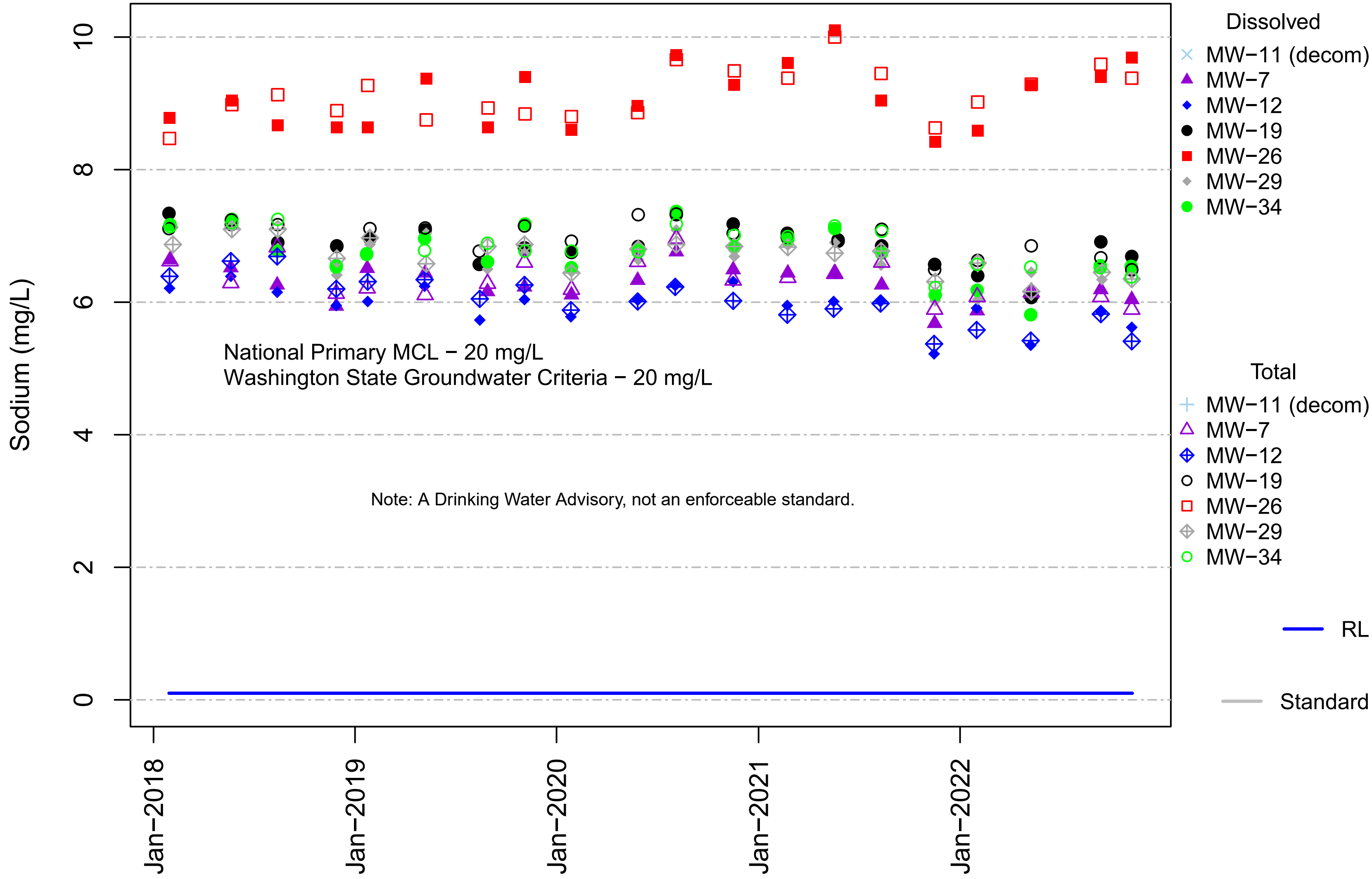


Figure F−16A
Unit D
1,1−Dichloroethane

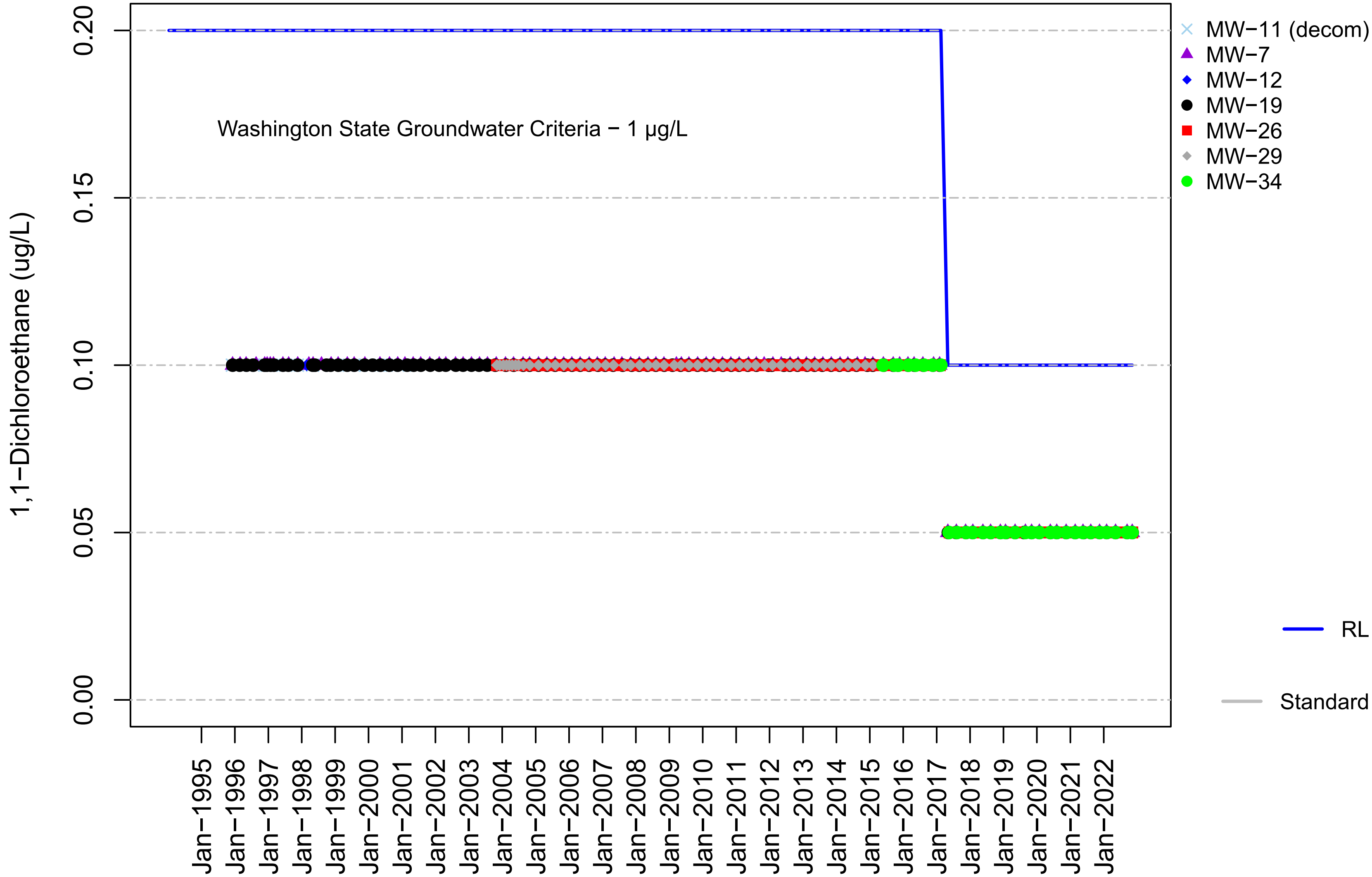


Figure F−16B
Unit D
1,1−Dichloroethane

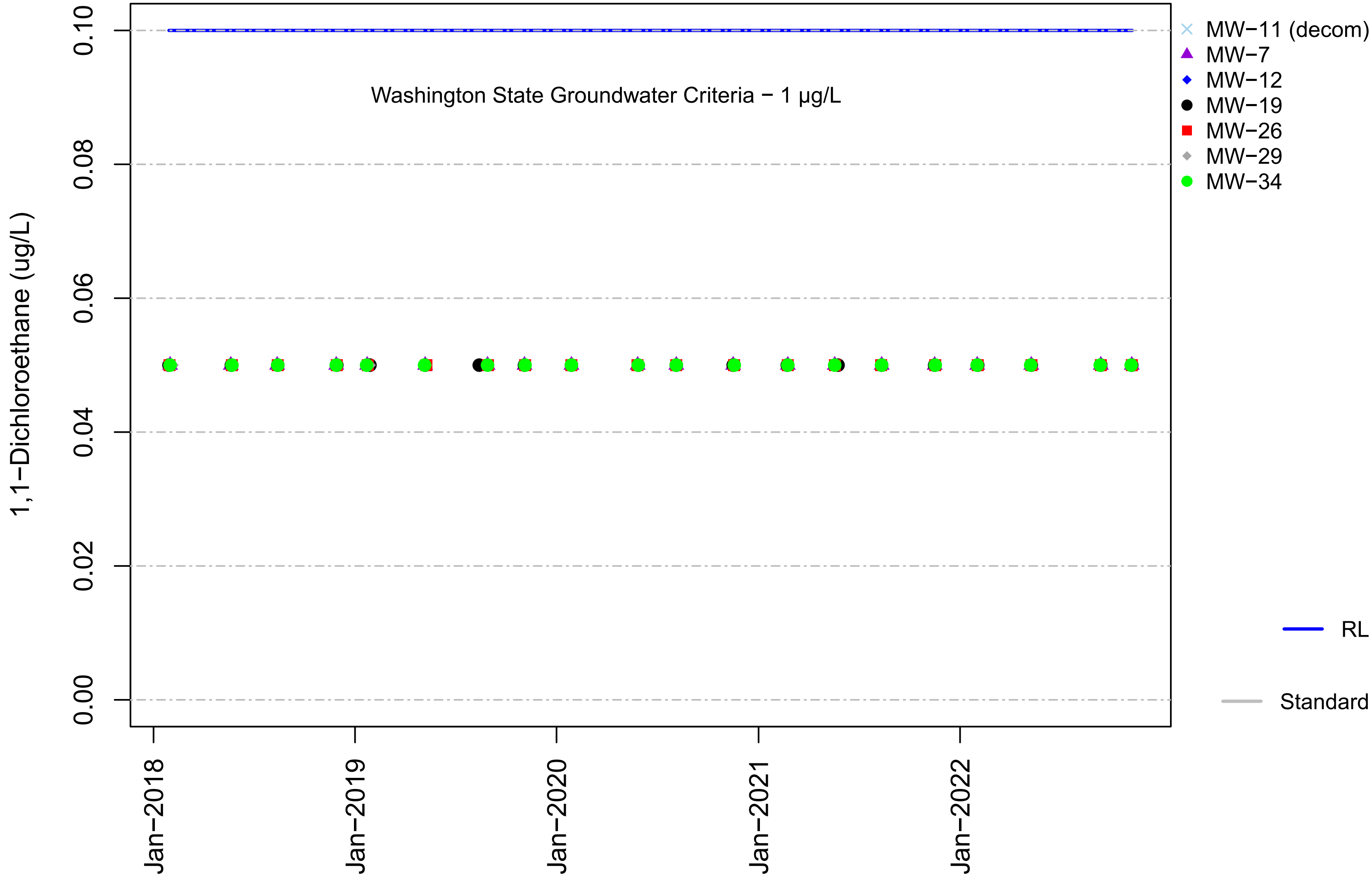
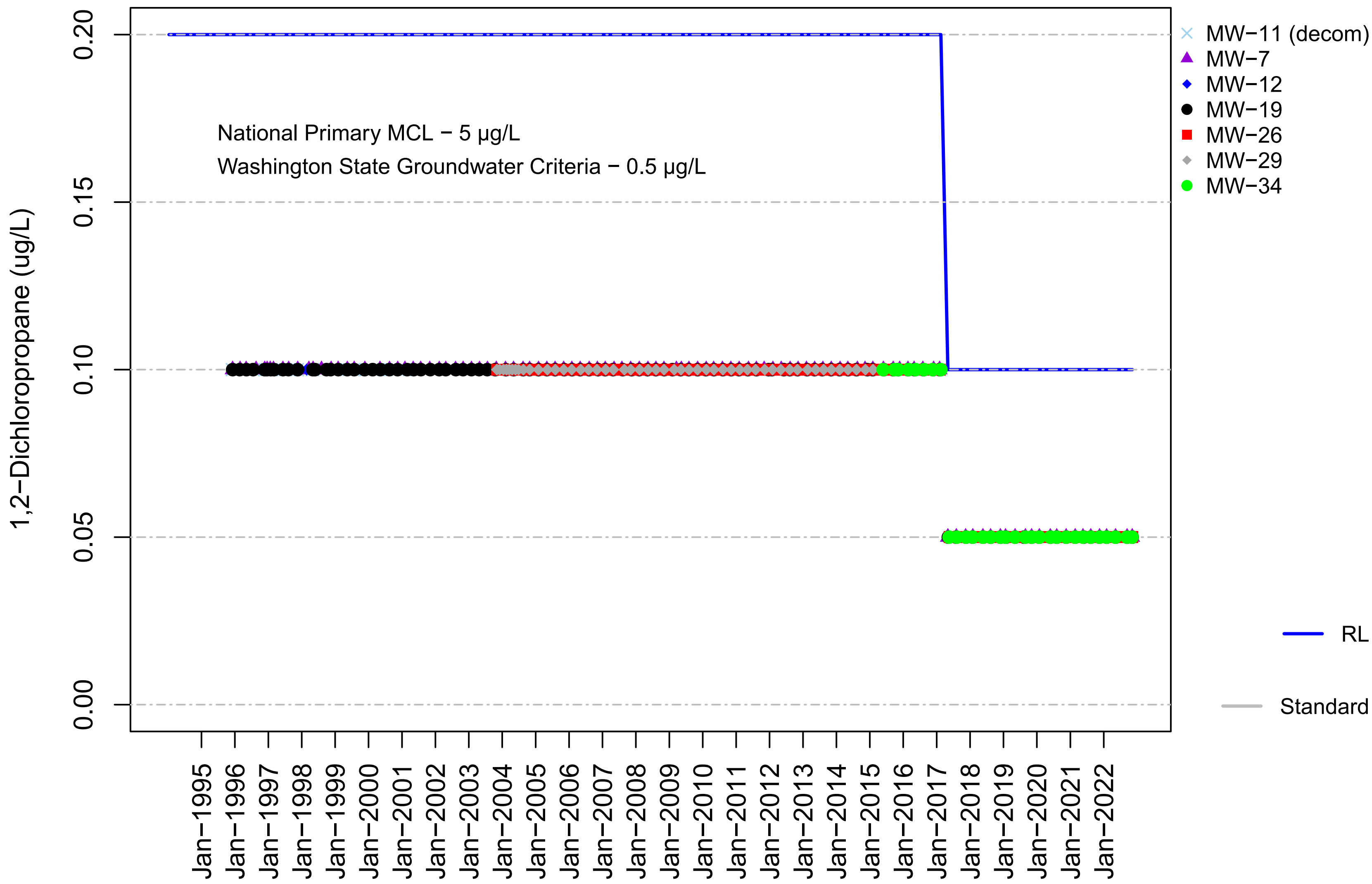


Figure F−17A
Unit D
1,2−Dichloropropane



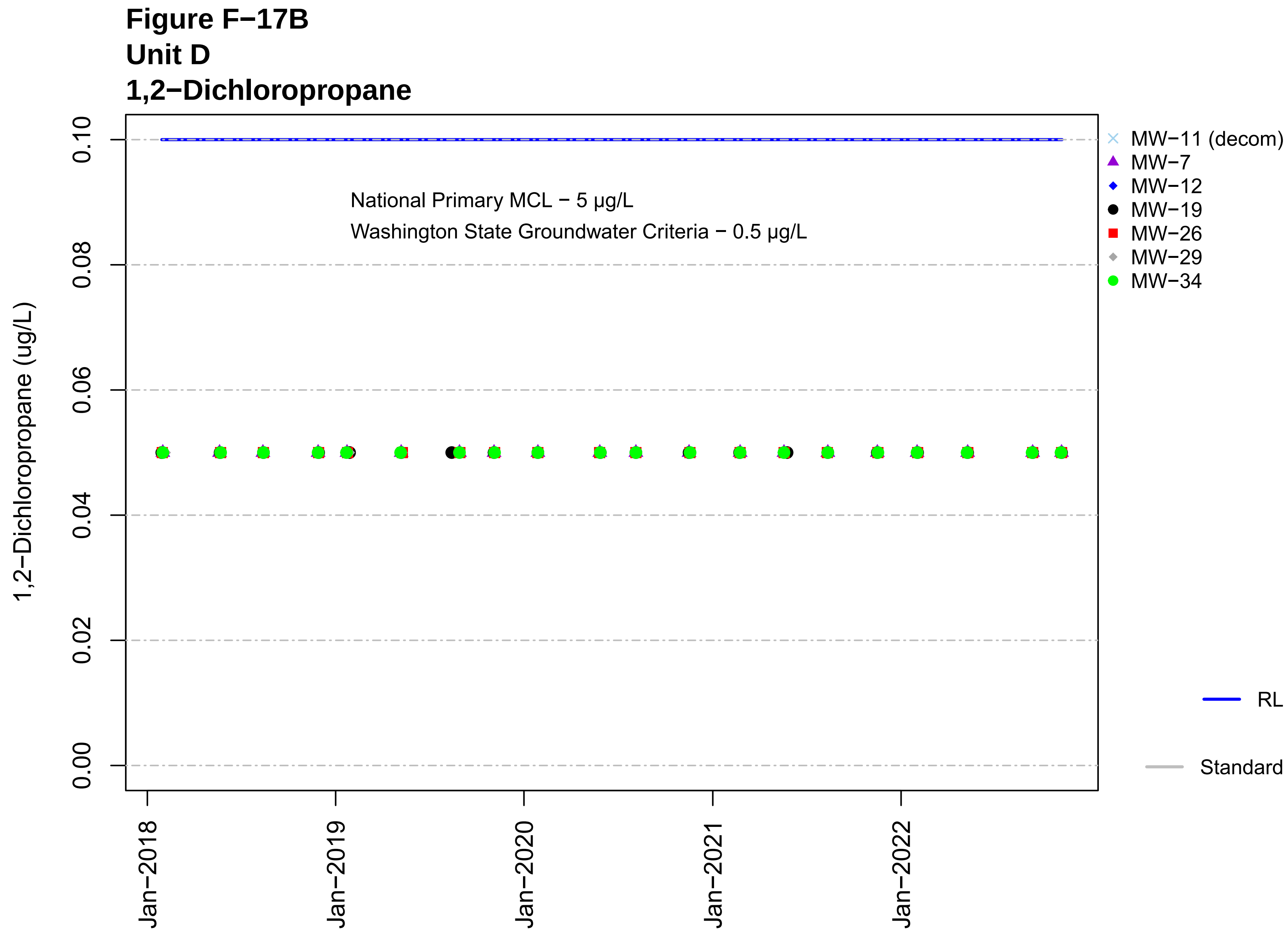
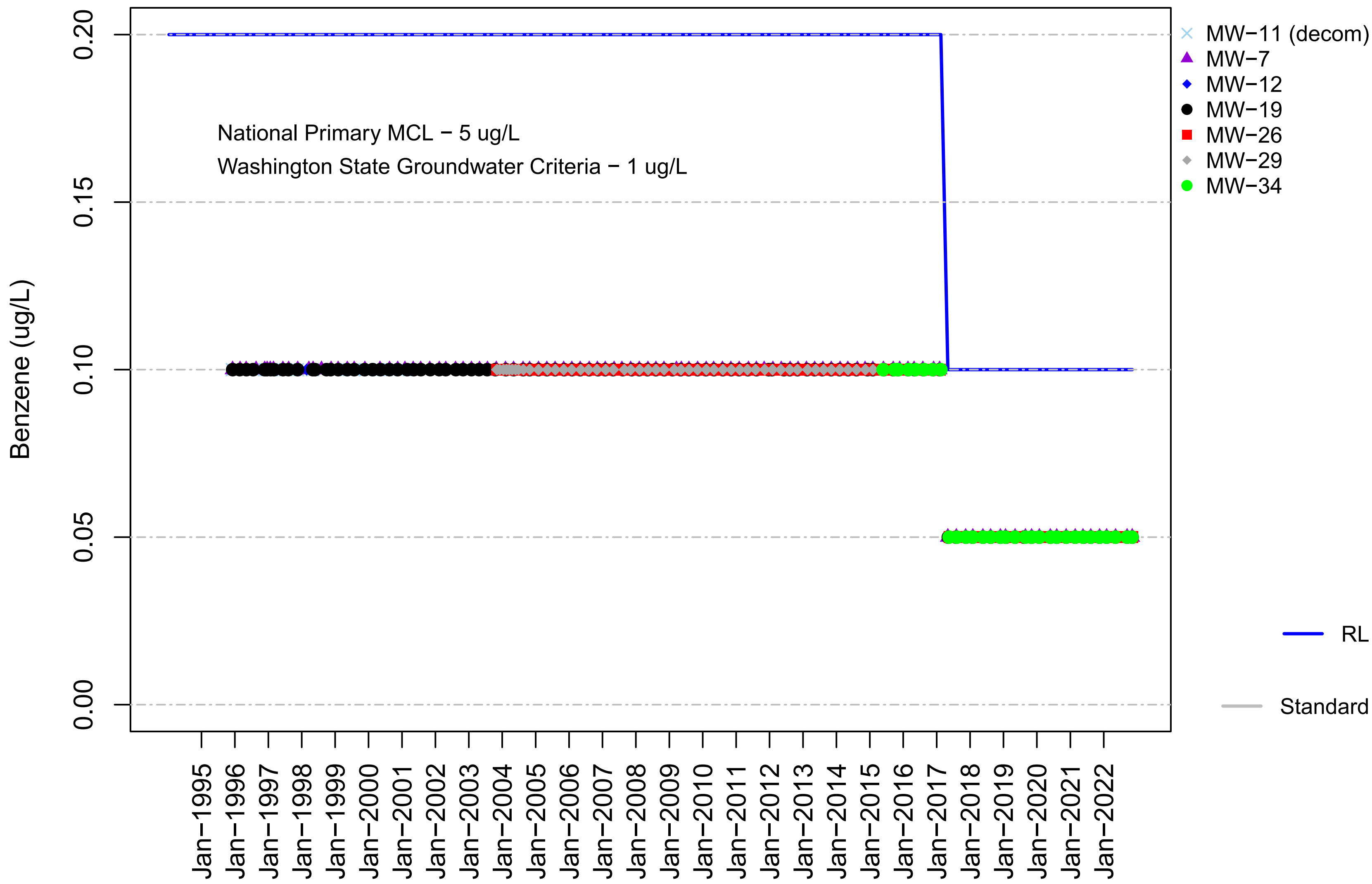


Figure F−17B
Unit D
1,2−Dichloropropane
National Primary MCL − 5 µg/L
Washington State Groundwater Criteria − 0.5 µg/L
1,2−Dichloropropane (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

Figure F−18A
Unit D
Benzene



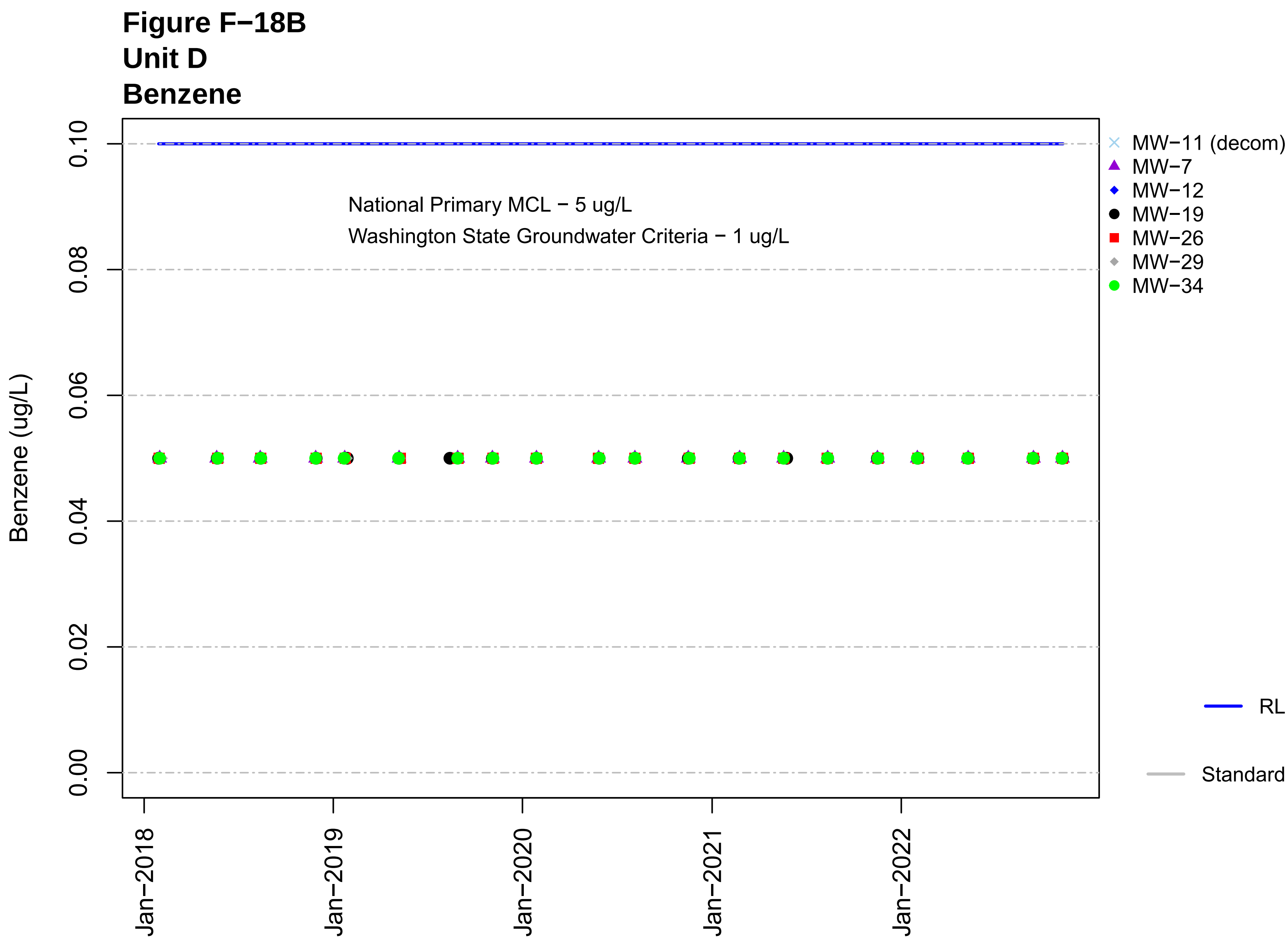


Figure F−18B
Unit D
Benzene
Benzene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
National Primary MCL − 5 ug/L
Washington State Groundwater Criteria − 1 ug/L
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

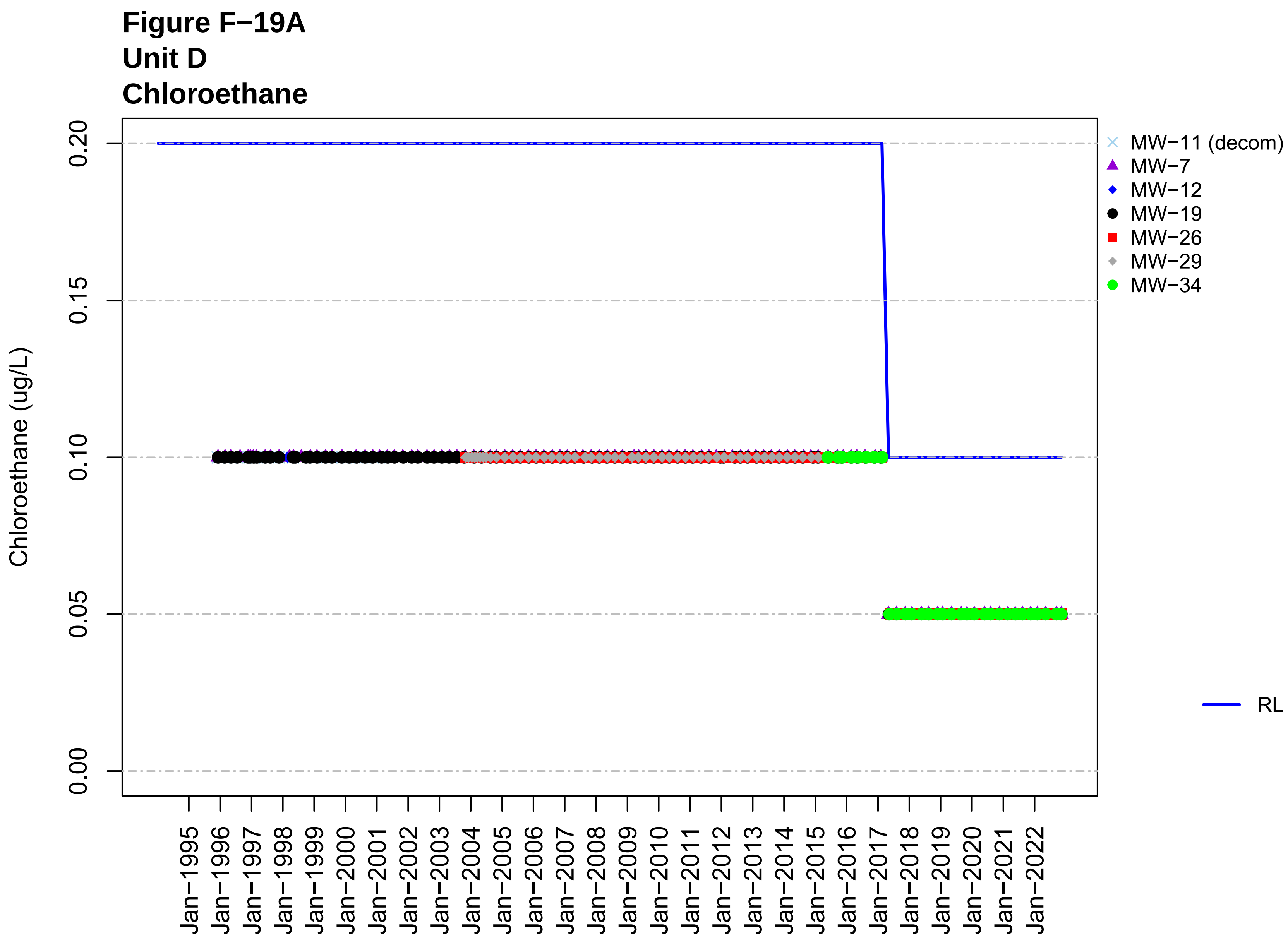


Figure F−19A
Unit D
Chloroethane
Chloroethane (ug/L)
0.00
0.05
0.10
0.15
0.20
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
Jan−2009
Jan−2010
Jan−2011
Jan−2012
Jan−2013
Jan−2014
Jan−2015
Jan−2016
Jan−2017
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

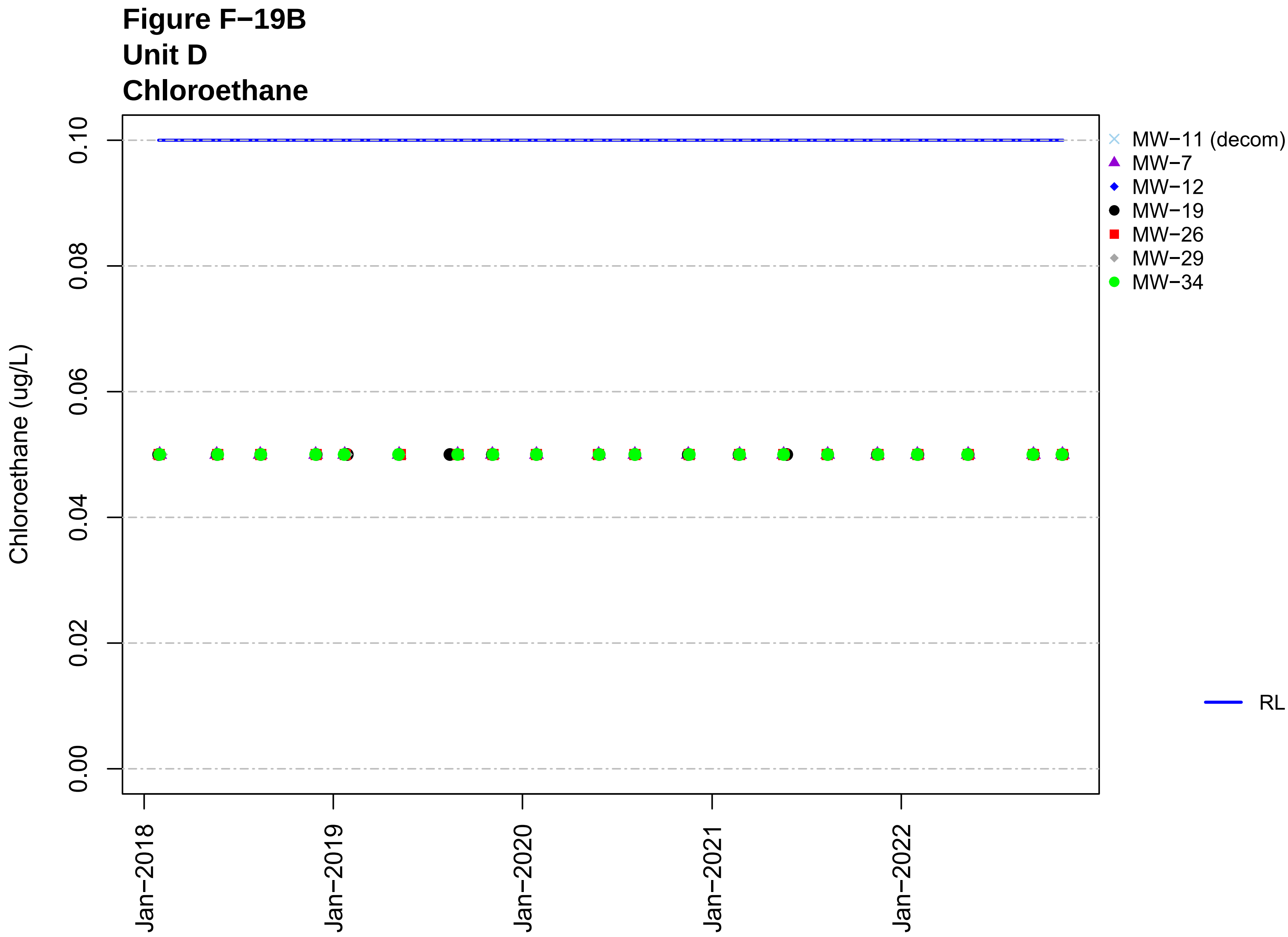


Figure F−19B
Unit D
Chloroethane
Chloroethane (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL

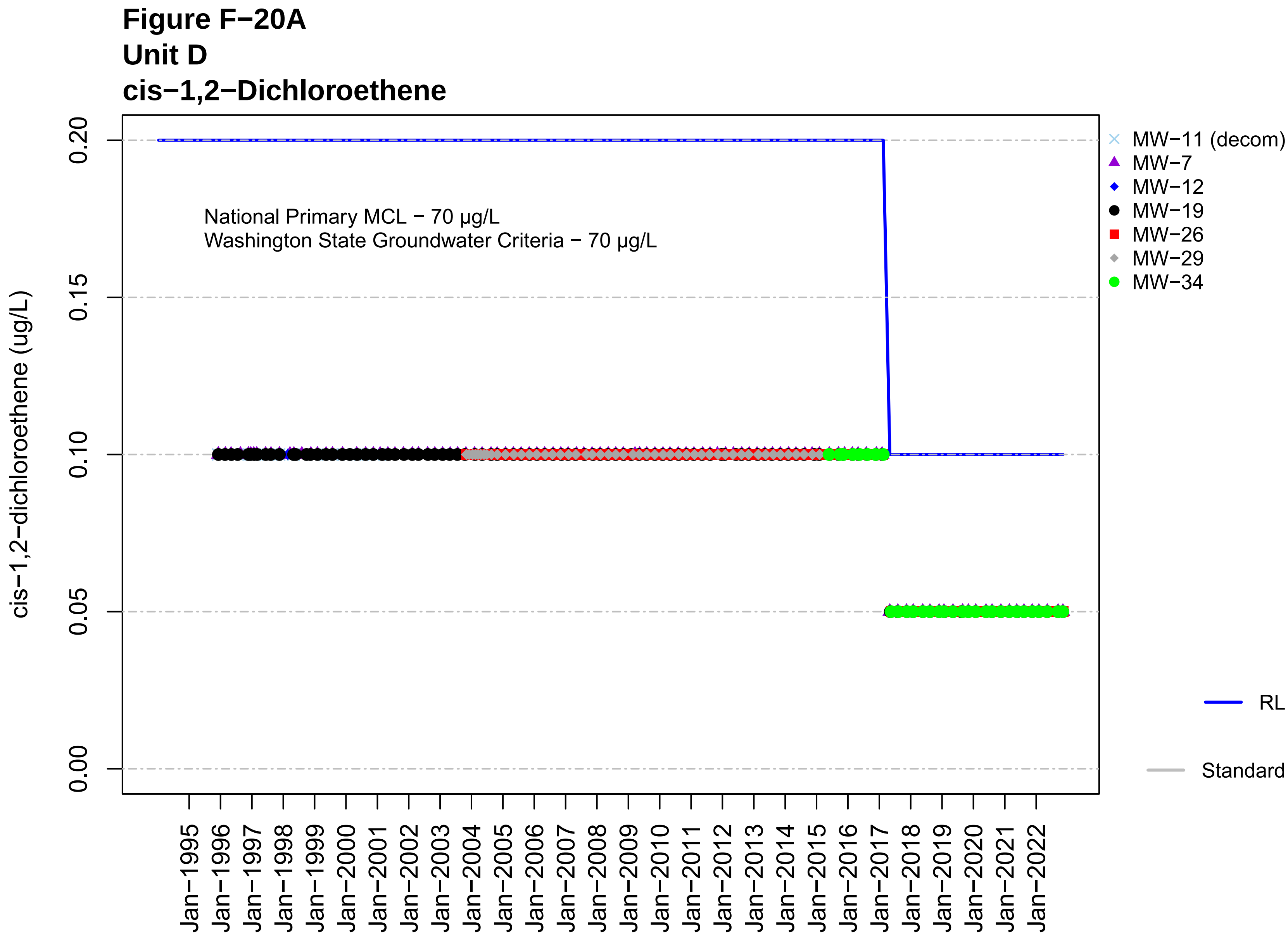


Figure F−20A
Unit D
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0.00
0.05
0.10
0.15
0.20
Jan−1995
Jan−1996
Jan−1997
Jan−1998
Jan−1999
Jan−2000
Jan−2001
Jan−2002
Jan−2003
Jan−2004
Jan−2005
Jan−2006
Jan−2007
Jan−2008
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
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

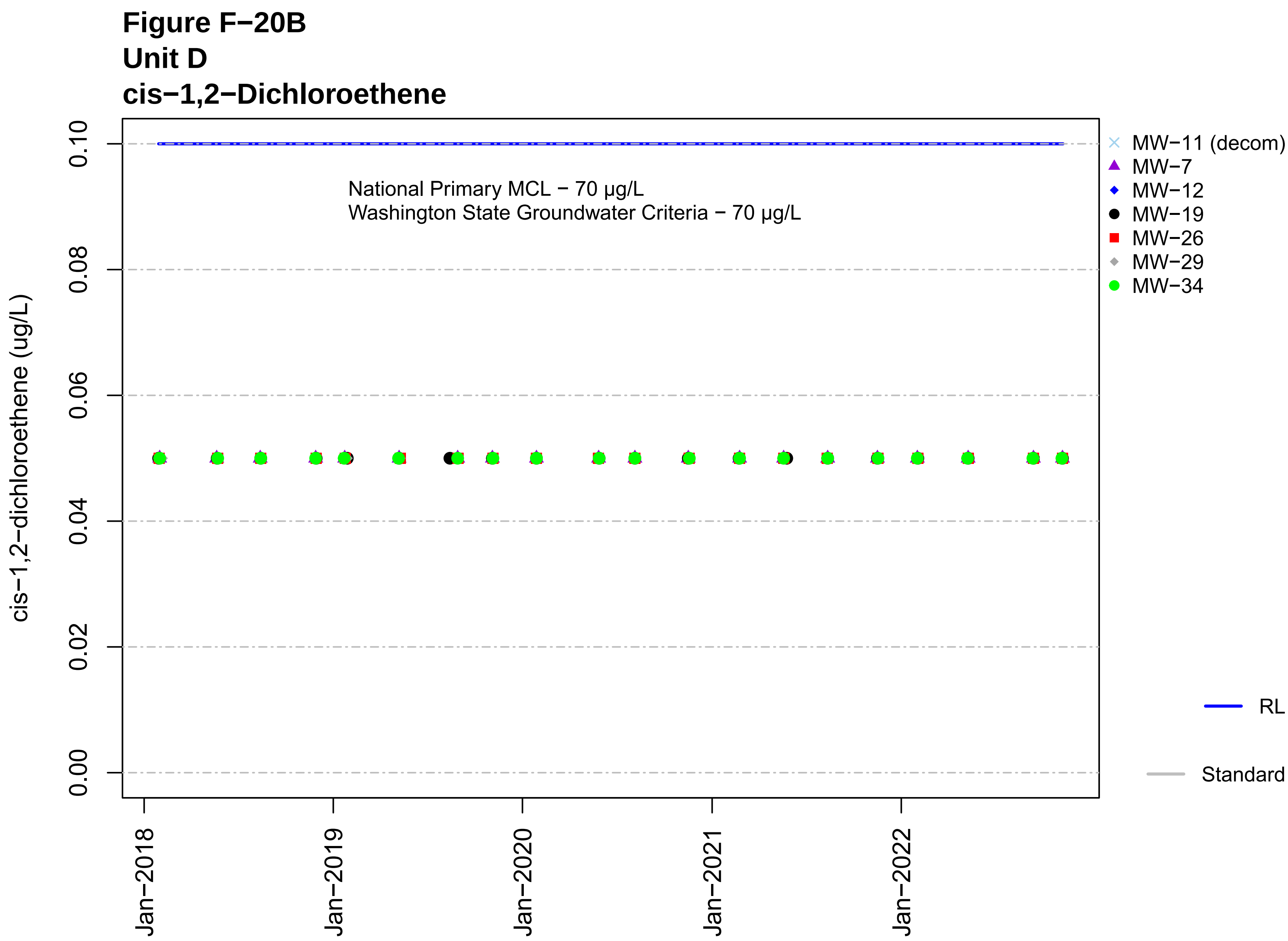


Figure F−20B
Unit D
cis−1,2−Dichloroethene
National Primary MCL − 70 µg/L
Washington State Groundwater Criteria − 70 µg/L
cis−1,2−dichloroethene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

Figure F−21A
Unit D
Dichlorodifluoromethane

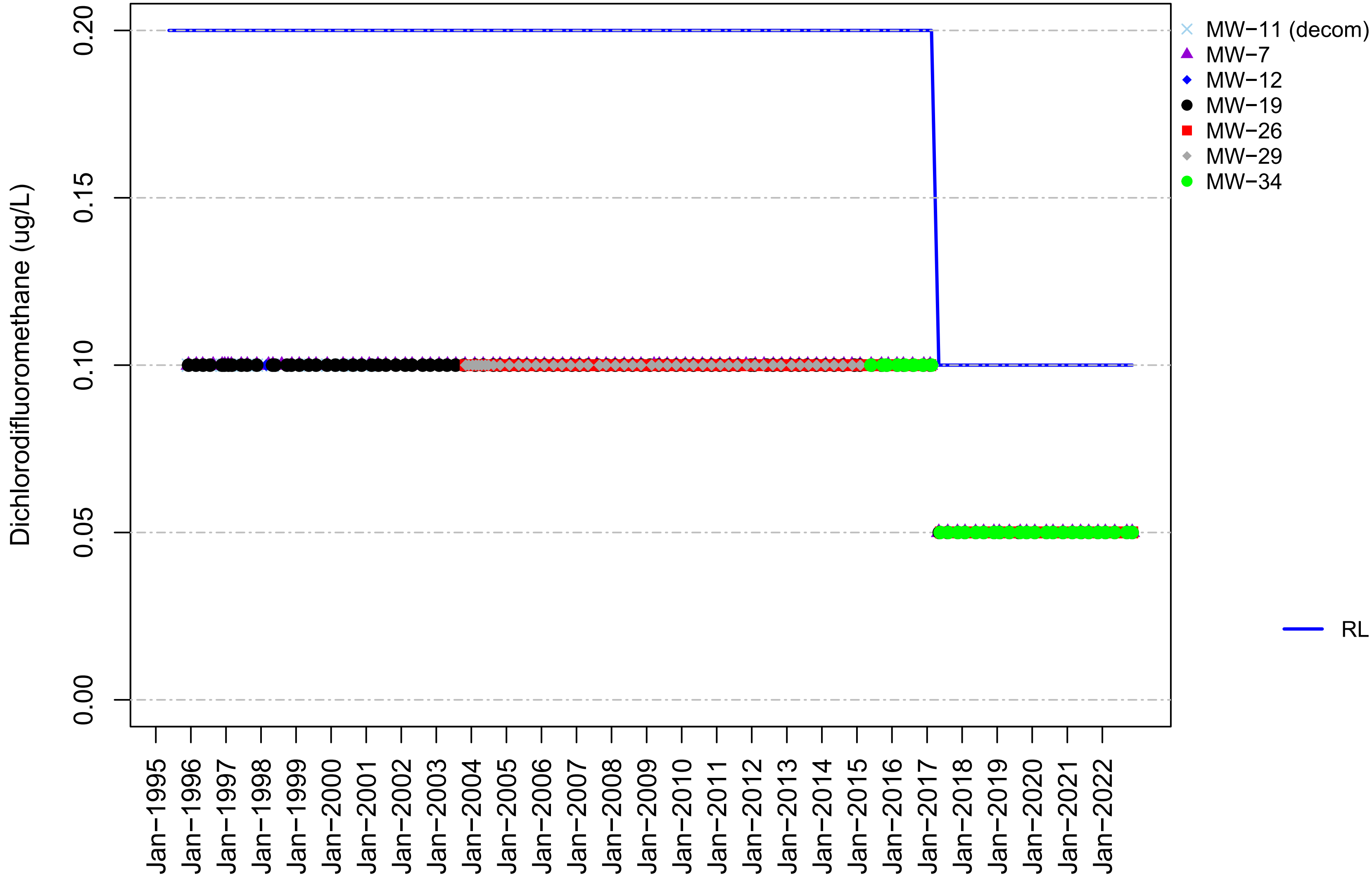


Figure F−21B
Unit D
Dichlorodifluoromethane

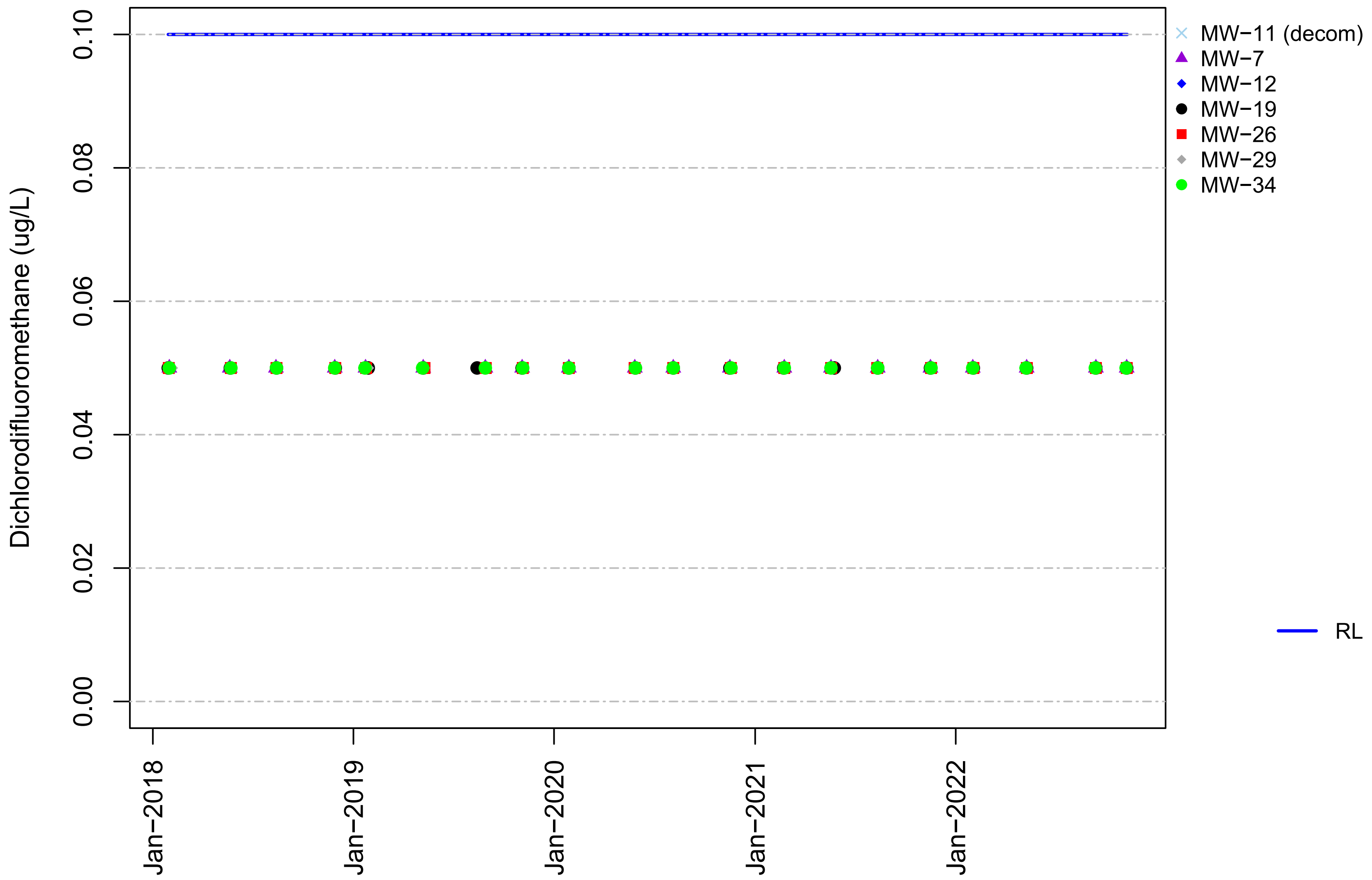


Figure F−22A
Unit D
Tetrachloroethene

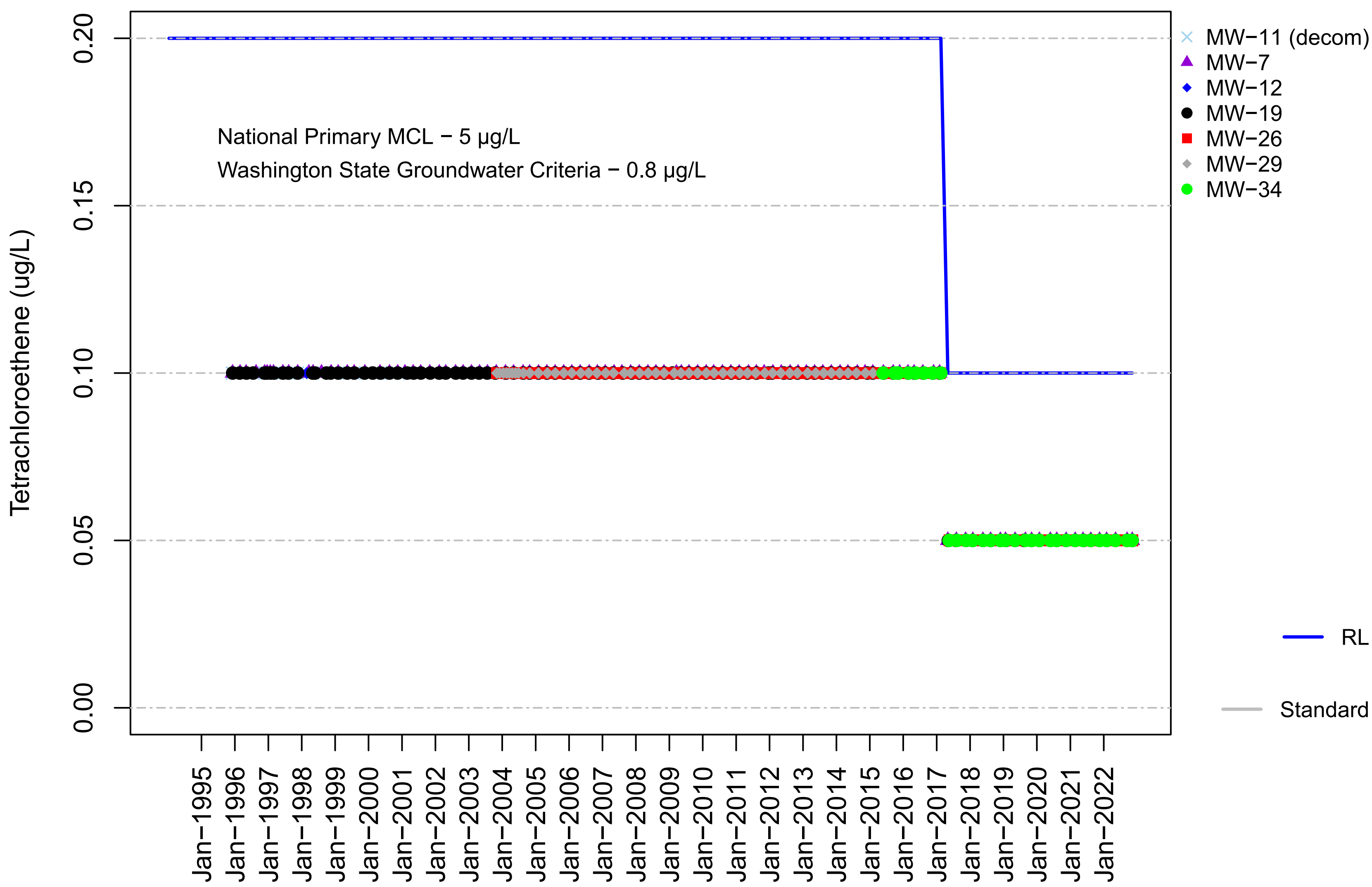


Figure F−22B
Unit D
Tetrachloroethene

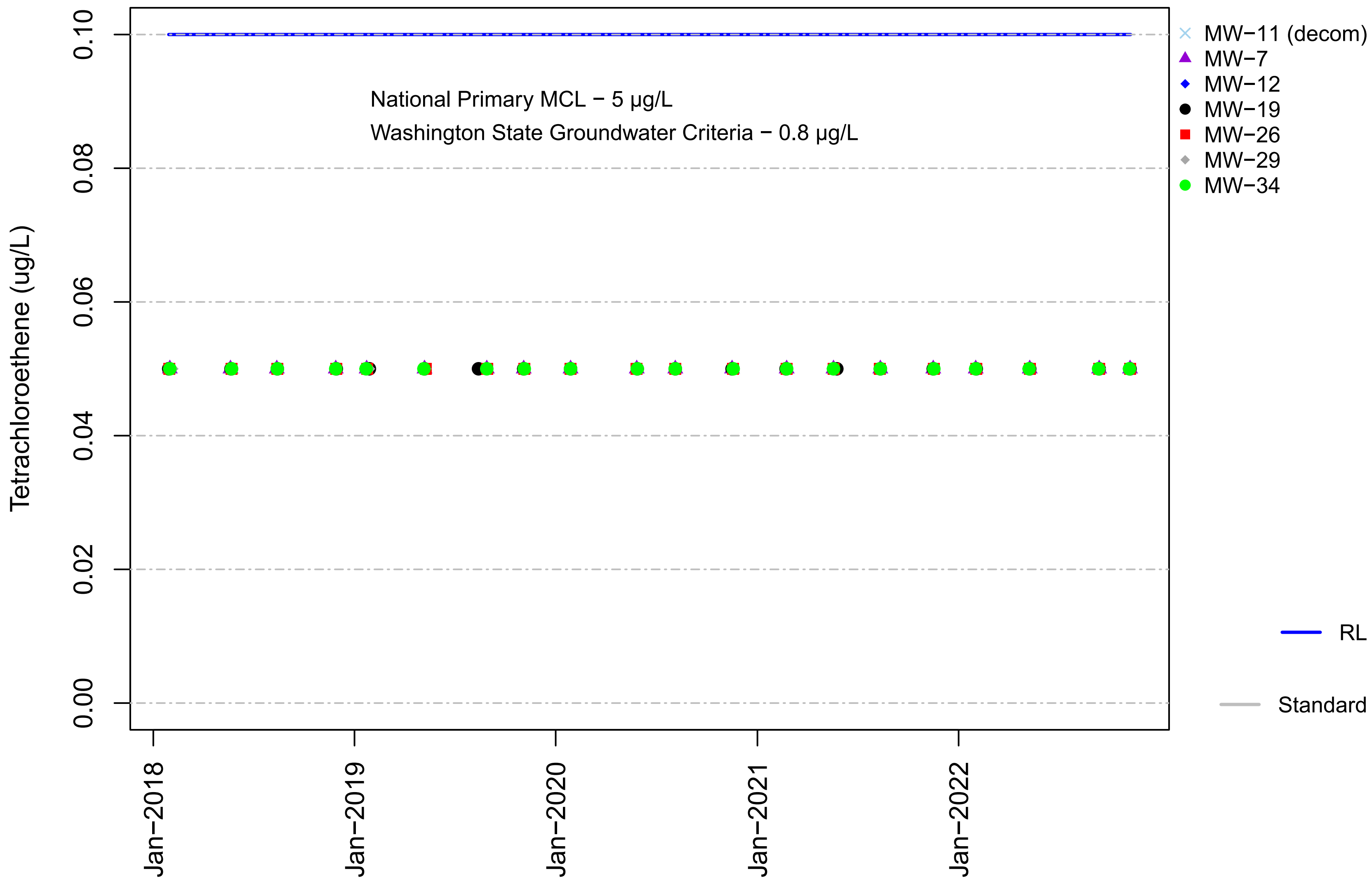
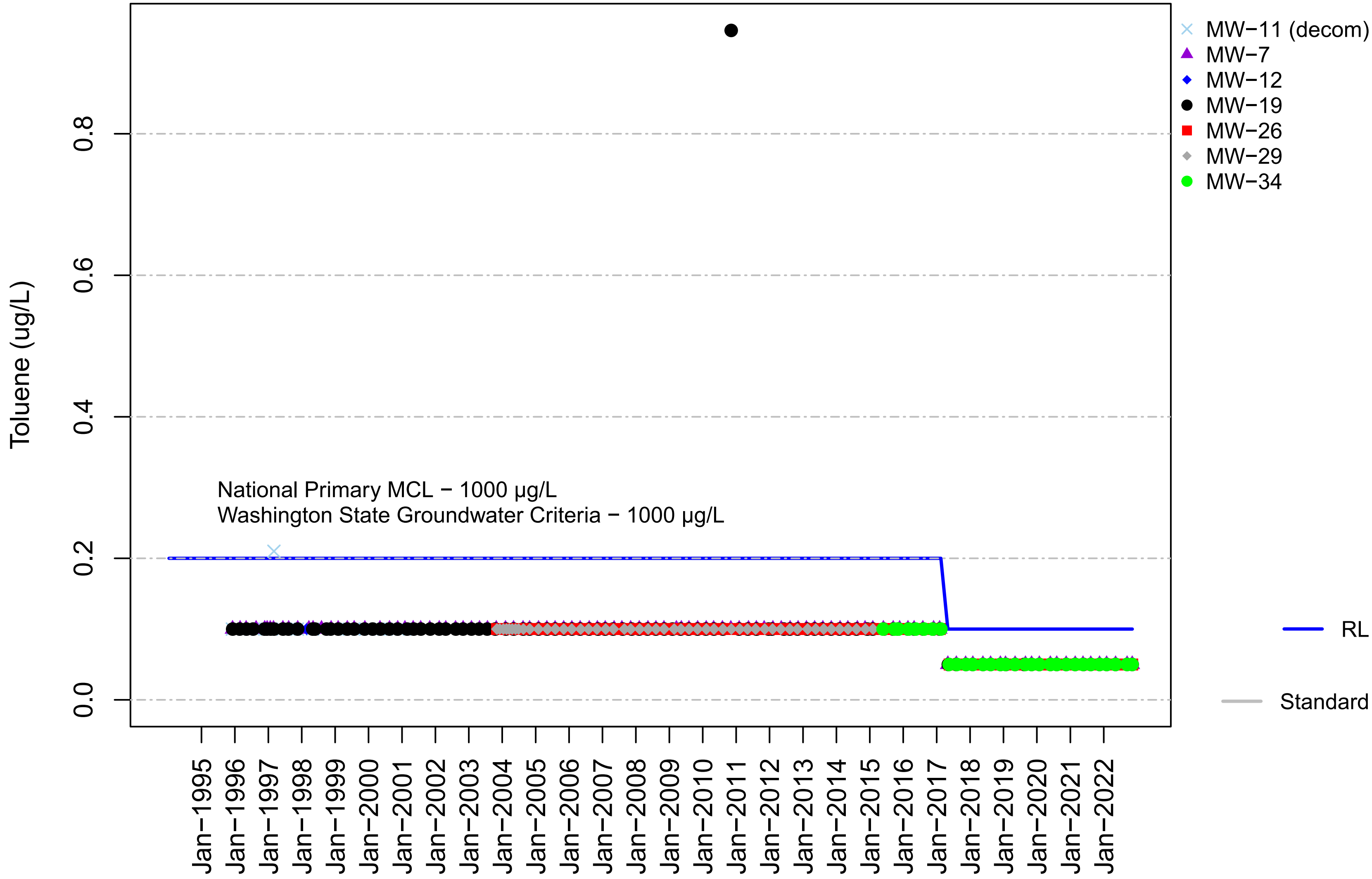


Figure F−23A
Unit D
Toluene



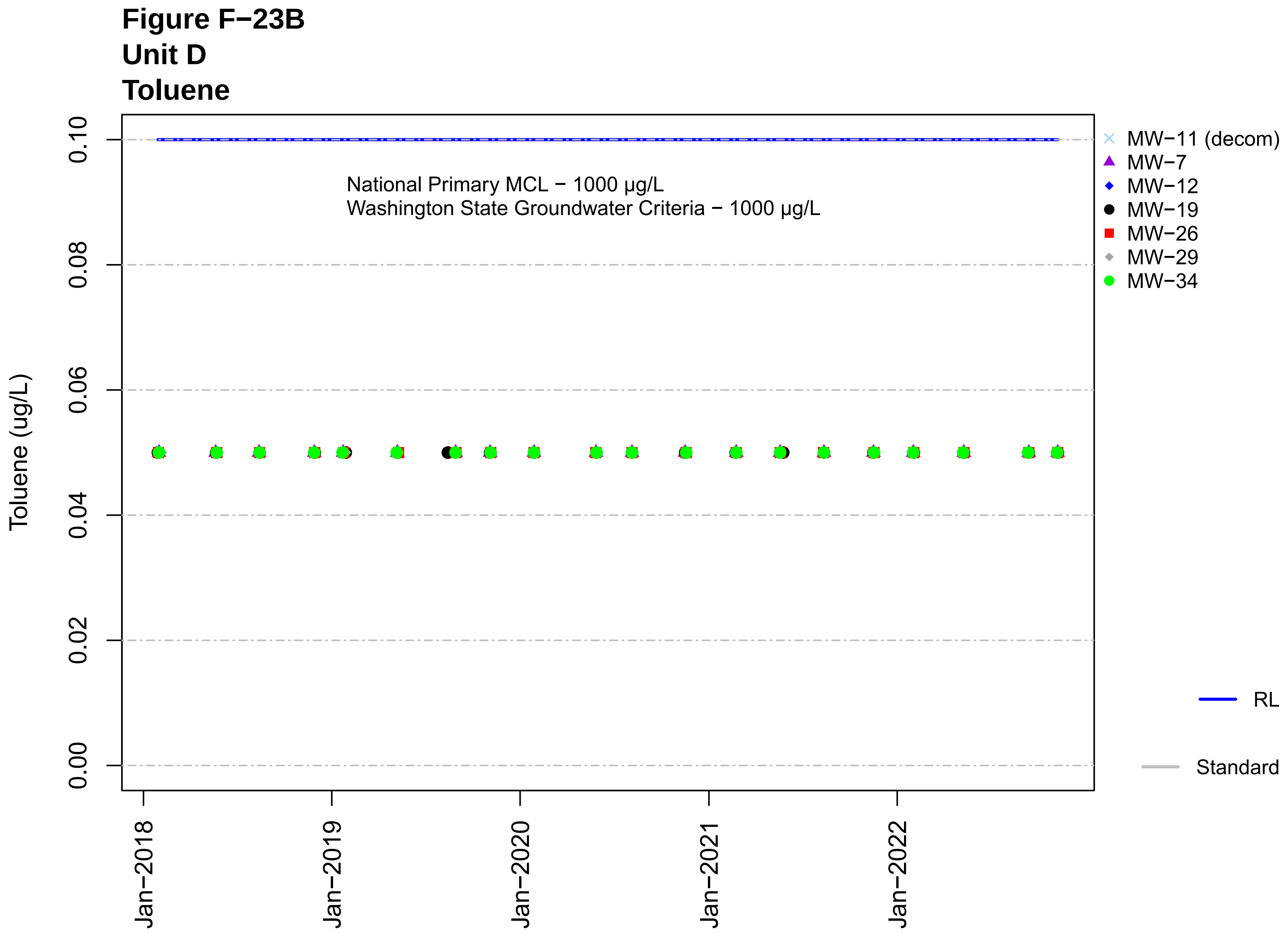


Figure F−23B
Unit D
Toluene
National Primary MCL − 1000 µg/L
Washington State Groundwater Criteria − 1000 µg/L
Toluene (ug/L)
0.00
0.02
0.04
0.06
0.08
0.10
Jan−2018
Jan−2019
Jan−2020
Jan−2021
Jan−2022
MW−11 (decom)
MW−7
MW−12
MW−19
MW−26
MW−29
MW−34
RL
Standard

Figure F−24A
Unit D
Trans−1,2−Dichloroethene

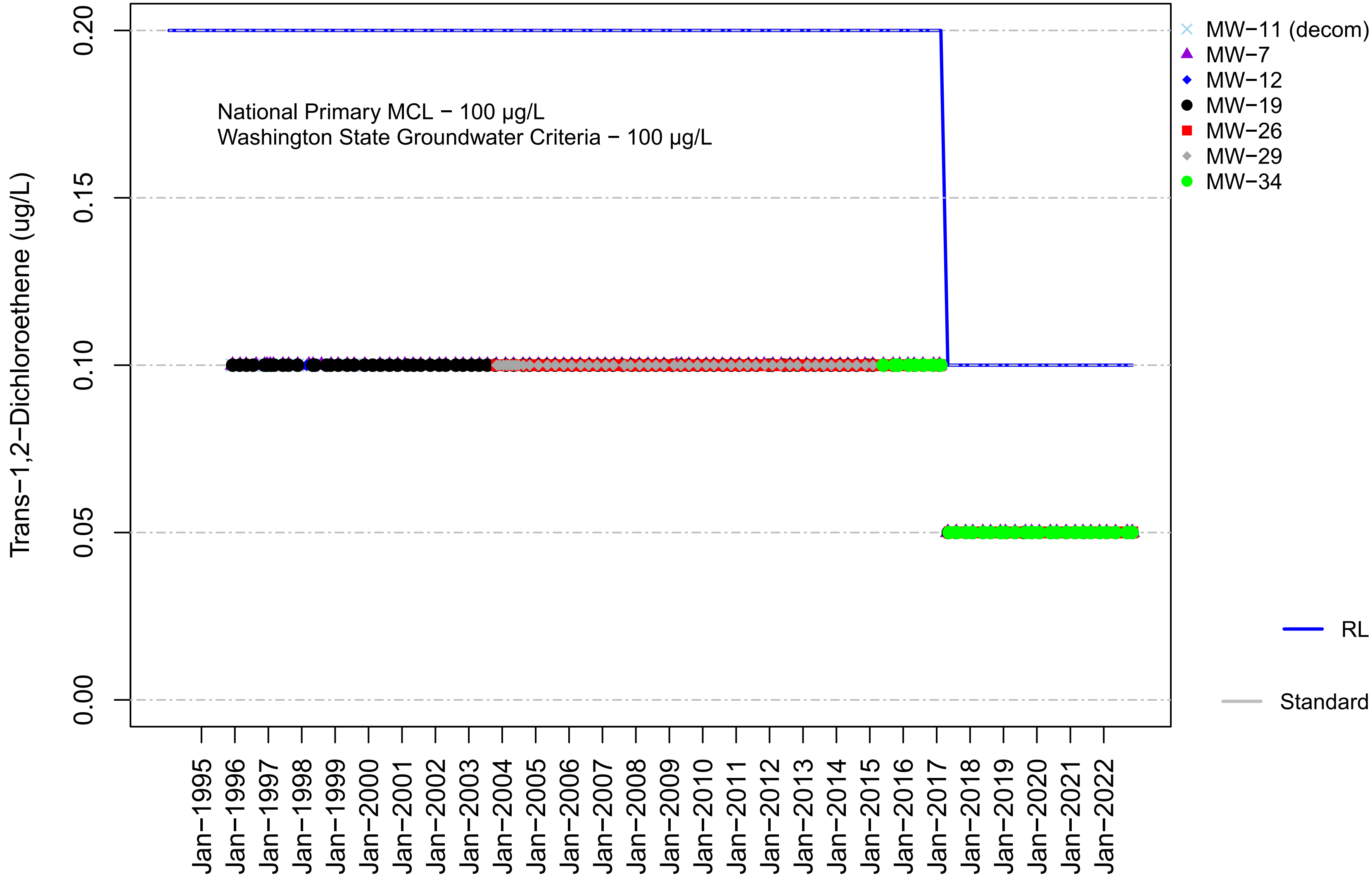


Figure F−24B
Unit D
Trans−1,2−Dichloroethene

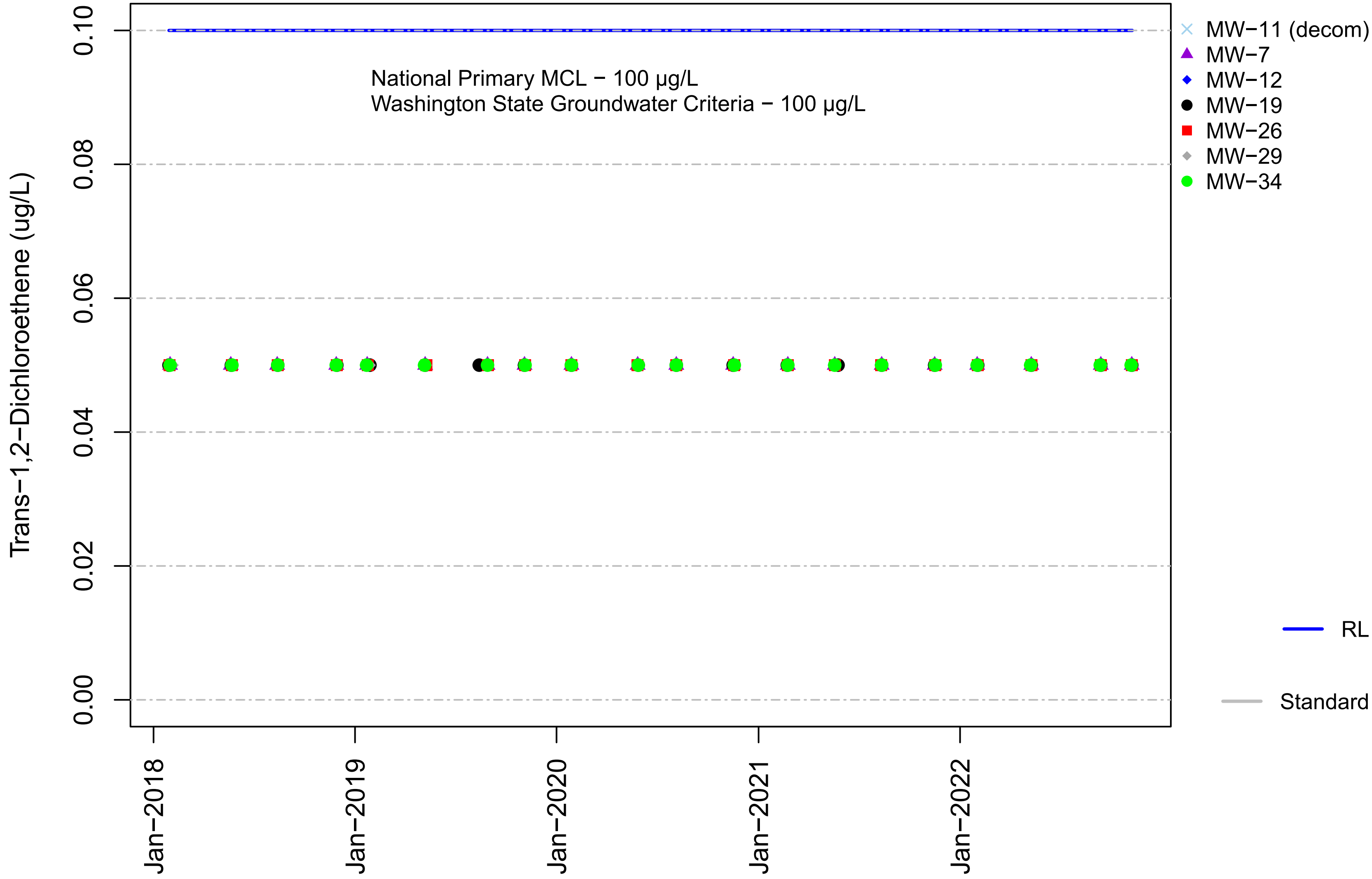


Figure F−25A
Unit D
Trichloroethene

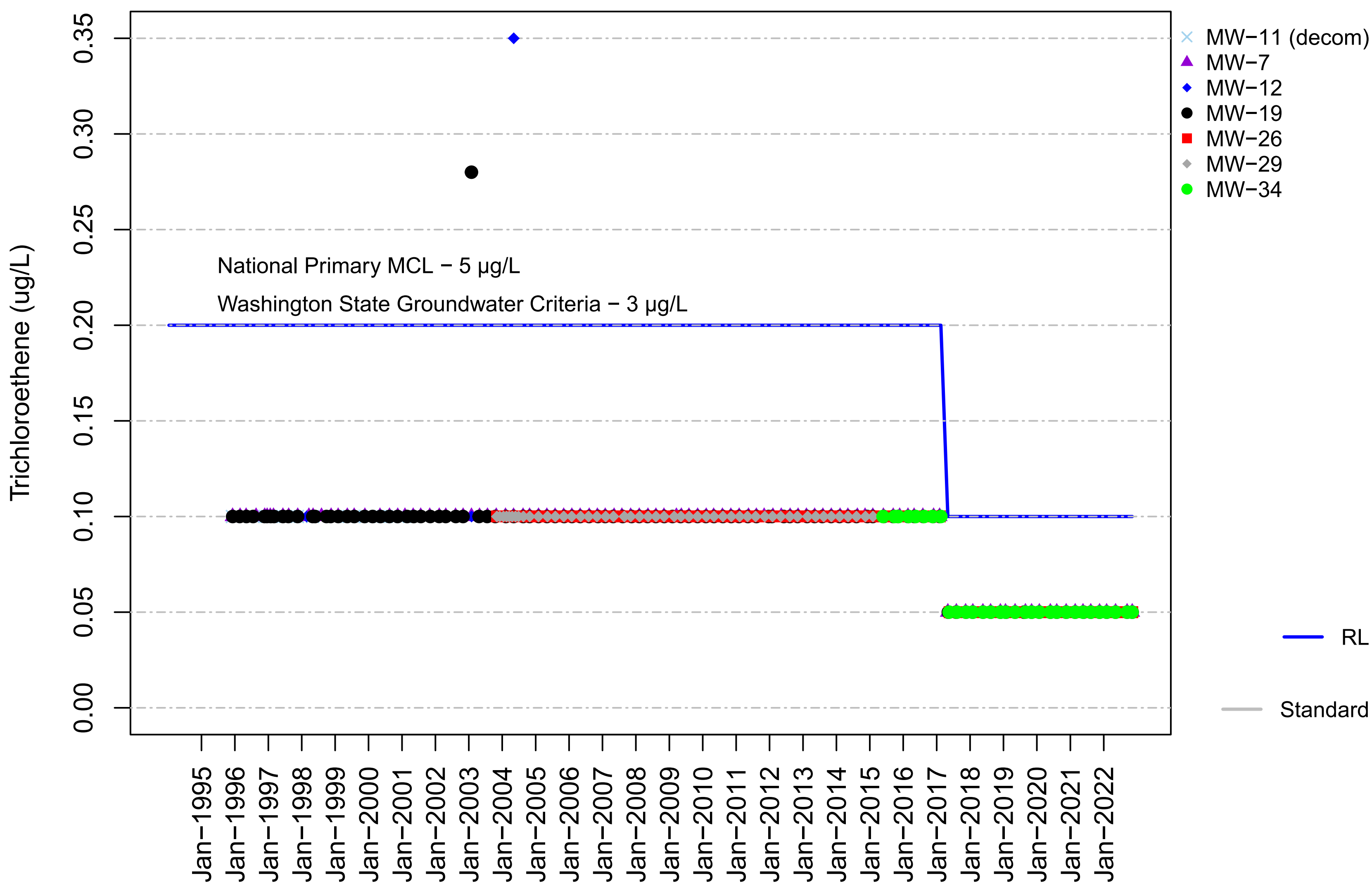


Figure F−25B
Unit D
Trichloroethene

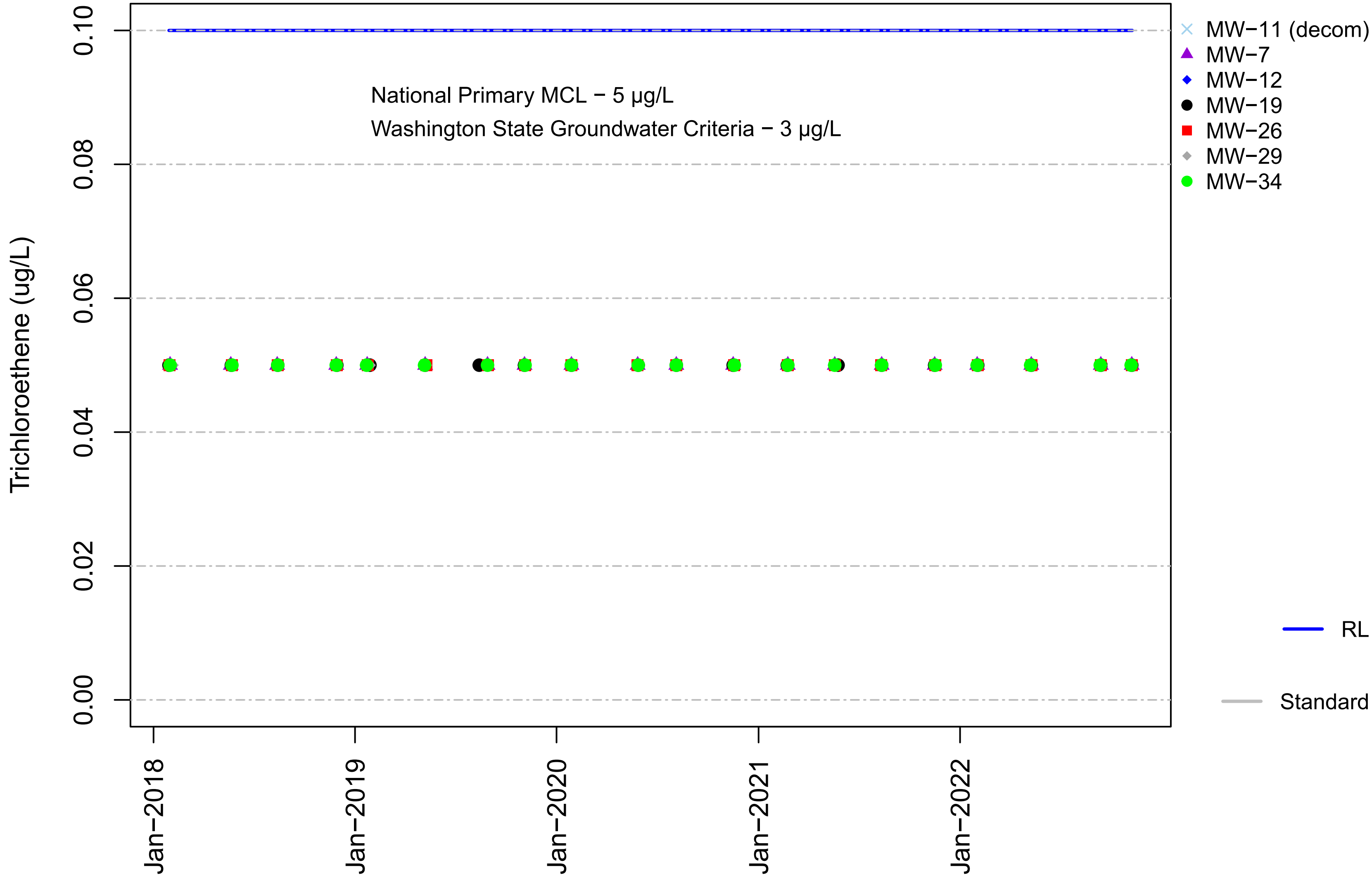


Figure F−26A
Unit D
Trichlorofluoromethane

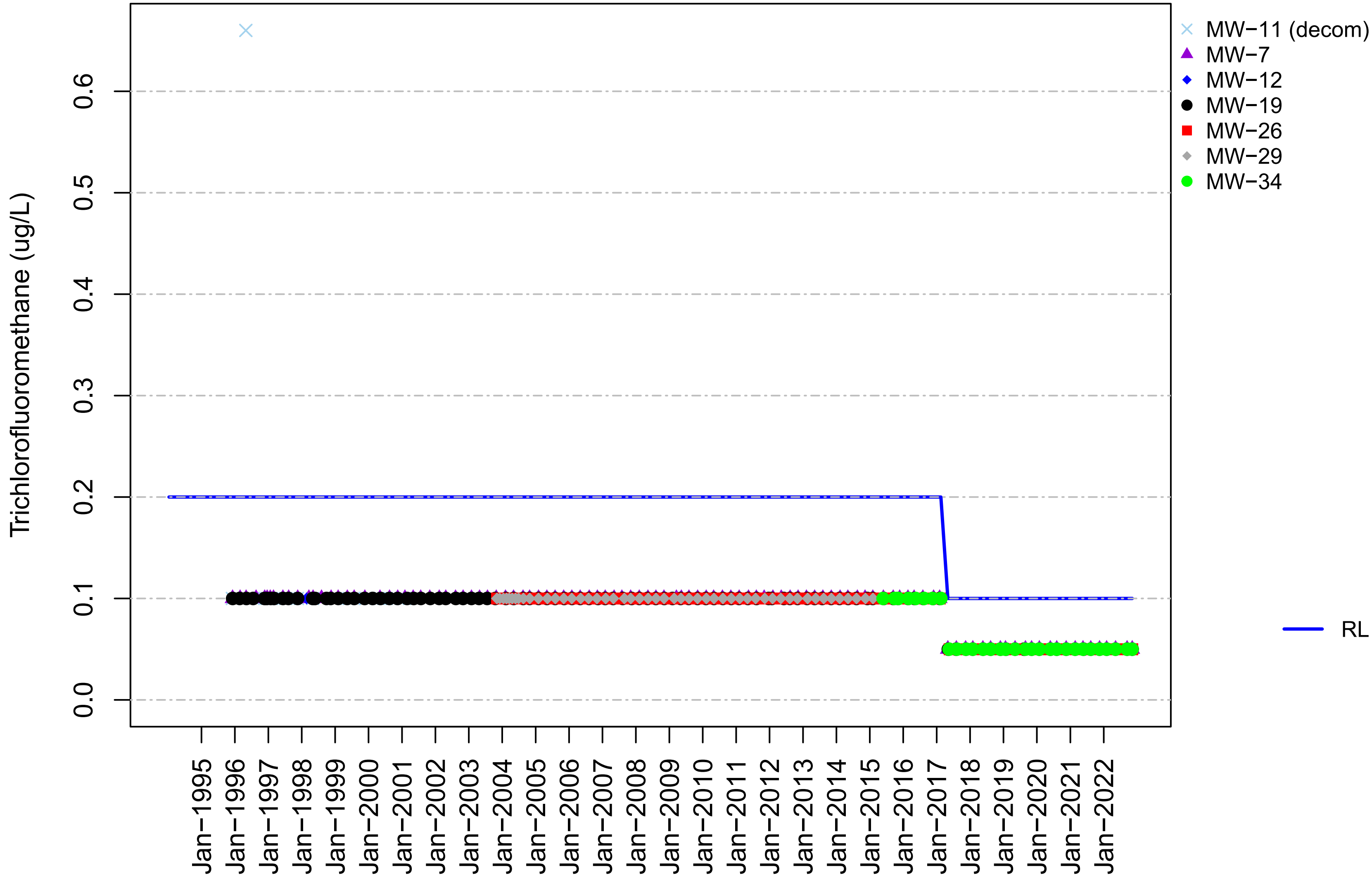


Figure F−26B
Unit D
Trichlorofluoromethane

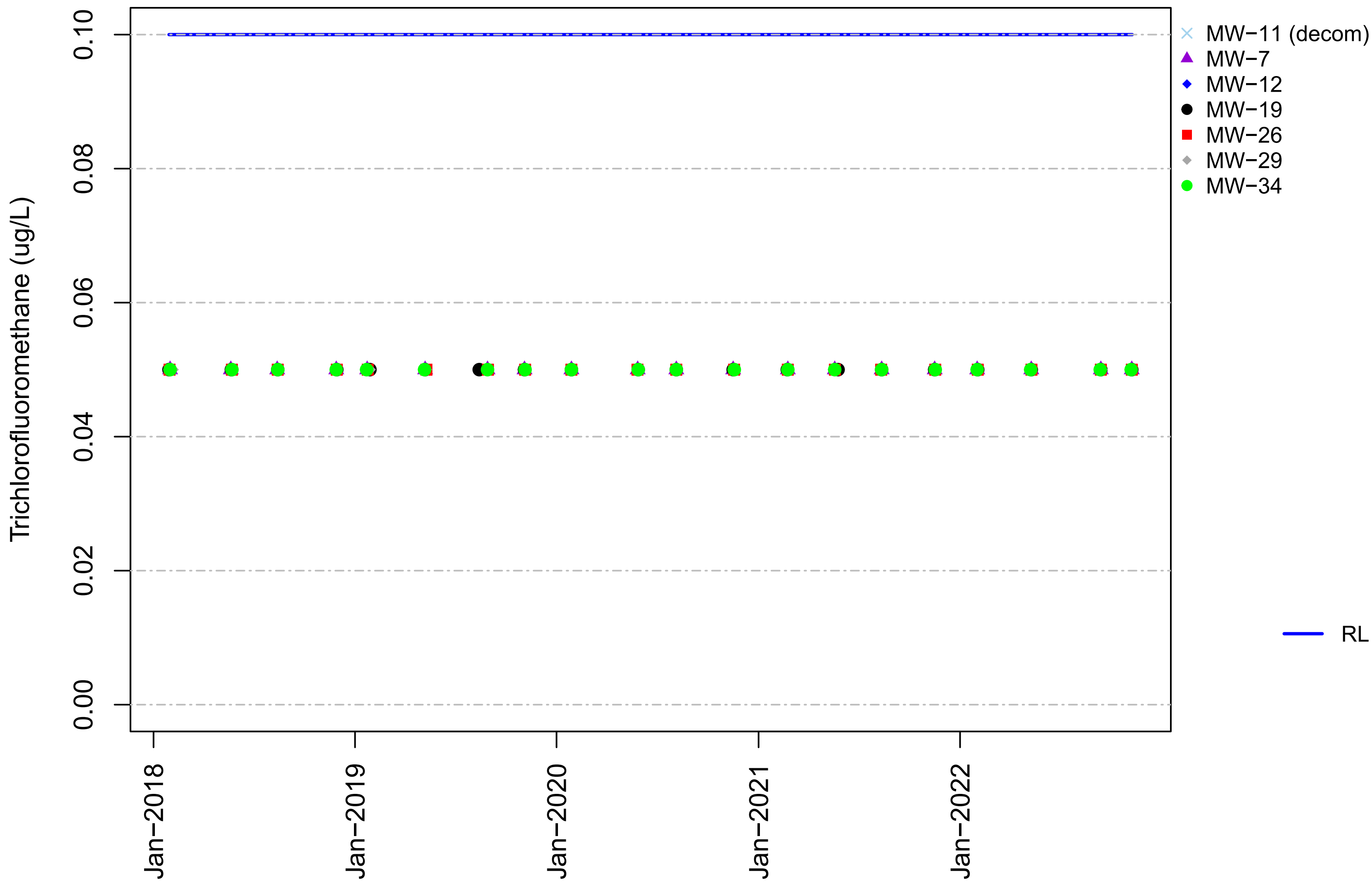


Figure F−27A
Unit D
Vinyl chloride

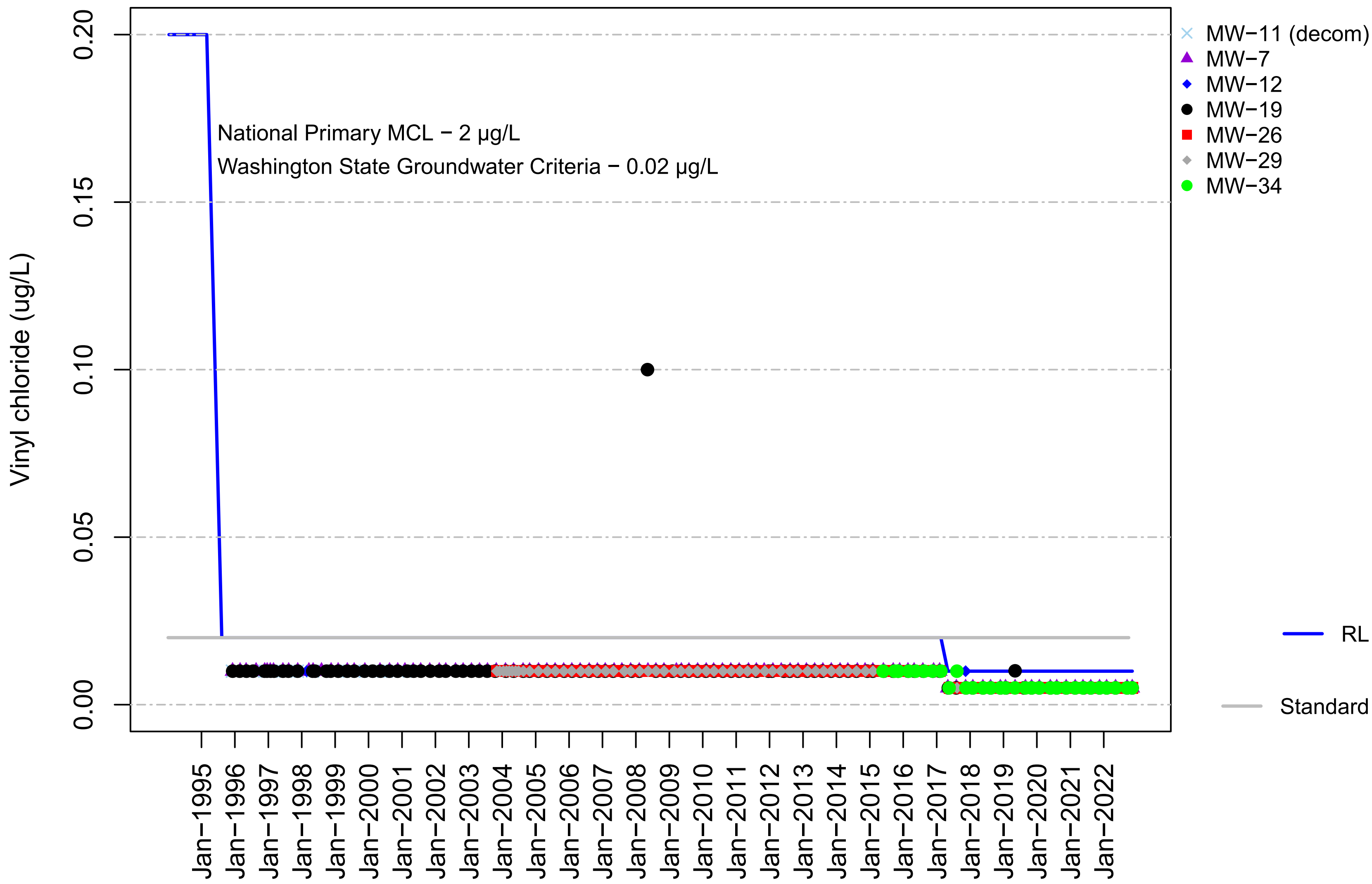
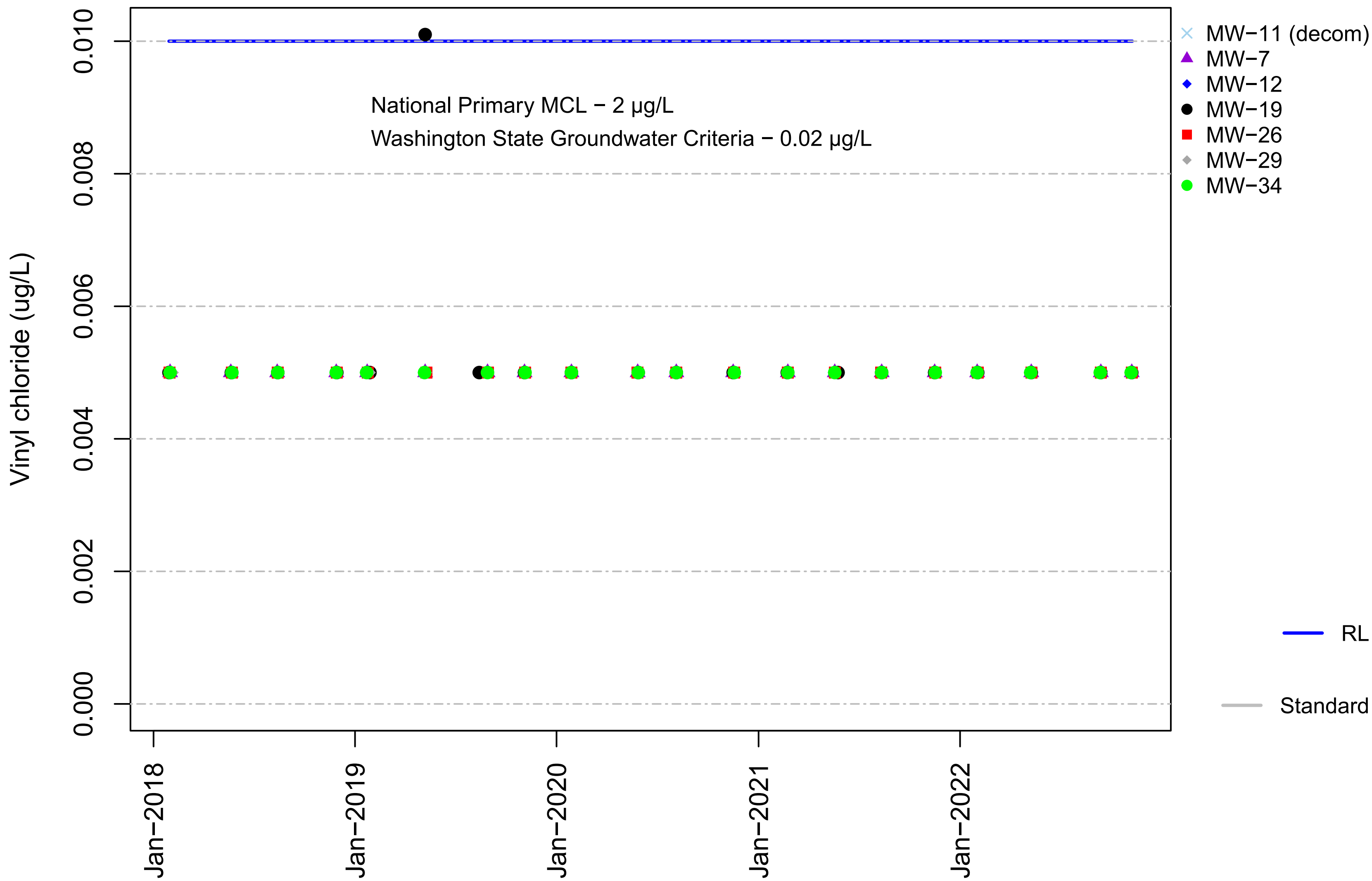


Figure F−27B
Unit D
Vinyl chloride



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 25, 2022

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

FM: Eric Ferguson and Sevin Bilir, Science and Technical Support Section, Water and Land Resources Division, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
First Quarter 2022 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 2022 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 January 31, 2022. These measurements were received by WLRD in May 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.

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 January 31, 2022.

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 January 31, 2022.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on January 31, 2022, 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 2022.

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 2022 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 0.020 ft/ft property wide and 0.012 ft/ft for the south slope area based on measurements made during the first quarter of 2022. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the first quarter of 2022, are approximately 0.029 and 0.017 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 0.81 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 1.45 and 0.88 ft/d in the northerly and southerly direction, respectively.

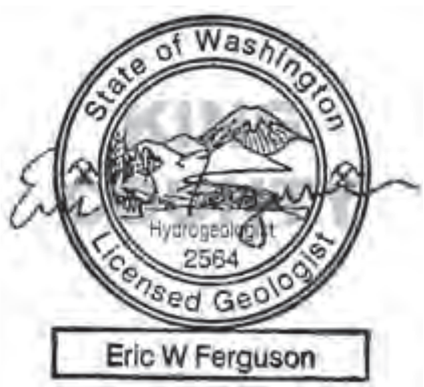
References

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 206-477-4690 (eric.ferguson@kingcounty.gov) or Sevin at 206-477-4646 (sevin.bilir@kingcounty.gov).

Sincerely,



Eric W Ferguson, WA LHG
Water Quality Planner - Hydrogeologist
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – First Quarter 2022
Table A-2:	Groundwater Parameters – First Quarter 2022
Figure A-1:	Groundwater Potentiometric Surface Map – First Quarter 2022 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – First Quarter 2022 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – First Quarter 2022
Vashon Island Closed Landfill
King County, Washington

							January 31, 2022	
	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	74.14	243.83
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	165.18	239.99
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	122.20	248.12
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.89	242.16
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	4.62	231.05
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	112.66	246.51
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.73	242.61
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	192.23	184.52
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	143.09	172.44
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	246.38	159.05
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.47	158.86
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	248.00	158.54
	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	244.56	169.29
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	205.14	180.82

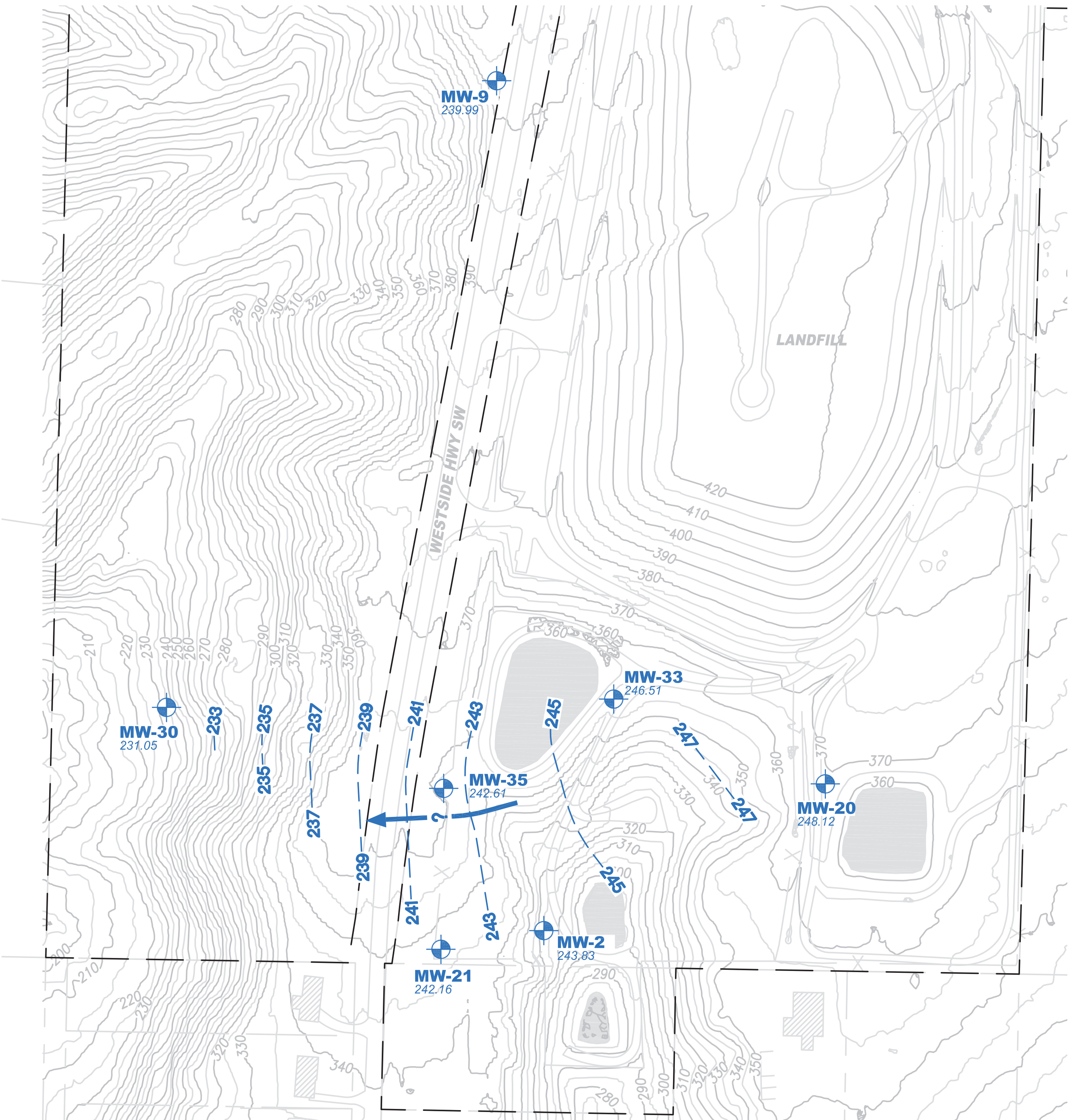
Notes:
1. Water level measurements made by SWD personnel.
2. Reference datum for eastings and northings is the North American Datum of 1983 (NAD83/11).
3. MW-28 requires 2 foot rise in groundwater levels. MW-28 screen installed at contact between Unit D and unit below (Unit E). Historically reported 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 2022
Vashon Island Closed Landfill
King County, Washington

Water Bearing Zone	Horizontal Hydraulic Conductivity (K)[1,2] Range	(cm/s)	(ft/d)	Effective Porosity (n_{eff})[1]	January 31, 2022 Horizontal Hydraulic Gradient (DH/DL)[3] (ft/ft)	Horizontal Groundwater Velocity (v) (ft/d)	General Groundwater Flow Direction
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		0.033	7.60	
	Average[6]	2.9E-03	8.21		0.020	0.81	
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	1.61	
	Average[6]	2.1E-03	5.81		0.012	0.34	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.029	0.62	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			6.57	
	Average	3.6E-03	10.2			1.45	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.017	0.38	Southwest - away from divide
	High	1.6E-02	46.1			3.98	
	Average	3.6E-03	10.2			0.88	

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 January 31, 2022.

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
First Quarter 2022 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

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

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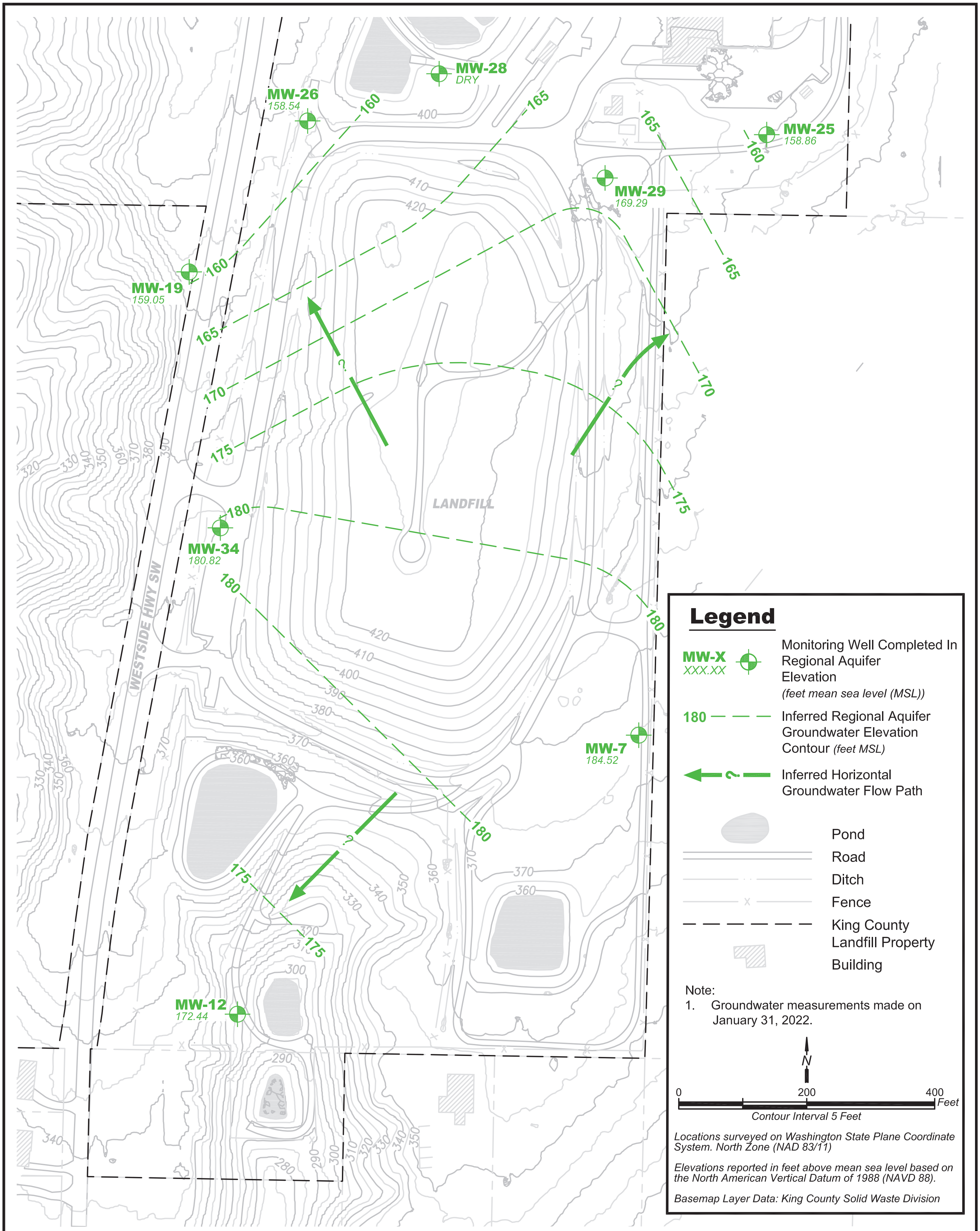

King County

Groundwater Potentiometric Surface Map

First Quarter 2022 - Unit D Aquifer

Vashon Island Closed Landfill

King County, Washington

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

VI_1Q2022_UnitD.dwg

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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 31, 2022

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

VIA: Eric Ferguson, Water Quality Planner – Hydrogeologist, Science and Technical Support Section, Water and Land Resources Division, DNRP

FM: Adrienne Scott, Engineer II, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Second Quarter 2022 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 2022 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 6, 2022. These measurements 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.

Since the first quarter 2022 quarterly report was submitted, groundwater monitoring well MW-37 was installed within the Cc2 perched zone, near the southern property boundary. The additional groundwater measurement at well MW-37 has elucidated a south-southeast flowpath for the south slope area of the Cc2 perched unit. Excluding the south slope area of the Cc2 perched zone, there have been no significant changes in the interpreted groundwater conditions since the report submitted for the first quarter of 2022.

Groundwater Elevation Data

On May 6, 2022, SWD attempted groundwater level measurements at 15 monitoring wells during the second quarter of 2022. 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). After measurements of the static groundwater levels during this quarter, groundwater monitoring well MW-37 was installed and successfully completed within the Cc2 perched zone on May 18, 2022; Well MW-37 was not installed as a replacement well for the recently decommissioned Unit D monitoring well MW-28.

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 measured nearly 17.6 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 6, 2022.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, 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 16.4 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. Subsequent to the quarterly static water level measurements, groundwater monitoring well MW-28 was decommissioned on May 16, 2022, due to the lack of groundwater observed in this well throughout its lifespan.

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 6, 2022.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on May 6, 2022, 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 2022.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the south-southeast in the south slope area with a component of west-northwest flow for the remainder of the property (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 2022 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 0.023 ft/ft property wide and 0.04 ft/ft for the south slope area based on measurements made during the second quarter of 2022. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the second quarter of 2022, are approximately 0.034 and 0.018 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 0.92 ft/d west-northwest across the property, and are 1.16 ft/d south-southeast for the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.71 and 0.89 ft/d in the northerly and southerly direction, respectively.

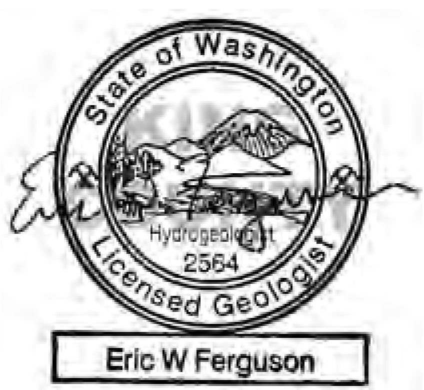
References

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 206-477-4690 (eric.ferguson@kingcounty.gov).

Sincerely,



Eric W Ferguson, WA LHG
Water Quality Planner - Hydrogeologist
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – Second Quarter 2022
Table A-2:	Groundwater Parameters – Second Quarter 2022
Figure A-1:	Groundwater Potentiometric Surface Map – Second Quarter 2022 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – Second Quarter 2022 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – Second Quarter 2022

Vashon Island Closed Landfill

King County, Washington

	Well Identification	Easting[2] (ft)	Northing[2] (ft)	Top of Casing Elevation[6] (ft MSL)	Top of Screen Elevation[6] (ft MSL)	Bottom of Screen Elevation[6] (ft MSL)	May 6, 2022 Measured Depth to Water[1] (ft)	May 6, 2022 Groundwater Elevations[6] (ft MSL)
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	73.49	244.48
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	164.71	240.46
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	121.37	248.95
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.30	242.75
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	5.51	230.16
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	111.96	247.21
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.10	243.24
	MW-37[3]	1227855.76	162186.41	294.70	222.10	212.10	61.90	232.80
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	191.19	185.56
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	142.18	173.35
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	245.85	159.58
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.33	159.00
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	247.50	159.04
	MW-28[4]	1228116.11	163843.88	398.73	172.15	162.65	DRY	DRY
	MW-29[5]	1228375.59	163681.26	413.85	172.83	158.63	244.22	169.63
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	204.01	181.95

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-37 installation was completed on May 18, 2022. The well was developed and the water level measurement was measured on June 30, 2022.
4. MW-28 was dry on May 6, 2022, and was decommissioned on May 16, 2022 since the well has been reported dry since installation.
5. 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.

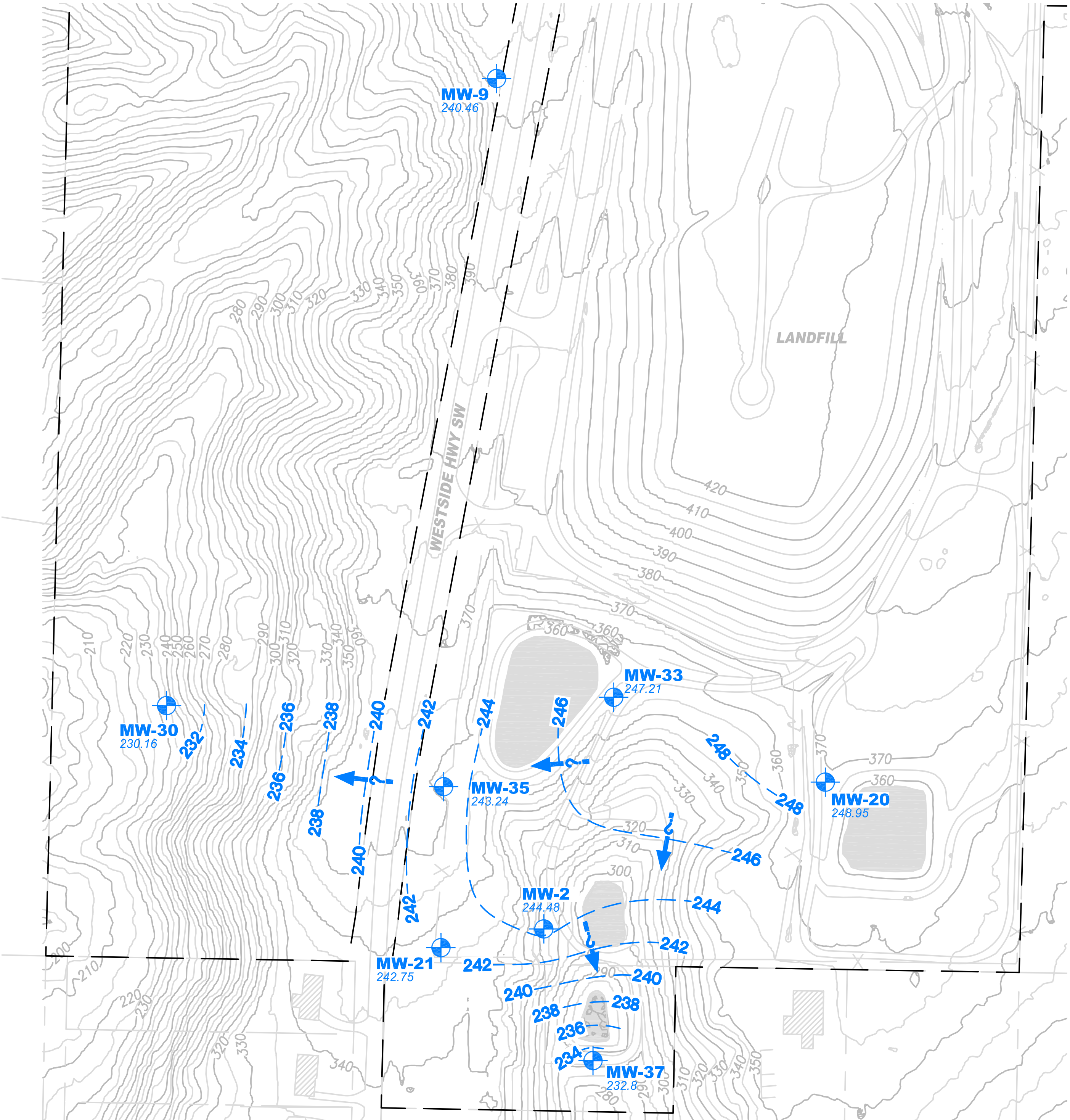
5\. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).

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

Table A-2: Groundwater Parameters – Second Quarter 2022
Vashon Island Closed Landfill
King County, Washington

Water Bearing Zone	Horizontal Hydraulic Conductivity (K)[1,2] Range	(cm/s)	(ft/d)	Effective Porosity (n_{eff})[1]	May 6, 2022 Horizontal Hydraulic Gradient (DH/DL)[3] (ft/ft)	May 6, 2022 Horizontal Groundwater Velocity (v) (ft/d)	May 6, 2022 General Groundwater Flow Direction
Unit Cc2 - Property Wide[4,6]	Low	5.7E-04	1.61	20%	0.010	0.08	West-northwest
	High	1.6E-02	46.1		0.035	8.06	
	Average[6]	2.9E-03	8.21		0.023	0.92	
Unit Cc2 - South Slope Area[5,6]	Low	5.7E-04	1.61		0.010	0.08	South-southeast
	High	6.8E-03	19.4		0.070	6.77	
	Average[6]	2.1E-03	5.81		0.040	1.16	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.034	0.73	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			7.72	
	Average	3.6E-03	10.2			1.71	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.018	0.38	Southwest - away from divide
	High	1.6E-02	46.1			4.03	
	Average	3.6E-03	10.2			0.89	

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, MW-35, and MW-35, and newly installed well MW-37.
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

N

0 200 400 Feet

Contour Interval 2 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

Note:
1. Groundwater measurements made on May 6, 2022.

King County

Groundwater Potentiometric Surface Map
Second Quarter 2022 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: August 2022	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: EWF	

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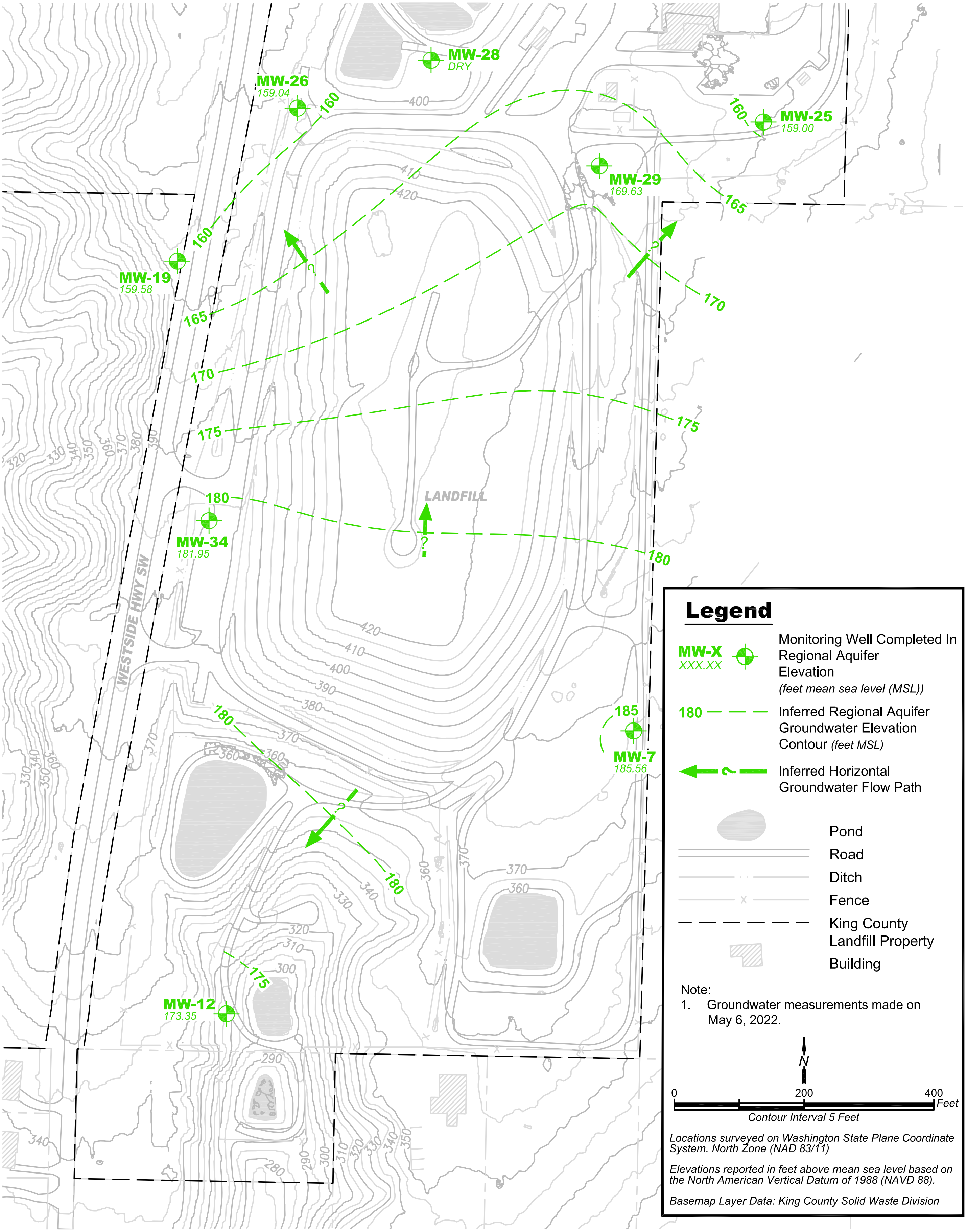

King County

Groundwater Potentiometric Surface Map
Second Quarter 2022 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: August 2022	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: EWF	

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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

December 6, 2022

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

VIA: Eric Ferguson, Water Quality Planner – Hydrogeologist, Science and Technical Support Section, Water and Land Resources Division, DNRP

FM: Adrienne Scott, Engineer II, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Third Quarter 2022 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 2022 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 18, 2022; the measurements 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 second quarter of 2022.

Groundwater Elevation Data

On August 18, 2022, the third quarter of 2022, SWD recorded groundwater level measurements for 15 monitoring wells. 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). Subsequent to the 2020 Aspect report, monitoring well MW-37 was successfully completed within the Cc2 perched zone.

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 measured approximately 17.63 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 August 18, 2022.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, 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 16.26 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.

Figure A-2 shows the third quarter 2022 calculated groundwater elevations at monitoring well locations and interpreted groundwater flow directions based on the potentiometric surface contours for the Unit D aquifer..

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on August 18, 2022, 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 third quarter of 2022.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the south-southeast in the south slope area with a component of west-northwest flow for the remainder of the property (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 groundwater potentiometric surface contours during the third quarter of 2022 indicate that groundwater in the Unit D aquifer flows 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 0.022 ft/ft property wide and 0.048 ft/ft for the south slope area based on measurements made

during the third quarter of 2022. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the third quarter of 2022, are approximately 0.031 and 0.017 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 0.91 ft/d west-northwest across the property, and are 1.39 ft/d south-southeast for the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.57 and 0.87 ft/d in the northerly and southerly direction, respectively.

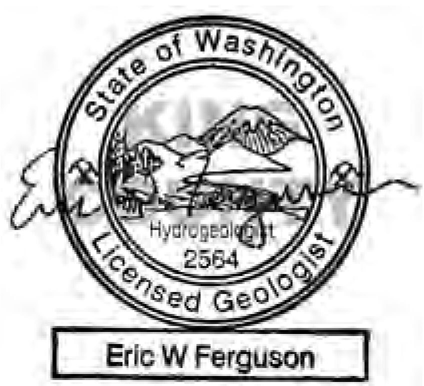
References

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). 2022. Proposal for 2022 Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations; King County Closed Landfills (Cedar Falls, Enumclaw, Hobart and Vashon Island) and Cedar Hills Regional Landfill. March.

Thank you for the opportunity to provide hydrogeologic services to SWD. If you have any questions, please feel free to contact me at 206-477-4690 (eric.ferguson@kingcounty.gov).

Sincerely,



Eric W Ferguson, WA LHG
Water Quality Planner - Hydrogeologist
King County Water and Land Resources Division

Enclosures:

Table A-1:	Well Details and Groundwater Elevations – Third Quarter 2022
Table A-2:	Groundwater Parameters – Third Quarter 2022
Figure A-1:	Groundwater Potentiometric Surface Map – Third Quarter 2022 – Cc2 Perched Zone
Figure A-2:	Groundwater Potentiometric Surface Map – Third Quarter 2022 – Unit D Aquifer

Table A-1: Well Details and Groundwater Elevations – Third Quarter 2022
Vashon Island Closed Landfill
King County, Washington

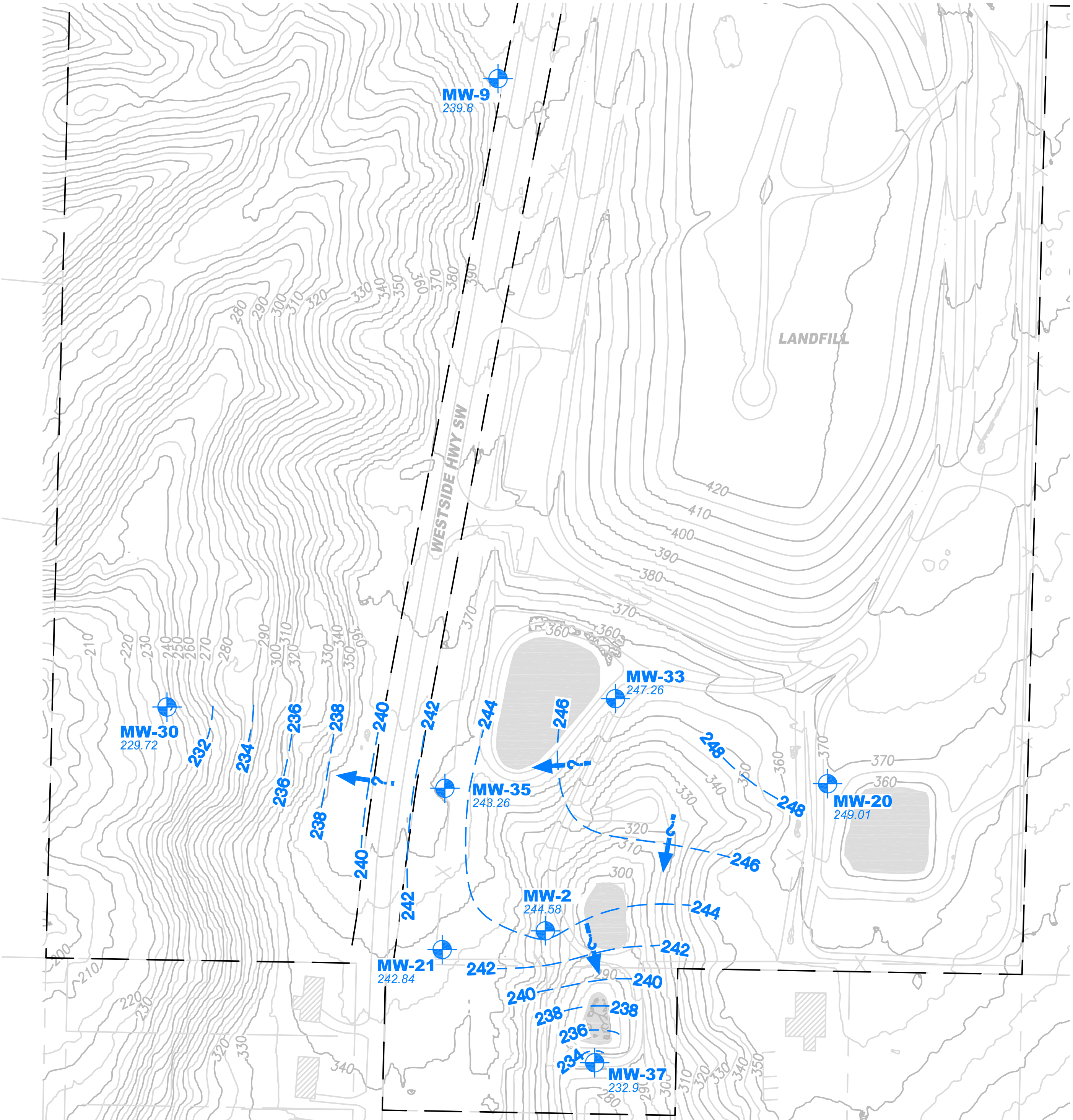
	Well Identification	Easting[2] (ft)	Northing[2] (ft)	Top of Casing Elevation[4] (ft MSL)	Top of Screen Elevation[4] (ft MSL)	Bottom of Screen Elevation[4] (ft MSL)	August 18, 2022 Measured Depth to Water[1] (ft)	August 18, 2022 Groundwater Elevations[4] (ft MSL)
Cc2 Perched Zone	MW-2	1227788.53	162365.91	317.97	237.06	232.06	73.39	244.58
	MW-9	1227723.68	163527.21	405.17	236.22	224.22	165.37	239.80
	MW-20	1228173.43	162566.52	370.32	241.41	236.41	121.31	249.01
	MW-21	1227647.90	162340.10	349.05	246.45	237.05	106.21	242.84
	MW-30	1227273.26	162671.10	235.67	230.40	225.40	5.95	229.72
	MW-33	1227883.53	162682.24	359.17	229.63	219.63	111.91	247.26
	MW-35	1227651.53	162559.82	361.34	244.20	234.20	118.08	243.26
	MW-37	1227855.76	162186.41	294.70	222.10	212.10	61.80	232.90
Unit D Aquifer	MW-7	1228427.68	162811.30	376.75	154.40	144.40	191.28	185.47
	MW-12	1227800.99	162375.28	315.53	142.72	132.72	142.14	173.39
	MW-19	1227725.02	163535.12	405.43	143.14	131.64	246.02	159.41
	MW-25	1228628.13	163749.00	402.33	141.76	137.76	243.45	158.88
	MW-26	1227910.18	163770.66	406.54	153.55	144.15	247.71	158.83
	MW-29[3]	1228375.59	163681.26	413.85	172.83	158.63	244.26	169.59
	MW-34	1227774.04	163135.04	385.96	147.94	137.94	204.14	181.82

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-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.
4. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).

Table A-2: Groundwater Parameters – Third Quarter 2022
Vashon Island Closed Landfill
King County, Washington

Water Bearing Zone	Horizontal Hydraulic Conductivity (K)[1,2] Range	(cm/s)	(ft/d)	Effective Porosity (n_{eff})[1]	August 18, 2022 Horizontal Hydraulic Gradient (DH/DL)[3] (ft/ft)	Horizontal Groundwater Velocity (v) (ft/d)	General Groundwater Flow Direction
Unit Cc2 - Property Wide[4,6]	Low	5.7E-04	1.61	20%	0.012	0.10	West-northwest
	High	1.6E-02	46.1		0.033	7.49	
	Average[6]	2.9E-03	8.21		0.022	0.92	
Unit Cc2 - South Slope Area[5,6]	Low	5.7E-04	1.61		0.035	0.08	South-southeast
	High	6.8E-03	19.4		0.061	5.90	
	Average[6]	2.1E-03	5.81		0.048	1.39	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.031	0.67	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			7.09	
	Average	3.6E-03	10.2			1.57	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.017	0.37	Southwest - away from divide
	High	1.6E-02	46.1			3.92	
	Average	3.6E-03	10.2			0.87	

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, MW-35, and MW-35, and MW-37.
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

N

0 200 400 Feet

Contour Interval 2 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

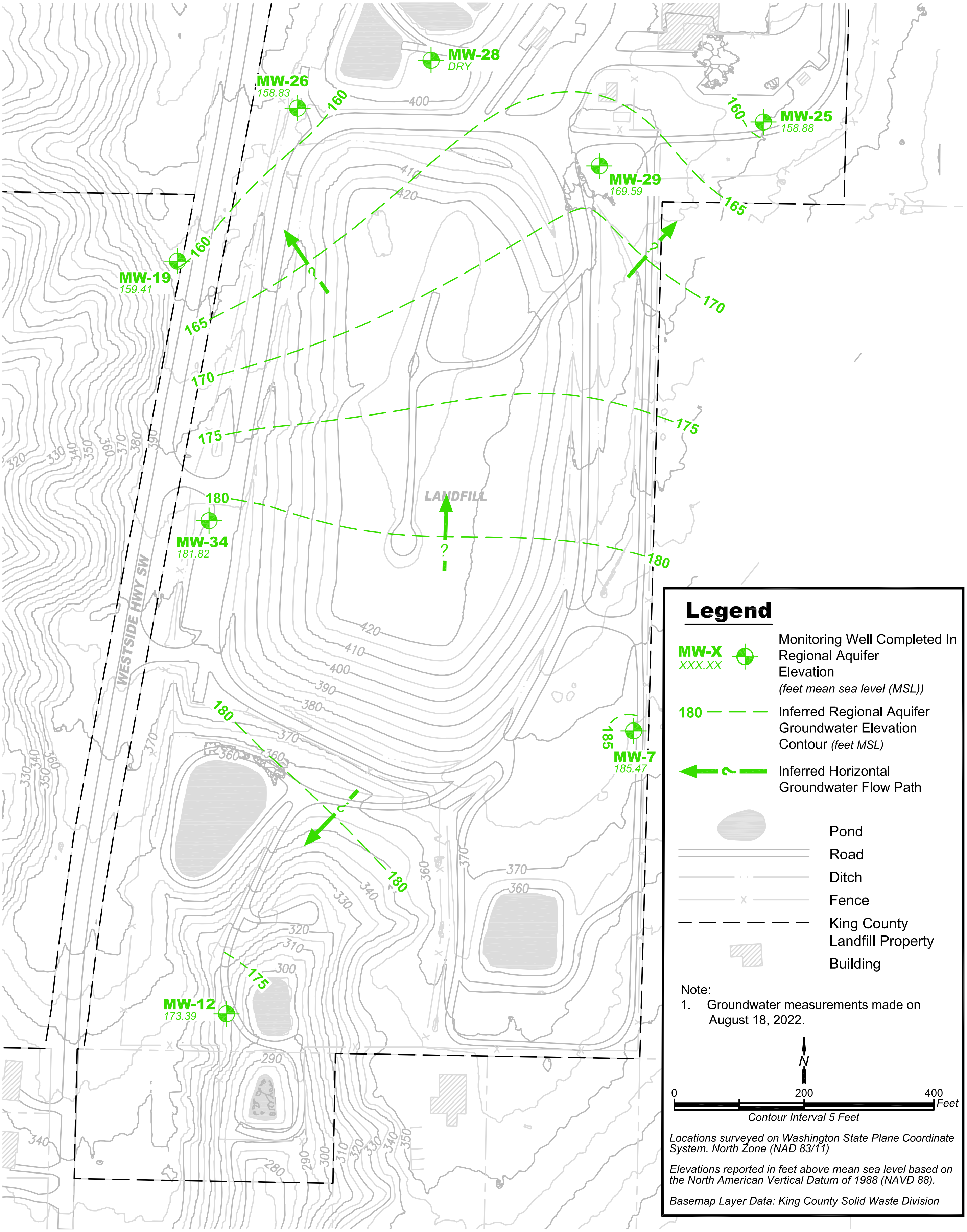
Note:
1. Groundwater measurements made on August 18, 2022.

King County

Groundwater Potentiometric Surface Map
Third Quarter 2022 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: November 2022	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: EWF	

VI_3Q2022_Cc2Perched.dwg



King County

Groundwater Potentiometric Surface Map
Third Quarter 2022 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: November 2022	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: EWF	

VI_3Q2022_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

January 12, 2023

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

VIA: Eric Ferguson, Water Quality Planner – Hydrogeologist, Science and Technical Support Section, Water and Land Resources Division, DNRP

FM: Adrienne Scott, Engineer III – Geologist, Facility Engineering and Science Section, Solid Waste Division, Department of Natural Resources and Parks, DNRP

RE: Potentiometric Groundwater Surface Maps & Groundwater Velocity Calculations
Fourth Quarter 2022 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 2022 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, 2022). King County Solid Waste Division (SWD) personnel measured groundwater levels at the Landfill on November 7, 2022; the measurements 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 third quarter of 2022.

Groundwater Elevation Data

On November 7, 2022, the fourth quarter of 2022, SWD recorded groundwater level measurements for 15 monitoring wells at the Landfill. 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). Subsequent to the 2020 Aspect report, monitoring well MW-37 was successfully completed within the Cc2 perched zone.

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 measured approximately 17.38 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 November 7, 2022.

Unit D Aquifer

Groundwater in the Unit D aquifer is monitored by wells MW-7, MW-12, MW-19, MW-25, MW-26, 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 16.38 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.

Figure A-2 shows the fourth quarter 2022 calculated groundwater elevations at monitoring well locations and interpreted groundwater flow directions based on the potentiometric surface contours for the Unit D aquifer.

Direction of Groundwater Flow

Interpreted groundwater flow directions in the Cc2 perched zone and Unit D aquifer, based on measurements taken on November 7, 2022, 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 fourth quarter of 2022.

Cc2 Perched Zone

Calculated groundwater elevations and interpreted groundwater potentiometric surface contours indicate that groundwater in the Cc2 perched zone generally flows towards the south-southeast in the south slope area with a component of west-northwest flow for the remainder of the property (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 groundwater potentiometric surface contours during the fourth quarter of 2022 indicate that groundwater in the Unit D aquifer flows 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 0.023 ft/ft property wide and 0.050 ft/ft for the south slope area based on measurements made during the fourth quarter of 2022. The average hydraulic gradients for the Unit D aquifer, based on measurements made during the fourth quarter of 2022, are approximately 0.032 and 0.017 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 0.92 ft/d west-northwest across the property, and are 1.45 ft/d south-southeast for the south slope area. The average horizontal groundwater velocities in the Unit D aquifer are approximately 1.62 and 0.84 ft/d in the northerly and southerly direction, respectively.

References

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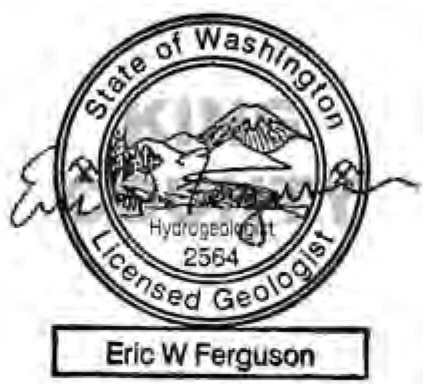

Eric W Ferguson, WA LHG
Water Quality Planner - Hydrogeologist
King County Water and Land Resources Division

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Figure A-1:	Groundwater Potentiometric Surface Map – Fourth Quarter 2022 – Cc2 Perched Zone
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Table A-1: Well Details and Groundwater Elevations – Fourth Quarter 2022
Vashon Island Closed Landfill
King County, Washington

	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)	November 7, 2022 Measured Depth to Water[1] (ft)	November 7, 2022 Groundwater Elevations[4] (ft MSL)
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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-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.
4. Elevations are reported in feet (ft) above mean sea level (MSL) based on the North American Vertical Datum of 1988 (NAVD88).

Table A-2: Groundwater Parameters – Fourth Quarter 2022
Vashon Island Closed Landfill
King County, Washington

Water Bearing Zone	Horizontal Hydraulic Conductivity (K)[1,2] Range	Horizontal Hydraulic Conductivity (K)[1,2] (cm/s)	Horizontal Hydraulic Conductivity (K)[1,2] (ft/d)	Effective Porosity (n_{eff})[1]	November 7, 2022 – Horizontal Hydraulic Gradient (DH/DL)[3] (ft/ft)	November 7, 2022 – Horizontal Groundwater Velocity (v) (ft/d)	November 7, 2022 – General Groundwater Flow Direction
Unit Cc2 - Property Wide[4,6]	Low	5.7E-04	1.61	20%	0.013	0.10	West-northwest
	High	1.6E-02	46.1		0.032	7.37	
	Average[6]	2.9E-03	8.21		0.023	0.92	
Unit Cc2 - South Slope Area[5,6]	Low	5.7E-04	1.61		0.036	0.29	South-southeast
	High	6.8E-03	19.4		0.064	6.19	
	Average[6]	2.1E-03	5.81		0.050	1.45	
Unit D - Northerly flow direction	Low	1.5E-03	4.4		0.032	0.70	North - with flow to the northeast and northwest
	High	1.6E-02	46.1			7.35	
	Average	3.6E-03	10.2			1.62	
Unit D - Southerly flow direction	Low	1.5E-03	4.4		0.017	0.36	Southwest - away from divide
	High	1.6E-02	46.1			3.80	
	Average	3.6E-03	10.2			0.84	

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).
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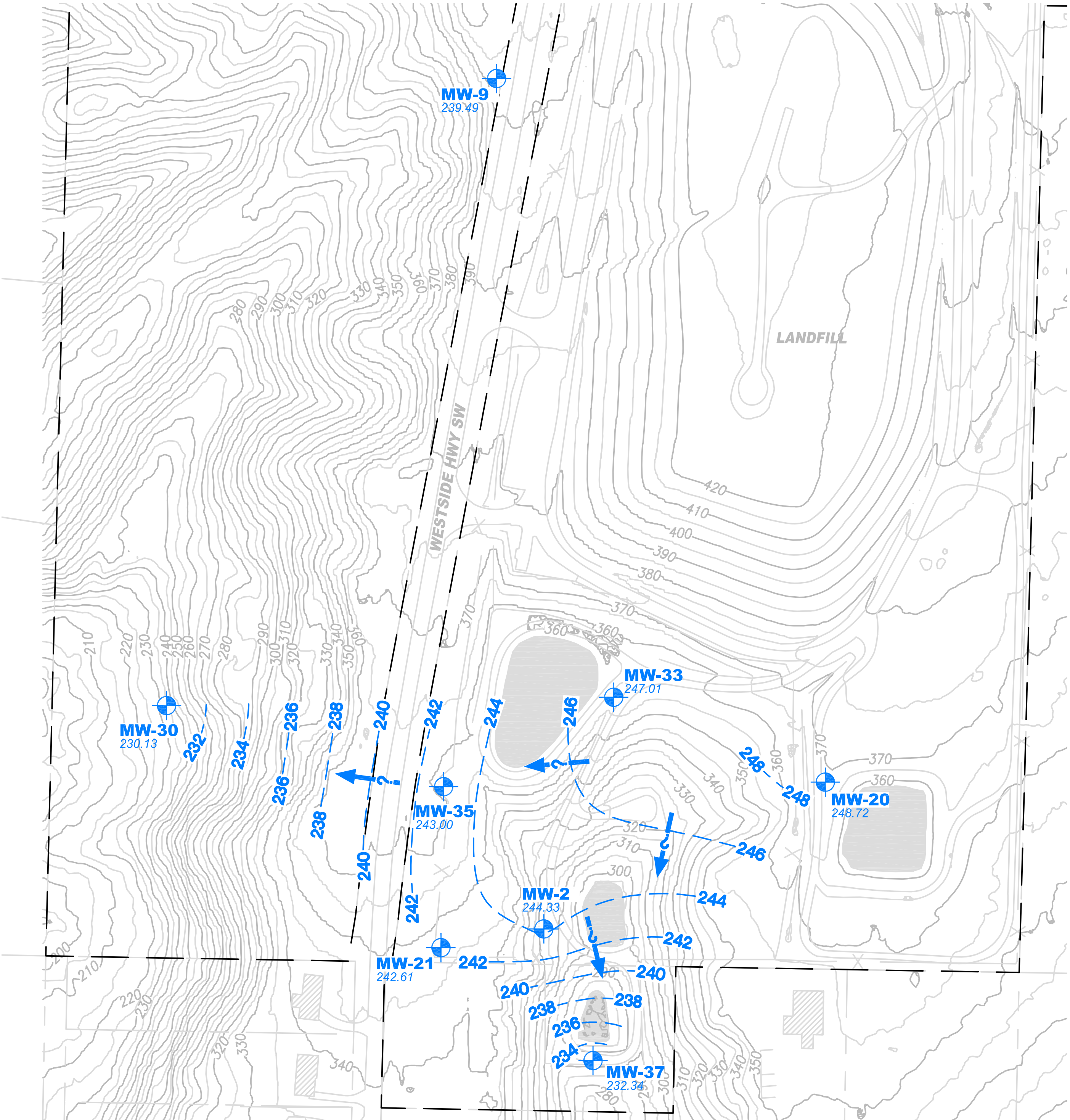
4. Calculations for property wide Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-9, MW-20, MW-21, MW-33, and MW-35. (Aspect 2020).
5. Calculations for South Slope Area Unit Cc2 horizontal hydraulic conductivities include data from wells MW-2, MW-20, MW-21, MW-33, MW-35, and MW-35, and MW-37.
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 November 7, 2022.

0 200 400 *Feet*

Contour Interval 2 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).

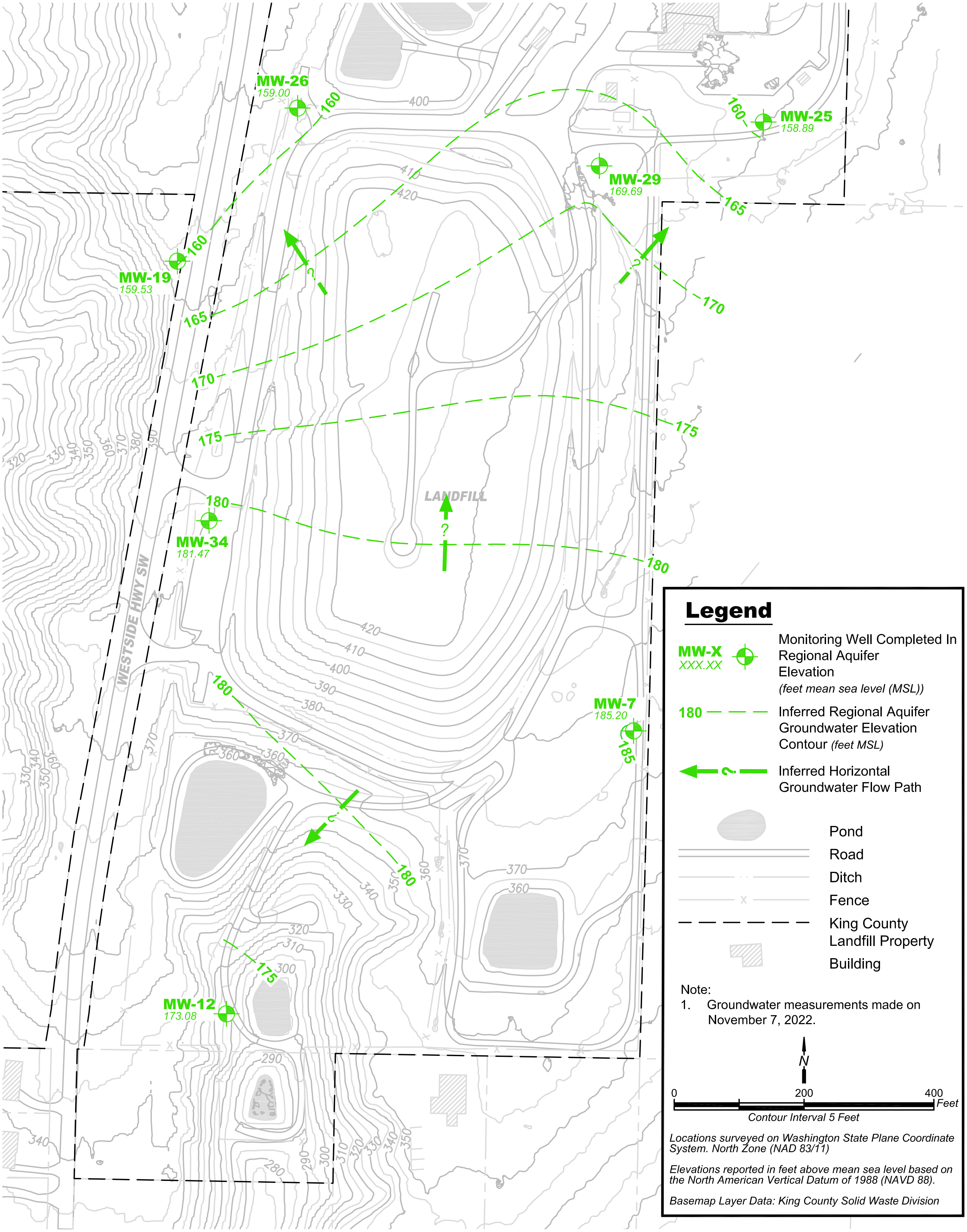
Basemap Layer Data: King County Solid Waste Division

King County

Groundwater Potentiometric Surface Map
Fourth Quarter 2022 - Cc2 Perched Zone
Vashon Island Closed Landfill
King County, Washington

DATE: January 2023	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-1
REVISED BY: EWF	

VI_4Q2022_Cc2Perched.dwg



King County

Groundwater Potentiometric Surface Map
Fourth Quarter 2022 - Unit D Aquifer
Vashon Island Closed Landfill
King County, Washington

DATE: January 2023	PROJECT NO. 1033601
DESIGNED BY: AMS	
DRAWN BY: KK	FIGURE NO. A-2
REVISED BY: EWF	

VI_4Q2022_UnitD.dwg

Appendix H

Groundwater Monitoring Data

Table H-1
Groundwater - Static Water Levels

Groundwater - Static Water Levels Well #	Measurement Date	Top of PVC Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
		Unit B		
MW-24	1/31/2022	377.48	89.12	288.36
MW-24	5/6/2022	377.48	87.86	289.62
MW-24	8/18/2022	377.48	87.57	289.91
MW-24	11/7/2022	377.48	88.28	289.2
		Channel Cc1		
MW-3	1/31/2022	318.02	38.26	279.76
MW-3	5/6/2022	318.02	38.78	279.24
MW-3	8/18/2022	318.02	40.37	277.65
MW-3	11/7/2022	318.02	41.74	276.28
MW-4	1/31/2022	377.18	106.50	270.68
MW-4	5/6/2022	377.18	103.70	273.48
MW-4	8/18/2022	377.18	101.72	275.46
MW-4	11/7/2022	377.18	102.62	274.56
MW-10	1/31/2022	409.94	145.66	264.28
MW-10	5/6/2022	409.94	145.02	264.92
MW-10	8/18/2022	409.94	145.08	264.86
MW-10	11/7/2022	409.94	145.05	264.89
MW-13	1/31/2022	377.28	100.9	276.38
MW-13	5/6/2022	377.28	99.76	277.52
MW-13	8/18/2022	377.28	99.61	277.67
MW-13	11/7/2022	377.28	99.99	277.29
		Channel Cc2		
MW-2	1/31/2022	317.97	74.14	243.83
MW-2	5/6/2022	317.97	73.49	244.48
MW-2	8/18/2022	317.97	73.39	244.58
MW-2	11/7/2022	317.97	73.64	244.33
MW-9	1/31/2022	405.17	165.18	239.99
MW-9	5/6/2022	405.17	164.71	240.46
MW-9	8/18/2022	405.17	165.37	239.8
MW-9	11/7/2022	405.17	165.68	239.49
MW-20	1/31/2022	370.32	122.2	248.12
MW-20	5/6/2022	370.32	121.37	248.95
MW-20	8/18/2022	370.32	121.31	249.01
MW-20	11/7/2022	370.32	121.6	248.72
MW-21	1/31/2022	349.05	106.89	242.16
MW-21	5/6/2022	349.05	106.3	242.75
MW-21	8/18/2022	349.05	106.21	242.84
MW-21	11/7/2022	349.05	106.44	242.61
MW-30	1/31/2022	235.67	4.62	231.05
MW-30	5/6/2022	235.67	5.51	230.16
MW-30	8/18/2022	235.67	5.95	229.72
MW-30	11/7/2022	235.67	5.54	230.13
MW-33	1/31/2022	359.17	112.66	246.51
MW-33	5/6/2022	359.17	111.96	247.21
MW-33	8/18/2022	359.17	111.91	247.26
MW-33	11/7/2022	359.17	112.16	247.01
MW-35	1/31/2022	361.34	118.73	242.61
MW-35	5/6/2022	361.34	118.1	243.24
MW-35	8/18/2022	361.34	118.08	243.26
MW-35	11/7/2022	361.34	118.34	243
MW-37[1]	8/18/2022	294.7	61.8	232.9
MW-37[1]	11/7/2022	294.7	62.36	232.34

Table H-1
Groundwater - Static Water Levels

Groundwater - Static Water Levels Well #	 Measurement Date	Top of PVC Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet above MSL)
Channel Cc3				
MW-8	1/31/2022	386.00	176.4	209.6
MW-8	5/6/2022	386.00	175.42	210.58
MW-8	8/18/2022	386.00	175.95	210.05
MW-8	11/7/2022	386.00	176.2	209.8
MW-36	1/31/2022	378.19	151.8	226.39
MW-36	5/6/2022	378.19	150.8	227.39
MW-36	8/18/2022	378.19	150.75	227.44
MW-36	11/7/2022	378.19	150.93	227.26
Unit D Aquifer				
MW-7	1/31/2022	376.748	192.23	184.52
MW-7	5/6/2022	376.748	191.19	185.56
MW-7	8/18/2022	376.748	191.28	185.47
MW-7	11/7/2022	376.748	191.55	185.2
MW-12	1/31/2022	315.53	143.09	172.44
MW-12	5/6/2022	315.53	142.18	173.35
MW-12	8/18/2022	315.53	142.14	173.39
MW-12	11/7/2022	315.53	142.45	173.08
MW-19	1/31/2022	405.43	246.38	159.05
MW-19	5/6/2022	405.43	245.85	159.58
MW-19	8/18/2022	405.43	246.02	159.41
MW-19	11/7/2022	405.43	245.9	159.53
MW-25	1/31/2022	402.331	243.47	158.86
MW-25	5/6/2022	402.331	243.33	159
MW-25	8/18/2022	402.331	243.45	158.88
MW-25	11/7/2022	402.331	243.44	158.89
MW-26	1/31/2022	406.538	248	158.54
MW-26	5/6/2022	406.538	247.5	159.04
MW-26	8/18/2022	406.538	247.71	158.83
MW-26	11/7/2022	406.538	247.54	159
MW-28	1/31/2022	398.73	DRY	DRY
MW-28	5/6/2022	398.73	DRY	DRY
MW-29	1/31/2022	413.847	244.56	169.29
MW-29	5/6/2022	413.847	244.22	169.63
MW-29	8/18/2022	413.847	244.26	169.59
MW-29	11/7/2022	413.847	244.15	169.7
MW-34	1/31/2022	385.957	205.14	180.82
MW-34	5/6/2022	385.957	204.01	181.95
MW-34	8/18/2022	385.957	204.14	181.82
MW-34	11/7/2022	385.957	204.49	181.47

Notes:

[1] MW-37 was installed on 5/18/2022, following second-quarter static water level readings.

Table H-2
Groundwater - Sampling Water Levels

Groundwater - Sampling Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation
Well #	Measurement Date	(feet)	(feet)	(feet above MSL)
Channel Cc1				
MW-3	2/1/2022	318.02	38.3	279.72
MW-3	5/11/2022	318.02	38.81	279.21
MW-3	9/13/2022	318.02	40.95	277.07
MW-3	11/8/2022	318.02	41.68	276.34
MW-4	2/2/2022	377.18	106.93	270.25
MW-4	5/11/2022	377.18	103.9	273.28
MW-4	9/14/2022	377.18	101.78	275.4
MW-4	11/8/2022	377.18	102.98	274.2
MW-10	1/31/2022	409.94	145.66	264.28
MW-10	5/9/2022	409.94	145.36	264.58
MW-10	9/12/2022	409.94	145.15	264.79
MW-10	11/7/2022	409.94	145.05	264.89
MW-13	1/31/2022	377.28	100.9	276.38
MW-13	5/9/2022	377.28	100.02	277.26
MW-13	9/13/2022	377.28	99.7	277.58
MW-13	11/8/2022	377.28	99.99	277.29
Channel Cc2				
MW-2	2/3/2022	317.97	74.03	243.94
MW-2	5/12/2022	317.97	73.53	244.44
MW-2	9/15/2022	317.97	73.54	244.43
MW-2	11/9/2022	317.97	73.78	244.19
MW-9	2/2/2022	405.17	165.24	239.93
MW-9	5/10/2022	405.17	165.1	240.07
MW-9	9/13/2022	405.17	165.48	239.69
MW-9	11/8/2022	405.17	165.86	239.31
MW-20	2/3/2022	370.32	122.1	248.22
MW-20	5/12/2022	370.32	121.48	248.84
MW-20	9/15/2022	370.32	121.5	248.82
MW-20	11/9/2022	370.32	221.9	148.42
MW-21	2/3/2022	349.05	106.83	242.22
MW-21	5/12/2022	349.05	106.27	242.78
MW-21	9/15/2022	349.05	106.32	242.73
MW-21	11/9/2022	349.05	106.55	242.5
MW-33	2/3/2022	359.17	112.64	246.53
MW-33	5/12/2022	359.17	111.92	247.25
MW-33	9/15/2022	359.17	112.1	247.07
MW-33	11/9/2022	359.17	112.39	246.78
MW-35	2/3/2022	361.34	118.62	242.72
MW-35	5/12/2022	361.34	118.13	243.21
MW-35	9/15/2022	361.34	118.23	243.11
MW-35	11/9/2022	361.34	118.39	242.95
MW-37[1]	6/30/2022	294.7	61.9	232.8
MW-37[1]	9/15/2022	294.7	62.16	232.54
MW-37[1]	11/9/2022	294.7	62.49	232.21

Table H-2
Groundwater - Sampling Water Levels

Groundwater - Sampling Water Levels		Top of PVC Casing Elevation	Depth to Groundwater	Groundwater Elevation
Well #	Measurement Date	(feet)	(feet)	(feet above MSL)
Channel Cc3				
MW-8	1/31/2022	386.00	176.40	209.60
MW-8	5/9/2022	386.00	175.73	210.27
MW-8	9/12/2022	386.00	176.05	209.95
MW-8	11/7/2022	386.00	176.20	209.80
MW-36	1/31/2022	378.19	151.50	226.69
MW-36	5/10/2022	378.19	151.13	227.06
MW-36	9/13/2022	378.19	150.80	227.39
MW-36	11/8/2022	378.19	151.11	227.08
Unit D Aquifer				
MW-7	2/1/2022	376.75	192.24	184.51
MW-7	5/10/2022	376.75	191.8	184.95
MW-7	9/13/2022	376.75	191.44	185.31
MW-7	11/8/2022	376.75	191.98	184.77
MW-12	1/31/2022	315.53	143.09	172.44
MW-12	5/9/2022	315.53	142.4	173.13
MW-12	9/13/2022	315.53	142.2	173.33
MW-12	11/8/2022	315.53	142.66	172.87
MW-19	2/2/2022	405.43	246.56	158.87
MW-19	5/10/2022	405.43	246.33	159.1
MW-19	9/13/2022	405.43	246.05	159.38
MW-19	11/8/2022	405.43	246.23	159.2
MW-26	2/2/2022	406.54	248.14	158.4
MW-26	5/10/2022	406.54	248.07	158.47
MW-26	9/13/2022	406.54	247.72	158.82
MW-26	11/8/2022	406.54	247.88	158.66
MW-29	2/2/2022	413.85	244.8	169.05
MW-29	5/10/2022	413.85	244.5	169.35
MW-29	9/15/2022	413.85	244.3	169.55
MW-29	11/8/2022	413.85	244.38	169.47
MW-34	2/1/2022	385.96	205.19	180.77
MW-34	5/9/2022	385.96	204.28	181.68
MW-34	9/12/2022	385.96	204.43	181.53
MW-34	11/7/2022	385.96	204.49	181.47

Notes:

[1] MW-37 was installed on 5/18/2022.

Table H-3
Groundwater - Field Parameters

Groundwater - Field Parameters Well #	Sample Date	Sample ID	Dissolved Oxygen (DO) (Field) (mg/L)	Oxidation-Reduction Potential (mV)	pH (Field) (std. units)	Specific Conductance (Field) (µmhos/cm)	Temperature (Field) (°C)	Turbidity (Field) (NTU)	Volume Purged (gal)
Channel Cc1									
MW-3	2/1/2022	WV3-220201-	9.28	377.2	5.65	50.6	8.97	0.29	1.25
MW-3	5/11/2022	WV3-220511-	8.7	370.1	5.72	51.1	9.18	4.76	2.5
MW-3	9/13/2022	WV3-220913-	9.13	186.7	5.6	46.3	10.31	0.54	0.75
MW-3*	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	--	--	7.12	191.1	12.68	0.24	10.29
MW-4*	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	4.57	183.8	7.17	127.3	10.18	0.28	2.1
MW-10	5/9/2022	WV10220509-	4.32	157.2	6.98	128.6	10.49	0.42	2.75
MW-10	9/12/2022	WV10220912-	4.48	234.1	7.12	130.5	9.82	0.27	4
MW-10	11/7/2022	WV10221107-	4.31	383	7.05	133.2	10.12	1.8	4
MW-13	1/31/2022	WV13220131-	5.57	294.8	7.1	101	10.16	0.39	3.5
MW-13	5/9/2022	WV13220509-	5.34	289.1	6.92	140.3	10.21	0.89	3.75
MW-13	9/13/2022	WV13220913-	7.23	300	6.65	134.6	11.27	0.21	2.5
MW-13	11/8/2022	WV13221107-	7.76	140.5	7.18	137.9	10.05	0.28	1.75
Channel Cc2									
MW-2	2/3/2022	WV2-220203-	0.9	235.8	6.74	271.2	9.09	3.81	3
MW-2	2/3/2022	WV2-220203D	0.9	235.8	6.74	271.2	9.09	3.81	3
MW-2	5/12/2022	WV2-220512-	0.65	201.2	6.8	262.8	9.91	0.93	2.25
MW-2	9/15/2022	WV2-220915-	0.49	285.8	6.67	260.5	9.89	0.25	2.2
MW-2	11/9/2022	WV2-221109-	0.91	136.4	7.07	263.7	8.82	2.14	2
MW-9	2/2/2022	WV9-220202-	5.29	342.2	7.02	161.9	9.85	0.14	2.5
MW-9	5/10/2022	WV9-220510-	6.28	26.01	6.89	171.5	9.78	1.27	5
MW-9	9/13/2022	WV9-220913-	7.45	411.3	6.68	185.5	10.51	0.33	2.25
MW-9	11/8/2022	WV9-221108-	8.74	132	7.21	181.4	9.39	0.32	3
MW-20	2/3/2022	WV20220203-	0.69	-4.3	7.8	163	10.42	0.69	3
MW-20	5/12/2022	WV20220512-	1.29	146.3	7.48	159.5	10.35	1.02	2.5
MW-20	9/15/2022	WV20220915-	1.27	-198.8	7.82	161.4	11.48	0.62	2.5
MW-20	9/15/2022	WV20220915D	1.27	-198.8	7.82	161.4	11.48	0.62	2.5
MW-20	11/9/2022	WV20221109-	0.86	-53.5	7.7	163.3	10.74	0.47	1.75
MW-21	2/3/2022	WV21220203-	0.74	170.7	6.91	270.8	9.58	1.61	4
MW-21	5/12/2022	WV21220512-	2.1	72.5	6.81	243.6	9.82	1.61	4
MW-21	9/15/2022	WV21220915-	1.68	235.4	6.53	246	10.23	0.98	3.75
MW-21	11/9/2022	WV21221109-	1.2	148.2	6.9	249	9.71	1.03	4.25
MW-33	2/3/2022	WV33220203-	0.01	-59.4	6.65	539.9	12.74	0.77	4.5
MW-33	5/12/2022	WV33220512-	0.33	-30.6	6.64	565	12.25	1.02	4.5
MW-33	9/15/2022	WV33220915-	0.2	-9	6.84	576	14.11	0.62	3.2
MW-33	11/9/2022	WV33221109-	0.22	-41	6.79	561.3	13.19	1.3	2.5
MW-35	2/3/2022	WV35220203-	0.2	-44.5	6.43	572.5	10.18	59.2	4
MW-35	5/12/2022	WV35220512-	0.08	-61.8	6.56	546	10.43	9.08	3
MW-35	9/15/2022	WV35220915-	0.11	15.3	6.45	512	11.04	23.1	2.5
MW-35	11/9/2022	WV35221109-	0.13	-23.2	6.7	488.8	10.54	3.74	2.25
MW-37[1]	6/30/2022	WV37220630-	3.5	181	6.54	179.9	12.13	12.7	1.25
MW-37[1]	9/15/2022	WV37220915-	4.55	57.8	6.92	180.4	10.92	6.2	1
MW-37[1]	11/9/2022	WV37221109-	4.08	48.7	6.7	190.5	8.94	5.78	1

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)	(^{o}C)	(NTU)	(gal)
Channel Cc3									
MW-8	1/31/2022	WV8-220131-	10.44	222.1	6.37	147.1	10.5	0.24	2
MW-8	5/9/2022	WV8-220509-	10.11	189.3	6.25	145.5	10.49	0.2	2.1
MW-8	9/12/2022	WV8-220912-	10.31	270.4	6.37	144.1	10.33	0.17	4
MW-8	11/7/2022	WV8-221107-	9.94	426.5	6.57	144.8	10.57	0.23	2.75
MW-36	1/31/2022	WV36220131-	3.72	251.3	7.65	114.1	11.38	0.16	2.25
MW-36	5/10/2022	WV36220510-	3.01	258.2	7.31	157.6	11.26	0.64	3.25
MW-36	5/10/2022	WV36220510D	3.01	258.2	7.31	157.6	11.26	0.64	3.25
MW-36	9/13/2022	WV36220913-	2.89	183.2	7.66	156.7	12.33	0.2	2.75
MW-36	11/8/2022	WV36221108-	3.3	163	7.69	161	10.93	0.35	2.75
Unit D Aquifer									
MW-7	2/1/2022	WV7-220201-	1.16	-1.9	7.46	163.9	10.18	1.71	6.5
MW-7	5/10/2022	WV7-220510-	1.37	167.7	7.36	164.6	10.65	5.58	2.9
MW-7	9/13/2022	WV7-220913-	1.19	205.1	7.37	165.3	11.58	3.59	3.75
MW-7	11/8/2022	WV7-221108-	1.35	249.7	7.55	165.3	10.16	19.3	3
MW-12	1/31/2022	WV12220131-	5.36	299.5	7.4	102.5	9.27	0.29	3.5
MW-12	5/9/2022	WV12220509-	5.19	233.4	7.12	142.8	9.04	1.11	3
MW-12	9/13/2022	WV12220913-	5.17	-59.1	7.3	141.1	9.19	0.42	2.5
MW-12	11/8/2022	WV12221108-	4.98	216.3	7.46	138.3	9.39	0.51	2.1
MW-19	2/2/2022	WV19220202-	0.5	294.2	7.48	194.3	9.56	0.59	5
MW-19	5/10/2022	WV19220510-	0.85	192.8	7.3	191.7	9.71	1.16	4
MW-19	9/13/2022	WV19220913-	0.83	264.3	7.19	192.5	10.47	1.37	3.5
MW-19	11/8/2022	WV19221108-	0.92	-18.7	7.6	194	9.27	0.85	5
MW-19	11/8/2022	WV19221108D	0.92	-18.7	7.6	194	9.27	0.85	5
MW-26	2/2/2022	WV26220202-	0.56	-63	7.8	167.7	9.98	1.85	6.25
MW-26	5/10/2022	WV26220510-	0.73	50.4	7.95	169.1	11.09	7.64	5
MW-26	9/13/2022	WV26220913-	0.58	106.4	7.97	172.2	10.97	2.61	4.75
MW-26	11/8/2022	WV26221108-	0.8	-70.3	8.17	171.1	10.4	2.3	3.75
MW-29	2/2/2022	WV29220202-	0.43	-84.7	7.06	207.6	9.95	9.44	6.75
MW-29	5/10/2022	WV29220510-	0.2	21.9	7.28	207.3	11	8.37	8
MW-29	9/15/2022	WV29220915-	0.71	-188.3	7.34	206.9	10.32	4.93	5
MW-29	11/8/2022	WV29221108-	0.69	-80.4	7.54	207.2	10.07	7.02	3.75
MW-34	2/1/2022	WV34220201-	6.64	122.4	6.75	172.1	12.17	0.27	2.25
MW-34	5/9/2022	WV34220509-	6.17	169.9	6.56	173.9	12.16	0.27	2.1
MW-34	9/12/2022	WV34220912-	6.24	209.4	6.92	172.3	11.67	1.31	3
MW-34	11/7/2022	WV34221107-	6.24	138.2	6.84	178.4	11.13	0.47	3
Field Blanks									
FIELD BLANK	2/1/2022	WV7-220201F	--	--	7.3	0.3	7.46	--	--
FIELD BLANK	2/7/2022	WV85220207F	11.42	145.1	6.67	1.7	8.9	0.62	--
FIELD BLANK	5/12/2022	WV2-220512F	--	--	6.31	0.7	10.33	--	--
FIELD BLANK	9/13/2022	WV9-220913F	--	--	5.86	1.2	18.74	--	--
FIELD BLANK	11/9/2022	WV37221109F	--	--	7.8	2.3	3.429	--	--
Offsite Domestic Wells									
DW-85	2/7/2022	WV85220207-	0.23	-3.8	7.62	135.2	9.59	0.71	75
DW-85	9/14/2022	WV85220914-	2.1	-205.5	8.11	133.3	11.15	0.56	60
DW-LS	2/7/2022	WVLS220207-	8.77	239.4	7	248.8	9.55	1.54	90
DW-LS	9/14/2022	WVLS220914-	8.41	42.3	7.26	243	12.1	1.06	60
DW-PA	2/7/2022	WVPA220207-	8.29	282.5	6.9	164.8	8.49	0.83	75
DW-PA	9/14/2022	WVPA220914-	8.67	51.8	7.11	161.7	11.37	6.24	60
Water and Land Resources Division Monitoring Well									
W-73	11/9/2022	WV73221109-	0.09	-130.4	7.84	181	11.4	81.9	0.9

Notes:

-- = parameter is not sampled for

*Insufficient water to collect a sample

[1] MW-37 was installed on 5/18/2022.

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	2/1/2022	WV3-220201-	21.3	0.002 U	3.33	1.29	79.6	3.96	44.7	0.76 T	49.30	1.64
MW-3	5/11/2022	WV3-220511-	17	0.002 U	1.52	0.333	56.6	4.33	42.7 J	0.59 T	64.7 J	3.2 J
MW-3	9/13/2022	WV3-220913-	15.6	0.002 U	1.07	0.394	51	4.02	40	0.5 U	41.3	0.5 U
MW-3*	11/8/2022	--	--	--	--	--	--	--	--	--	--	--
MW-4*	2/2/2022	--	--	--	--	--	--	--	--	--	--	--
MW-4*	5/11/2022	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	66.4	0.0031 T	8.63	2.87	210	14.7	155	0.5 U	157	0.5 U
MW-4*	11/8/2022	--	--	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	56.5	0.002 U	3.42	0.409	147	9.67	90	0.5 U	92	0.5 U
MW-10	5/9/2022	WV10220509-	58.2	0.002 U	3.46	0.424	152	10.2	104	0.5 U	105	0.5 U
MW-10	9/12/2022	WV10220912-	58.8	0.002 U	3.16	0.425	146	9.04	107	0.5 U	103	0.5 U
MW-10	11/7/2022	WV10221107-	59.4	0.002 U	3.3	0.434	146	9.38	104	0.52 T	108	1.10
MW-13	1/31/2022	WV13220131-	62.3	0.002 U	2.7	0.298	157	11.1	101	0.5 U	108	0.5 U
MW-13	5/9/2022	WV13220509-	62.7	0.002 U	2.89	0.264	160	11.4	109	0.5 U	109	0.5 U
MW-13	9/13/2022	WV13220913-	63.1	0.002 U	2.62	0.315	152	9.66	109	0.5 U	113	1 U
MW-13	11/8/2022	WV13221107-	63	0.002 U	2.84	0.369	149	9.01	110	0.5 U	111	0.51 U
Channel Cc2												
MW-2	2/3/2022	WV2-220203-	135	0.002 U	2.27	1.23	304	12.9	169	0.5 U	175	0.5 U
MW-2	2/3/2022	WV2-220203D	136	0.002 U	2.27	1.22	305	12.9	165	0.5 U	171	0.5 U
MW-2	5/12/2022	WV2-220512-	136	0.002 U	2.19	0.856	301	12.4	174	0.58 T	181	0.5 U
MW-2	9/15/2022	WV2-220915-	136	0.002 U	2.12	0.278	289	13.2	178	0.55 T	176	0.5 T
MW-2	11/9/2022	WV2-221109-	141	0.002 U	2.06	0.154	287	11.9	179	0.84 T	179	0.5 U
MW-9	2/2/2022	WV9-220202-	67.5	0.002 U	4.54	0.541	178	12	108	0.5 U	111	0.5 U
MW-9	5/10/2022	WV9-220510-	71.4	0.002 U	5.38	0.876	192	12.3	127	0.5 U	130	0.51 U
MW-9	9/13/2022	WV9-220913-	79.8	0.002 U	4.96	0.951	205	13.7	139	0.5 U	145	0.5 U
MW-9	11/8/2022	WV9-221108-	78.1	0.002 U	4.94	0.735	197	13.1	133	0.5 U	134	0.53 U
MW-20	2/3/2022	WV20220203-	70.7	0.016	3.16	0.01 U	184	15	113	0.5 U	126	0.5 U
MW-20	5/12/2022	WV20220512-	68.5	0.0158	3.17	0.01 U	182	16	121	0.5 U	126	0.5 U
MW-20	9/15/2022	WV20220915-	71.7	0.0187	3.36	0.01 U	182	15.5	129	0.5 U	130	0.5 U
MW-20	9/15/2022	WV20220915D	71.9	0.0183	3.19	0.01 U	182	16.2	129	0.5 U	131	0.5 U
MW-20	11/9/2022	WV20221109-	71	0.0157	3.15	0.01 U	177	15.5	128	0.5 U	127	0.5 T
MW-21	2/3/2022	WV21220203-	140	0.01 T	1.91	0.315	305	12.5	166	0.67 T	172	0.82 T
MW-21	5/12/2022	WV21220512-	127	0.0077 T	1.76	0.226	278	12	169	0.73 T	192	1
MW-21	9/15/2022	WV21220915-	131	0.0088 T	1.98	0.102	276	12.6	174	0.68 T	175	0.8 T
MW-21	11/9/2022	WV21221109-	131	0.009 T	1.9	0.0987	272	13	174	0.83 T	176	2.40
MW-33	2/3/2022	WV33220203-	316	0.0305	3.47	0.01 U	616	15.9	325	1.87	339	8.8
MW-33	5/12/2022	WV33220512-	328	0.0306	3.52	0.01 U	634	17.1	370	2.01	397	2
MW-33	9/15/2022	WV33220915-	343	0.0323	4.07	0.01 U	641	18.6	394	1.8	391	4.9
MW-33	11/9/2022	WV33221109-	334	0.0306	3.75	0.01 U	610	16.6	373	2.1	394	9.1
MW-35	2/3/2022	WV35220203-	331	0.0643	3.85	0.01 U	659	26	401	3.76	701	323
MW-35	5/12/2022	WV35220512-	306	0.0649	3.64	0.01 U	618	29.2	405	3.35	449	84
MW-35	9/15/2022	WV35220915-	310	0.0657	3.86	0.01 U	609	31.9	401	3.1	491	170
MW-35	11/9/2022	WV35221109-	297	0.0635	3.32	0.01 U	568	29.1	371.00	3.28	425.00	89.50
MW-37[1]	6/30/2022	WV37220630-	93.2	0.0147	3	0.90	209	8.18	154.00	0.53 T	155.00	13.80
MW-37[1]	9/15/2022	WV37220915-	90.5	0.002 U	2.99	0.90	205	8.42	140.00	0.52 T	148.00	11.90
MW-37[1]	11/9/2022	WV37221109-	91.4	0.002 U	2.86	0.78	199	7.28	137.00	0.62 T	155.00	8.30

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 Cc3												
MW-8	1/31/2022	WV8-220131-	55.9	0.002 U	4.15	3.53	168	7.2	101	0.5 U	108	0.5 U
MW-8	5/9/2022	WV8-220509-	50.6	0.002 U	4.53	4.41	167	6.56	121	0.5 U	122	0.53 U
MW-8	9/12/2022	WV8-220912-	51.9	0.002 U	4.35	4.3	158	6.45	119	0.5 U	122	0.5 U
MW-8	11/7/2022	WV8-221107-	52.9	0.002 U	4.33	3.83	158	6.19	113	0.5 U	120	0.5 U
MW-36	1/31/2022	WV36220131-	68.1	0.002 U	3.08	0.021 T	177	14.6	115	0.5 U	122	1 U
MW-36	5/10/2022	WV36220510-	67.3	0.002 U	3.09	0.02 T	175	14.4	127	0.5 U	127	0.5 U
MW-36	5/10/2022	WV36220510D	67.7	0.002 U	3.02	0.019 T	175	13.8	123	0.5 U	131	0.5 U
MW-36	9/13/2022	WV36220913-	69.8	0.002 U	2.86	0.024 T	175	13.8	131	0.5 U	131	0.53 U
MW-36	11/8/2022	WV36221108-	69.7	0.002 U	2.96	0.028 T	173	14	132	0.5 U	132	0.5 U
Unit D Aquifer												
MW-7	2/1/2022	WV7-220201-	78.1	0.235	3.35	0.013 T	189	11.3	123	0.5 U	123	0.9 T
MW-7	5/10/2022	WV7-220510-	76.7	0.233	3.44	0.021 T	187	11	132	0.5 U	140	3.2
MW-7	9/13/2022	WV7-220913-	78.6	0.233	3.12	0.018 T	185	10.6	134	0.5 U	133	2
MW-7	11/8/2022	WV7-221108-	78.1	0.231	3.23	0.024 T	183	10.8	134	0.61 T	148	16
MW-12	1/31/2022	WV12220131-	62	0.002 U	3.13	0.696	160	9.85	105	0.5 U	104	0.5 U
MW-12	5/9/2022	WV12220509-	62.7	0.002 U	3.25	0.674	163	9.75	110	0.5 U	114	0.53 U
MW-12	9/13/2022	WV12220913-	63.8	0.0039 T	3	0.65	159	9.94	113	0.5 U	115	0.51 U
MW-12	11/8/2022	WV12221108-	63.5	0.002 U	3.02	0.638	157	9.69	112	0.5 U	115	0.53 T
MW-19	2/2/2022	WV19220202-	84.2	0.029	4.6	0.01 U	216	16.6	124	0.5 U	133	0.5 U
MW-19	5/10/2022	WV19220510-	82.8	0.0296	4.81	0.01 U	214	18.4	140	0.5 U	140	0.5 U
MW-19	9/13/2022	WV19220913-	85.9	0.0321	4.58	0.01 U	214	16.1	143	0.5 U	143	0.84 T
MW-19	11/8/2022	WV19221108-	85.5	0.0556	4.49	0.01 U	212	16.8	138	0.5 U	142	0.5 U
MW-19	11/8/2022	WV19221108D	85.5	0.0307	4.49	0.01 U	211	16.7	139	0.5 U	143	0.5 U
MW-26	2/2/2022	WV26220202-	76	0.245	3.72	0.025 T	193	13.2	124	0.5 U	125	3.9
MW-26	5/10/2022	WV26220510-	74.8	0.252	3.76	0.021 T	191	13.2	137	0.5 U	144	12.3
MW-26	9/13/2022	WV26220913-	77.9	0.312	3.49	0.01 U	191	13.3	139	0.5 U	143	7.5
MW-26	11/8/2022	WV26221108-	77.7	0.255	3.62	0.02 T	188	13.2	138	0.58 T	145	4.9
MW-29	2/2/2022	WV29220202-	98.7	0.0024 T	3.51	0.01 U	238	15.9	139	0.5 U	166	8.1
MW-29	5/10/2022	WV29220510-	97.2	0.0036 T	3.61	0.01 U	235	15.9	156	0.5 U	164	7.38
MW-29	9/15/2022	WV29220915-	99.8	0.0027 T	3.47	0.01 U	231	14.9	149	0.5 U	153	4
MW-29	11/8/2022	WV29221108-	99.6	0.0021 T	3.35	0.01 U	228	14.1	148	0.5 U	151	5.8
MW-34	2/1/2022	WV34220201-	69.6	0.002 U	4.81	1.75	196	13.1	109	0.5 U	121	0.5 U
MW-34	5/9/2022	WV34220509-	69.8	0.002 U	5.01	1.85	199	13.7	133	0.5 U	136	0.5 U
MW-34	9/12/2022	WV34220912-	70.7	0.002 U	5.25	2.05	193	12	134	0.5 U	142	2.10
MW-34	11/7/2022	WV34221107-	72.2	0.002 U	4.61	2.01	193	12.1	131	0.5 U	134	0.5 U
Field Blanks												
FIELD BLANK	2/1/2022	WV7-220201F	1 U	0.002 U	0.214	0.01 U	1.6 T	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	2/7/2022	WV85220207F	1 U	0.002 U	0.05 U	0.01 U	1.9 T	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	5/12/2022	WV2-220512F	5.49	0.002 U	0.05 U	0.01 U	13.4	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	9/13/2022	WV9-220913F	1 U	0.002 U	0.05 U	0.01 U	1.1 T	0.1 U	10 U	0.5 U	10 U	0.5 U
FIELD BLANK	11/9/2022	WV37221109F	1 U	0.002 U	0.05 U	0.01 U	1.5 T	0.1 U	10 U	0.5 U	10 U	0.5 U
Offsite Domestic Wells												
DW-85	2/7/2022	WV85220207-	68.9	0.282	2.55	0.01 U	151	1.86	88	0.5 U	94.70	0.5 U
DW-85	9/14/2022	WV85220914-	70.5	0.269	2.8	0.01 U	149	1.96	107	0.5 U	106	0.5 U
DW-LS	2/7/2022	WVLS220207-	113	0.002 U	6.63	2.17	282	10.9	156	0.75 T	163	5.20
DW-LS	9/14/2022	WVLS220914-	113	0.0033 T	6.35	2.37	276	12.4	175	0.73 T	181	0.7 T
DW-PA	2/7/2022	WVPA220207-	67.6	0.002 U	5.23	0.805	184	10.8	103	0.5 U	102.00	0.5 U
DW-PA	9/14/2022	WVPA220914-	68.8	0.0061 T	5.55	1	181	11.2	121	0.5 U	124	2.40
Water and Land Resources Division Monitoring Well												
W-73	11/9/2022	WV73221109-	92.3	0.04	3.58	0.01 U	201	8.39	150	0.76 T	252	158.00

Notes:

-- = parameter is not sampled for

*Insufficient water to collect a sample

[1] MW-37 was installed on 5/18/2022.

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

Groundwater - Metals (Dissolved & Total) Well #	Sample Date	Sample ID	Antimony, Dissolved (mg/L)	Antimony, Total (mg/L)	Arsenic, Dissolved (ug/L)	Arsenic, Total (ug/L)	Barium, Dissolved (mg/L)	Barium, Total (mg/L)	Beryllium, Dissolved (mg/L)	Beryllium, Total (mg/L)	Cadmium, Dissolved (mg/L)	Cadmium, Total (mg/L)	Calcium, Dissolved (mg/L)	Calcium, Total (mg/L)	Chromium, Dissolved (mg/L)	Chromium, Total (mg/L)	Cobalt, Dissolved (mg/L)	Cobalt, Total (mg/L)	Copper, Dissolved (mg/L)	Copper, Total (mg/L)	Iron, Dissolved (mg/L)	Iron, Total (mg/L)	Lead, Dissolved (mg/L)	Lead, Total (mg/L)
			Channel Cc1																					
MW-3	2/1/2022	WV3-220201-	0.0003 U	0.0003 U	0.05 U	0.0691	0.0183	0.018	0.0001 U	0.0001 U	5E-05 U	5E-05 U	7.3	7.4	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.000402	0.01 U	0.0431	0.0001 U	0.00014
MW-3	5/11/2022	WV3-220511-	0.0003 U	0.0003 U	0.05 U	0.171	0.0149	0.0183	0.0001 U	0.0001 U	5E-05 U	5E-05 U	5.06	5.08	0.0002 U	0.000419	5E-05 U	0.000126	0.0002 U	0.00055	0.01 U	0.237	0.0001 U	0.000334
MW-3	9/13/2022	WV3-220913-	0.0003 U	0.0003 U	0.05 U	0.05 U	0.0106	0.0109	0.0001 U	0.0001 U	5E-05 U	5E-05 U	4.55	4.47	0.0002 U	0.0003	5E-05 U	5E-05 U	0.0002 U	0.0003	0.01 U	0.0236	0.0001 U	0.0001 U
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	0.0003 U	0.0003 U	0.311	0.33	0.00552	0.00586	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.6	16.5	0.0045	0.00486	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0111	0.0001 U	0.0001 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	0.0003 U	0.0003 U	1.77	1.72	0.00316	0.00322	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.8	10.4	0.0025	0.00254	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	5/9/2022	WV10220509-	0.0003 U	0.0003 U	1.72	1.72	0.00331	0.00354	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.88	9.72	0.00265	0.00259	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	9/12/2022	WV10220912-	0.0003 U	0.0003 U	1.7	1.72	0.00326	0.00333	0.0001 U	0.0001 U	5E-05 U	5E-05 U	10.1	10.2	0.00273	0.00266	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	11/7/2022	WV10221107-	0.0003 U	0.0003 U	1.67	1.7	0.00331	0.00407	0.0001 U	0.0001 U	0.000148	0.000288	10.2	10.1	0.00259	0.00262	5E-05 U	5E-05 U	0.000268	0.000859	0.01 U	0.062	0.0001 U	0.000135
MW-13	1/31/2022	WV13220131-	0.0003 U	0.0003 U	1.94	1.96	0.00451	0.00455	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.32	9.6	0.0015	0.00172	5E-05 U	5E-05 U	0.000265	0.000296	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-13	5/9/2022	WV13220509-	0.0003 U	0.0003 U	1.89	1.94	0.00448	0.00474	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.15	9.49	0.00195	0.00191	5E-05 U	5E-05 U	0.000267	0.000385	0.01 U	0.0137	0.0001 U	0.0001 U
MW-13	9/13/2022	WV13220913-	0.0003 U	0.0003 U	2.18	2.2	0.00604	0.00457	0.0001 U	0.0001 U	5E-05 U	5E-05 U	9.27	9.05	0.00241	0.00264	5E-05 U	5E-05 U	0.00506	0.000254	0.0302	0.01 U	0.0001 U	0.0001 U
MW-13	11/8/2022	WV13221107-	0.0003 U	0.0003 U	2.27	2.33	0.00431	0.00423	0.0001 U	0.0001 U	5E-05 U	5E-05 U	8.98	9.11	0.00289	0.003	5E-05 U	5E-05 U	0.000442	0.000238	0.01 U	0.01 U	0.0001 U	0.0001 U
			Channel Cc2																					
MW-2	2/3/2022	WV2-220203-	0.0003 U	0.0003 U	0.97	1.02	0.00642	0.00642	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.9	20.3	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	2/3/2022	WV2-220203D	0.0003 U	0.0003 U	0.989	0.991	0.00654	0.00651	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.6	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	5/12/2022	WV2-220512-	0.0003 U	0.0003 U	0.897	0.911	0.00661	0.00617	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.3	20.7	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.000224	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-2	9/15/2022	WV2-220915-	0.0003 U	0.0003 U	0.913	0.886	0.00603	0.00642	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.4	20.4	0.000432	0.000729	5E-05 U	5.08E-05	0.0002 U	0.000236	0.012	0.0218	0.0001 U	0.0001 U
MW-2	11/9/2022	WV2-221109-	0.0003 U	0.0003 U	0.876	0.889	0.00588	0.0059	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.1	20.4	0.000285	0.0002 U	5E-05 U	5E-05 U	0.00021	0.000225	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-9	2/2/2022	WV9-220202-	0.0003 U	0.0003 U	2.44	2.4	0.00366	0.00348	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.4	13.6	0.00216	0.00225	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	5/10/2022	WV9-220510-	0.0003 U	0.0003 U	2.34	2.31	0.00411	0.0039	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.1	14.8	0.00261	0.00263	5E-05 U	5E-05 U	0.0002 U	0.000229	0.01 U	0.01 U	0.0001 U	0.0001 U
MW-9	9/13/2022	WV9-220913-	0.0003 U	0.0003 U	2.27	2.33	0.00418	0.00421	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.6	16	0.0034	0.00321	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	11/8/2022	WV9-221108-	0.0003 U	0.0003 U	2.27	2.28	0.00384	0.00384	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.1	15.2	0.00349	0.00331	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-20	2/3/2022	WV20220203-	0.0003 U	0.0003 U	1.97	2.16	0.00511	0.00531	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.1	13.1	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.103	0.206	0.0001 U	0.0001 U
MW-20	5/12/2022	WV20220512-	0.0003 U	0.0003 U	1.98	2.2	0.00513	0.00508	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.9	13.1	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.101	0.209	0.0001 U	0.0001 U
MW-20	9/15/2022	WV20220915-	0.0003 U	0.0003 U	2.08	2.09	0.00526	0.0056	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13	13.1	0.000224	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.152	0.18	0.0001 U	0.0001 U
MW-20	9/15/2022	WV20220915D	0.0003 U	0.0003 U	2.03	2.1	0.00537	0.00571	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.9	12.8	0.0002 U	0.000296	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.141	0.183	0.0001 U	0.0001 U
MW-20	11/9/2022	WV20221109-	0.0003 U	0.0003 U	2.06	2.12	0.00493	0.0051	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13	13.2	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0992	0.137	0.0001 U	0.0001 U
MW-21	2/3/2022	WV21220203-	0.0003 U	0.0003 U	0.94	1.49	0.00846	0.00911	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21	21.4	0.0002 U	0.0002 U	0.000236	0.000277	0.0002 U	0.0002 U	0.457	0.739	0.0001 U	0.0001 U
MW-21	5/12/2022	WV21220512-	0.0003 U	0.0003 U	1.12	1.48	0.00637	0.00652	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	20.3	0.0002 U	0.0002 U	0.000123	0.000143	0.0002 U	0.0002 U	0.168	0.36	0.0001 U	0.0001 U
MW-21	9/15/2022	WV21220915-	0.0003 U	0.0003 U	0.958	1.26	0.00613	0.00677	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.4	20	0.000202	0.000361	0.000103	0.000135	0.0002 U	0.0002 U	0.102	0.299	0.0001 U	0.0001 U
MW-21	11/9/2022	WV21221109-	0.0003 U	0.0003 U	0.938	1.2	0.00587	0.00618	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	20.3	0.0002 U	0.0002 U	0.000104	0.000125	0.0002 U	0.0002 U	0.157	0.303	0.0001 U	0.0001 U
MW-33	2/3/2022	WV33220203-	0.0003 U	0.0003 U	38	38.6	0.0207	0.0207	0.0001 U	0.0001 U	5E-05 U	5E-05 U	55.2	57.2	0.000266	0.0002 U	0.000982	0.000978	0.0002 U	0.0002 U	5.47	5.42	0.0001 U	0.0001 U
MW-33	5/12/2022	WV33220512-	0.0003 U	0.0003 U	36.7	37.7	0.0216	0.0213	0.0001 U	0.0001 U	5E-05 U	5E-05 U	58	57.7	0.0002 U	0.000204	0.001	0.000992	0.0002 U	0.0002 U	5.61	5.72	0.0001 U	0.0001 U
MW-33	9/15/2022	WV33220915-	0.0003 U	0.0003 U	36.1	36.1	0.0222	0.0235	0.0001 U	0.0001 U	5E-05 U	5E-05 U	57.8	58.4	0.000263	0.000213	0.00104	0.00108	0.0002 U	0.0002 U	5.41	5.68	0.0001 U	0.0001 U
MW-33	11/9/2022	WV33221109-	0.0003 U	0.0003 U	37.9	38.6	0.0205	0.0211	0.0001 U	0.0001 U	5E-05 U	5E-05 U	56.7	56.4	0.0002 U	0.000232	0.000992	0.000992	0.0002 U	0.0002 U	5.36	5.36	0.0001 U	0.0001 U
MW-35	2/3/2022	WV35220203-	0.0003 U	0.0003 U	26.8	51.8	0.0213	0.0402	0.0001 U	0.0001 U	5E-05 U	5E-05 U	61.3	67.2	0.0002 U	0.0045	0.00182	0.00284	0.0002 U	0.00273	12.8	17.1	0.0001 U	0.000698
MW-35	5/12/2022	WV35220512-	0.0003 U	0.0003 U	26.9	32.7	0.019	0.0234	0.0001 U	0.0001 U	5E-05 U	5E-05 U	56.9	60.3	0.0002 U	0.00193	0.00181	0.00215	0.0002 U	0.000815	12.2	13.3	0.0001 U	0.000158
MW-35	9/15/2022	WV35220915-	0.0003 U	0.0003 U	26.4	31.7	0.0198	0.0278	0.0001 U	0.0001 U	5E-05 U	5E-05 U	55.7	55.7	0.000467	0.00286	0.00171	0.00235	0.0002 U	0.0013	10.6	12.4	0.0001 U	0.00025
MW-35	11/9/2022	WV35221109-	0.0003 U	0.0003 U	25.1	31.8	0.0175	0.0219	0.0001 U	0.0001 U	5E-05 U	5E-05 U	54.2	54.2	0.000271	0.0013	0.00167	0.00197	0.0002 U	0.000793	10.4	11.7	0.0001 U	0.000128
MW-37[1]	6/30/2022	WV37220630-	0.0003 U	0.0003 U	0.851	1.02	0.0114	0.0153	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.2	16	0.00399	0.00626	0.000273	0.000549	0.0002 U	0.001	0.0122	0.594	0.0001 U	0.00018
MW-37[1]	9/15/2022	WV37220915-	0.0003 U	0.0003 U	0.928	1.17	0.00795	0.00996	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.2	15.2	0.00564	0.00861	5E-05 U	0.000461	0.0002 U	0.000543	0.01 U	0.354	0.0001 U	0.0001 U
MW-37[1]	11/9/2022	WV37221109-	0.0003 U	0.0003 U	0.989	1.48	0.00626	0.00834	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.9	15.3	0.0059	0.00973	5E-05 U	0.000382	0.000284	0.000474	0.0313	0.494	0.0001 U	0.0001 U

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

Groundwater - Metals (Dissolved & Total) Well #	Sample Date	Sample ID	Magnesium, Dissolved (mg/L)	Magnesium, Total (mg/L)	Manganese, Dissolved (ug/L)	Manganese, Total (ug/L)	Mercury, Dissolved (mg/L)	Mercury, Total (mg/L)	Nickel, Dissolved (mg/L)	Nickel, Total (mg/L)	Potassium, Dissolved (mg/L)	Potassium, Total (mg/L)	Selenium, Dissolved (mg/L)	Selenium, Total (mg/L)	Silver, Dissolved (mg/L)	Silver, Total (mg/L)	Sodium, Dissolved (mg/L)	Sodium, Total (mg/L)	Thallium, Dissolved (mg/L)	Thallium, Total (mg/L)	Vanadium, Dissolved (mg/L)	Vanadium, Total (mg/L)	Zinc, Dissolved (mg/L)	Zinc, Total (mg/L)
			Channel Cc1																					
MW-3	2/1/2022	WV3-220201-	2.23	2.4	1.08	3.27	5E-05 U	5E-05 U	0.000284 D	0.000545	1.5	1.59	0.0005 U	0.0005 U	4E-05 U	4E-05 U	3.23	3.42	7.5E-05 U	7.5E-05 U	0.000243	0.000313	0.000626	0.00101
MW-3	5/11/2022	WV3-220511-	1.87	1.92	0.54	20.9	5E-05 DU	5E-05 DU	0.000217	0.000614	1.29	1.3	0.0005 U	0.0005 U	4E-05 U	4E-05 U	2.54	2.45	7.5E-05 U	7.5E-05 U	0.000234	0.000771	0.00155	0.000671
MW-3	9/13/2022	WV3-220913-	1.94	1.89	0.479	1.13	5E-05 U	5E-05 U	0.000408	0.000634	1.06	1.04	0.0005 U	0.0005 U	4E-05 U	4E-05 U	1.81	1.82	7.5E-05 U	7.5E-05 U	0.000135	0.00011	0.000871	0.00148
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	11.5	11.5	0.494	4.14	5E-05 U	5E-05 U	0.000749	0.00105	1.07	1.13	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.74	8.05	7.5E-05 U	7.5E-05 U	0.00229	0.00266	0.00115	0.00138
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	9.4	9.29	0.1 U	0.194	5E-05 U	5E-05 U	0.000317	0.000353	1.41	1.47	0.0005 U	0.0005 U	4E-05 U	4E-05 U	4.73	4.91	7.5E-05 U	7.5E-05 U	0.00424	0.00412	0.0005 U	0.0005 U
MW-10	5/9/2022	WV10220509-	9.6	8.95	0.1 U	0.247	5E-05 U	5E-05 DU	0.00031	0.00031	1.55	1.45	0.0005 U	0.0005 U	4E-05 U	4E-05 U	4.45	4.62	7.5E-05 U	7.5E-05 U	0.00414	0.00412	0.0005 U	0.0005 U
MW-10	9/12/2022	WV10220912-	9.58	9.56	0.307	0.116	5E-05 U	5E-05 U	0.000424	0.000403	1.41	1.42	0.0005 U	0.0005 U	4E-05 U	4E-05 U	4.81	4.95	7.5E-05 U	7.5E-05 U	0.0043	0.00422	0.00107	0.000552
MW-10	11/7/2022	WV10221107-	10.1	9.59	0.553	4.26	5E-05 U	5E-05 U	0.00029	0.000527	1.42	1.41	0.0005 U	0.0005 U	4E-05 U	4E-05 U	4.96	4.89	7.5E-05 U	7.5E-05 U	0.00414	0.00421	0.00244	0.0068
MW-13	1/31/2022	WV13220131-	11.1	11	0.659	0.987	5E-05 U	5E-05 U	0.000941	0.000975	1.7	1.74	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.88	5.74	7.5E-05 U	7.5E-05 U	0.00591	0.00591	0.0005 U	0.0005 U
MW-13	5/9/2022	WV13220509-	11.5	11	3.57	3.93	5E-05 U	5E-05 DU	0.00111	0.00107	1.89	1.84	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.31	5.83	7.5E-05 U	7.5E-05 U	0.0057	0.00552	0.0005 U	0.0005 U
MW-13	9/13/2022	WV13220913-	10.7	10.6	7.7	0.337	5E-05 U	5E-05 U	0.00108	0.00104	1.59	1.59	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.83	5.74	7.5E-05 U	7.5E-05 U	0.00667	0.0065	0.00993	0.000746
MW-13	11/8/2022	WV13221107-	10.9	10.9	0.282	0.195	5E-05 U	5E-05 U	0.000863	0.00087	1.63	1.65	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.76	5.86	7.5E-05 U	7.5E-05 U	0.00681	0.00696	0.0005 U	0.0005 U
			Channel Cc2																					
MW-2	2/3/2022	WV2-220203-	20.6	22.2	43.3	46.7	5E-05 U	5E-05 U	0.0027 D	0.00284	2.01	2.08	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.1	8.37	7.5E-05 U	7.5E-05 U	0.00393	0.00401	0.0005 U	0.0005 U
MW-2	2/3/2022	WV2-220203D	21.1	22.3	44.8	46.1	5E-05 U	5E-05 U	0.00282 D	0.00286	2.01	2.05	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.1	8.61	7.5E-05 U	7.5E-05 U	0.00406	0.00402	0.00113	0.0005 U
MW-2	5/12/2022	WV2-220512-	22.5	19.7	33.6	47.6	5E-05 DU	5E-05 U	0.00231	0.00223	2.16	2.12	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.01	7.73	7.5E-05 U	7.5E-05 U	0.00346	0.00338	0.0005 U	0.00051
MW-2	9/15/2022	WV2-220915-	21	21.5	56.1	62	5E-05 U	5E-05 U	0.00321	0.00338	2.06	2.19	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.64	8.94	7.5E-05 U	7.5E-05 U	0.0034	0.00375	0.00176	0.00166
MW-2	11/9/2022	WV2-221109-	21.5	21.1	55.7	67.8	5E-05 U	5E-05 U	0.0028	0.00286	2.06	2.06	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.75	8.59	7.5E-05 U	7.5E-05 U	0.00314	0.00316	0.00134	0.000931
MW-9	2/2/2022	WV9-220202-	10.2	11.1	0.1 U	0.1 U	5E-05 U	5E-05 U	0.000126 D	0.000164	2.01	2.09	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.34	5.69	7.5E-05 U	7.5E-05 U	0.0049	0.00477	0.0005 U	0.0005 U
MW-9	5/10/2022	WV9-220510-	12.1	12	0.1 U	0.165	5E-05 U	5E-05 DU	0.000204	0.000223	2.26	2.28	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.37	6.08	7.5E-05 U	7.5E-05 U	0.00477 D	0.00471	0.0005 U	0.0005 U
MW-9	9/13/2022	WV9-220913-	12.6	13.2	0.1 U	0.12	5E-05 U	5E-05 U	0.000316	0.000275	2.12	2.19	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.22	6.37	7.5E-05 U	7.5E-05 U	0.00488	0.00484	0.00104	0.000593
MW-9	11/8/2022	WV9-221108-	12.3	11.9	0.1 U	0.385	5E-05 U	5E-05 U	0.000169	0.000142	2.12	2.12	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.97	5.91	7.5E-05 U	7.5E-05 U	0.00463	0.00462	0.0005 U	0.0005 U
MW-20	2/3/2022	WV20220203-	10.9	11.5	126	135	5E-05 U	5E-05 U	0.000138 D	0.000194	1.99	2.03	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.41	5.61	7.5E-05 U	7.5E-05 U	0.000161	0.000163	0.0005 U	0.0005 U
MW-20	5/12/2022	WV20220512-	11.8	10.1	133	130	5E-05 DU	5E-05 U	0.00015	0.000203	2.11	2.06	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.1	4.99	7.5E-05 U	7.5E-05 U	0.000172	0.000165	0.0005 U	0.0005 U
MW-20	9/15/2022	WV20220915-	11.7	11.8	146	152	5E-05 U	5E-05 U	0.000375	0.000377	2.04	2.21	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.98	5.99	7.5E-05 U	7.5E-05 U	0.000135	0.000604	0.00128	0.00103
MW-20	9/15/2022	WV20220915D	11.5	11.3	143	148	5E-05 U	5E-05 U	0.000345	0.000422	2.03	2.13	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.92	5.74	7.5E-05 U	7.5E-05 U	0.000126	0.000608	0.00102	0.00107
MW-20	11/9/2022	WV20221109-	11.5	11.7	130	134	5E-05 U	5E-05 U	0.000165	0.000193	2	2.05	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.79	5.71	7.5E-05 U	7.5E-05 U	0.000125	0.000141	0.0026	0.000558
MW-21	2/3/2022	WV21220203-	20.3	21.8	361	409	5E-05 U	5E-05 U	0.00172 D	0.00183	2.21	2.27	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.48	9.84	7.5E-05 U	7.5E-05 U	0.000704	0.00085	0.0005 U	0.0005 U
MW-21	5/12/2022	WV21220512-	19.2	17.8	168	175	5E-05 DU	5E-05 U	0.00114	0.00119	2.17	2.16	0.0005 U	0.0005 U	4E-05 U	4E-05 U	10.9	9.87	7.5E-05 U	7.5E-05 U	0.000711	0.000747	0.0005 U	0.0005 U
MW-21	9/15/2022	WV21220915-	19.4	18.9	158	186	5E-05 U	5E-05 U	0.00104	0.00132	2.15	2.3	0.0005 U	0.0005 U	4E-05 U	4E-05 U	10.9	10.8	7.5E-05 U	7.5E-05 U	0.000626	0.00109	0.000684	0.00104
MW-21	11/9/2022	WV21221109-	19.6	19.3	186	200	5E-05 U	5E-05 U	0.000972	0.00102	2.1	2.15	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.83	9.86	7.5E-05 U	7.5E-05 U	0.000655	0.000669	0.000963	0.000509
MW-33	2/3/2022	WV33220203-	41.4	43	883	863	5E-05 U	5E-05 U	0.00456 D	0.00462	3.02	3.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	15.5	15.8	7.5E-05 U	7.5E-05 U	0.000664	0.00067	0.0005 U	0.0005 U
MW-33	5/12/2022	WV33220512-	45.5	40.1	877	867	5E-05 DU	5E-05 U	0.00517	0.00499	3.21	3.13	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.6	14.6	7.5E-05 U	7.5E-05 U	0.000663	0.000656	0.0005 U	0.0005 U
MW-33	9/15/2022	WV33220915-	45.4	45.9	881	893	5E-05 U	5E-05 U	0.00515	0.00536	3.09	3.33	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.4	16.7	7.5E-05 U	7.5E-05 U	0.000681	0.000813	0.00111	0.000676
MW-33	11/9/2022	WV33221109-	44.5	44.7	877	877	5E-05 U	5E-05 U	0.0049	0.00494	3.08	3.06	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16	16	7.5E-05 U	7.5E-05 U	0.000663	0.000653	0.00106	0.000999
MW-35	2/3/2022	WV35220203-	45.3	47.2	2350	2400	5E-05 U	5E-05 U	0.00302 D	0.00853	3.27	3.56	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.2	16.7	7.5E-05 U	7.5E-05 U	0.000267	0.00362	0.00167	0.0263
MW-35	5/12/2022	WV35220512-	43	41.2	2290	2280	5E-05 DU	5E-05 U	0.00379	0.00552	3.28	3.3	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.5	15.1	7.5E-05 U	7.5E-05 U	0.000254	0.00121	0.00192	0.00731
MW-35	9/15/2022	WV35220915-	41.2	41.6	2190	2230	5E-05 U	5E-05 U	0.00379	0.00772	3.14	3.32	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.3	16.2	7.5E-05 U	7.5E-05 U	0.000248	0.002	0.00265	0.00965
MW-35	11/9/2022	WV35221109-	41.7	42.4	2140	2180	5E-05 U	5E-05 U	0.00343	0.00508	3.13	3.16	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16.2	16.7	7.5E-05 U	7.5E-05 U	0.000248	0.00108	0.00226	0.00538
MW-37[1]	6/30/2022	WV37220630-	13.3	13.6	58.5	70.7	5E-05 U	5E-05 U	0.00238	0.00348	1.67	1.77	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.52	7.76	7.5E-05 U	7.5E-05 U	0.00337	0.00441	0.00221	0.0058
MW-37[1]	9/15/2022	WV37220915-	13	13.1	21.7	55.2	5E-05 U	5E-05 U	0.00194	0.00273	1.47	1.6	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.25	7.55	7.5E-05 U	7.5E-05 U	0.00408	0.00555	0.00117	0.0024
MW-37[1]	11/9/2022	WV37221109-	12.9	13.3	20.4	84.4	5E-05 U	5E-05 U	0.00162	0.00244	1.43	1.48	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.37	7.5	7.5E-05 U	7.5E-05 U	0.0042	0.00574	0.00134	0.00198

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

Groundwater - Metals (Dissolved & Total) Well #	Sample Date	Sample ID	Antimony, Dissolved (mg/L)	Antimony, Total (mg/L)	Arsenic, Dissolved (ug/L)	Arsenic, Total (ug/L)	Barium, Dissolved (mg/L)	Barium, Total (mg/L)	Beryllium, Dissolved (mg/L)	Beryllium, Total (mg/L)	Cadmium, Dissolved (mg/L)	Cadmium, Total (mg/L)	Calcium, Dissolved (mg/L)	Calcium, Total (mg/L)	Chromium, Dissolved (mg/L)	Chromium, Total (mg/L)	Cobalt, Dissolved (mg/L)	Cobalt, Total (mg/L)	Copper, Dissolved (mg/L)	Copper, Total (mg/L)	Iron, Dissolved (mg/L)	Iron, Total (mg/L)	Lead, Dissolved (mg/L)	Lead, Total (mg/L)
								Channel Cc3											**Channel Cc3**					
MW-8	1/31/2022	WV8-220131-	0.0003 U	0.0003 U	0.552	0.526	0.00352	0.00365	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12.4	12.5	0.00186	0.00186	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	5/9/2022	WV8-220509-	0.0003 U	0.0003 U	0.528	0.532	0.00365	0.00368	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11	11.8	0.00164	0.00163	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	9/12/2022	WV8-220912-	0.0003 U	0.0003 U	0.534	0.52	0.00354	0.00352	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.4	11.5	0.00159	0.00159	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	11/7/2022	WV8-221107-	0.0003 U	0.0003 U	0.535	0.535	0.00346	0.00328	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.7	11.4	0.00156	0.00171	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	1/31/2022	WV36220131-	0.0003 U	0.0003 U	1.83	1.79	0.00718	0.00737	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14	14.7	0.000558	0.000572	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	5/10/2022	WV36220510-	0.0003 U	0.0003 U	2.08	2.09	0.00749	0.0073	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.6	13.9	0.0005	0.000484	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	5/10/2022	WV36220510D	0.0003 U	0.0003 U	2.05	2.11	0.00739	0.00734	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.4	14.3	0.000495	0.000638	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	9/13/2022	WV36220913-	0.0003 U	0.0003 U	1.92	1.88	0.00724	0.00761	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.8	14.1	0.000606	0.000669	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	11/8/2022	WV36221108-	0.0003 U	0.0003 U	1.89	1.93	0.00689	0.00704	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14	14.1	0.000523	0.000498	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											**Unit D Aquifer**					
MW-7	2/1/2022	WV7-220201-	0.0003 U	0.0003 U	5.06	5.52	0.0129	0.0144	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16	16.3	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0271	0.169	0.0001 U	0.0001 U
MW-7	5/10/2022	WV7-220510-	0.0003 U	0.0003 U	4.97	5.93	0.0142	0.0173	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.6	16	0.0002 U	0.0002 U	5E-05 U	9.77E-05	0.000637	0.0002 U	0.0344	0.38	0.00013	0.0001 U
MW-7	9/13/2022	WV7-220913-	0.0003 U	0.0003 U	4.95	5.88	0.0127	0.0172	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.7	16	0.000236	0.00031	5E-05 U	7.66E-05	0.0002 U	0.0002 U	0.0201	0.373	0.0001 U	0.0001 U
MW-7	11/8/2022	WV7-221108-	0.0003 U	0.0003 U	5.01	7.31	0.0118	0.0265	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.8	15.9	0.0002 U	0.000267	5E-05 U	0.000324	0.0002 U	0.0002 U	0.0124	0.854	0.0001 U	0.0001 U
MW-12	1/31/2022	WV12220131-	0.0003 U	0.0003 U	2.17	2.12	0.00463	0.00459	0.0001 U	0.0001 U	5E-05 U	5E-05 U	12	11.8	0.00369	0.00363	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	5/9/2022	WV12220509-	0.0003 U	0.0003 U	2.13	2.18	0.00474	0.00466	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.1	11.5	0.00381	0.00371	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	9/13/2022	WV12220913-	0.0003 U	0.0003 U	2.09	2.18	0.00457	0.00478	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.7	11.8	0.00386	0.00364	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0107	0.0204	0.0001 U	0.0001 U
MW-12	11/8/2022	WV12221108-	0.0003 U	0.0003 U	2.13	2.11	0.0043	0.00432	0.0001 U	0.0001 U	5E-05 U	5E-05 U	11.8	11.5	0.00355	0.0035	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.0162	0.0001 U	0.0001 U
MW-19	2/2/2022	WV19220202-	0.0003 U	0.0003 U	0.983	1.06	0.0159	0.0164	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.1	15.7	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.000265	0.035	0.107	0.0001 U	0.0001 U
MW-19	5/10/2022	WV19220510-	0.0003 U	0.0003 U	0.956	1.06	0.016	0.0169	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.7	15.4	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0315	0.121	0.0001 U	0.0001 U
MW-19	9/13/2022	WV19220913-	0.0003 U	0.0003 U	0.94	1.13	0.0157	0.0173	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.1	15.3	0.0002 U	0.000213	5E-05 U	5E-05 U	0.0002 U	0.000202	0.0459	0.228	0.0001 U	0.0001 U
MW-19	11/8/2022	WV19221108-	0.0003 U	0.0003 U	0.967	1.08	0.015	0.0158	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15.2	15.2	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0527	0.168	0.0001 U	0.0001 U
MW-19	11/8/2022	WV19221108D	0.0003 U	0.0003 U	0.977	1.11	0.0148	0.0159	0.0001 U	0.0001 U	5E-05 U	5E-05 U	15	15.1	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0529	0.182	0.0001 U	0.0001 U
MW-26	2/2/2022	WV26220202-	0.0003 U	0.0003 U	3.12	3.34	0.00889	0.0101	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.1	17.9	0.0002 U	0.000209	5E-05 U	7.13E-05	0.0002 U	0.0002 U	0.0928	0.461	0.0001 U	0.0001 U
MW-26	5/10/2022	WV26220510-	0.0003 U	0.0003 U	3.06	3.76	0.00924	0.0118	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.9	18.1	0.0002 U	0.000357	5E-05 U	7.71E-05	0.0002 U	0.000246	0.103	0.915	0.0001 U	0.0001 U
MW-26	9/13/2022	WV26220913-	0.0003 U	0.0003 U	3.06	3.34	0.00902	0.00986	0.0001 U	0.0001 U	5E-05 U	5E-05 U	18	17.7	0.0002 U	0.000534	5E-05 U	7.47E-05	0.0002 U	0.000257	0.115	0.45	0.0001 U	0.0001 U
MW-26	11/8/2022	WV26221108-	0.0003 U	0.0003 U	3.06	3.48	0.00821	0.00969	0.0001 U	0.0001 U	5E-05 U	5E-05 U	17.9	17.8	0.000234	0.000637	5E-05 U	7.18E-05	0.0002 U	0.000679	0.111	0.625	0.0001 U	0.0001 U
MW-29	2/2/2022	WV29220202-	0.0003 U	0.0003 U	3.95	8.14	0.00983	0.0121	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.7	21.2	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.666	2.42	0.0001 U	0.0001 U
MW-29	5/10/2022	WV29220510-	0.0003 U	0.0003 U	4.25	13.6	0.0101	0.0155	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.3	20	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.741	4.23	0.0001 U	0.0001 U
MW-29	9/15/2022	WV29220915-	0.0003 U	0.0003 U	4.24	7.07	0.0103	0.0124	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	20	0.0002 U	0.000239	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.804	1.9	0.0001 U	0.0001 U
MW-29	11/8/2022	WV29221108-	0.0003 U	0.0003 U	4.16	6.45	0.00922	0.0105	0.0001 U	0.0001 U	5E-05 U	5E-05 U	19.8	19.6	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.756	1.63	0.0001 U	0.0001 U
MW-34	2/1/2022	WV34220201-	0.0003 U	0.0003 U	1.33	1.33	0.00449	0.00458	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.5	13.9	0.000956	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	5/9/2022	WV34220509-	0.0003 U	0.0003 U	1.33	1.37	0.00468	0.00474	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.6	14.2	0.000986	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	9/12/2022	WV34220912-	0.0003 U	0.0003 U	1.33	1.4	0.00438	0.00493	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14	13.9	0.000979	0.00138	5E-05 U	6.91E-05	0.0002 U	0.0002 U	0.01 U	0.0909	0.0001 U	0.0001 U
MW-34	11/7/2022	WV34221107-	0.0003 U	0.0003 U	1.33	1.34	0.00425	0.00423	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.7	13.6	0.000867	0.000886	5E-05 U	5E-05 U	0.000227	0.000515	0.01 U	0.01 U	0.0001 U	0.0001 U
								Field Blanks											**Field Blanks**					
FIELD BLANK	2/1/2022	WV7-220201F	0.0003 U	0.0003 U	0.05 U	0.05 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	0.00576	0.00582	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	2/7/2022	WV85220207F	0.0003 U	0.0003 U	0.05 U	0.05 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	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	5/12/2022	WV2-220512F	0.0003 U	0.0003 U	0.05 U	0.05 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	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	9/13/2022	WV9-220913F	0.0003 U	0.0003 U	0.05 U	0.05 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	0.00022	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.01 U	0.01 U	0.0001 U	0.0001 U
FIELD BLANK	11/9/2022	WV37221109F	0.0003 U	0.0003 U	0.05 U	0.05 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	0.000301	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
								Offsite Domestic Wells											**Offsite Domestic Wells**					
DW-85	2/7/2022	WV85220207-	0.0003 U	0.0003 U	0.463	0.466	0.0103	0.00988	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.5	14.7	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.0002 U	0.0654	0.0673	0.0001 U	0.0001 U
DW-85	9/14/2022	WV85220914-	0.0003 U	0.0003 U	0.439	0.458	0.0102	0.0107	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.2	14.4	0.0002 U	0.0002 U	5E-05 U	5E-05 U	0.0002 U	0.00473	0.0726	0.0756	0.0001 U	0.0001 U
DW-LS	2/7/2022	WVLS220207-	0.0003 U	0.0003 U	1.71	1.77	0.00739	0.00718	0.0001 U	0.0001 U	5E-05 U	5E-05 U	23.3	23.7	0.00362	0.00378	5E-05 U	5E-05 U	0.0216	0.0254	0.01 U	0.19	0.0001 U	0.000273
DW-LS	9/14/2022	WVLS220914-	0.0003 U	0.0003 U	1.7	1.72	0.00607	0.00655	0.0001 U	0.0001 U	5E-05 U	5E-05 U	22.9	23.2	0.00397	0.00422	5E-05 U	5E-05 U	0.0446	0.152	0.0119	0.0412	0.000121	0.000358
DW-PA	2/7/2022	WVPA220207-	0.0003 U	0.0003 U	1.35	1.36	0.00411	0.00407	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.4	13.6	0.00122	0.00127	5E-05 U	5E-05 U	0.00625	0.114	0.01 U	0.0191	0.00013	0.00267
DW-PA	9/14/2022	WVPA220914-	0.0003 U	0.0003 U	1.55	1.56	0.00411	0.0043	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.1	13.2	0.00216	0.00195	5E-05 U	5E-05 U	0.00915	0.0292	0.0118	0.0126	0.00021	0.000623
								Water and Land Resources Division Monitoring Well											**Water and Land Resources Division Monitoring Well**					
W-73	11/9/2022	WV73221109-	0.0003 U	0.0003 U	6.62	8.01	0.0145	0.0294	0.0001 U	0.0001 U	5E-05 U	5E-05 U	18.5	19.3	0.00027	0.00467	0.000166	0.00152	0.0002 U	0.00705	0.53	3.63	0.0001 U	0.00123

Notes:
-- = parameter is not sampled for
*Insufficient water to collect a sample
[1] MW-37 was installed on 5/18/2022.

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

Groundwater - Metals (Dissolved & Total) Well #	Sample Date	Sample ID	Magnesium, Dissolved (mg/L)	Magnesium, Total (mg/L)	Manganese, Dissolved (ug/L)	Manganese, Total (ug/L)	Mercury, Dissolved (mg/L)	Mercury, Total (mg/L)	Nickel, Dissolved (mg/L)	Nickel, Total (mg/L)	Potassium, Dissolved (mg/L)	Potassium, Total (mg/L)	Selenium, Dissolved (mg/L)	Selenium, Total (mg/L)	Silver, Dissolved (mg/L)	Silver, Total (mg/L)	Sodium, Dissolved (mg/L)	Sodium, Total (mg/L)	Thallium, Dissolved (mg/L)	Thallium, Total (mg/L)	Vanadium, Dissolved (mg/L)	Vanadium, Total (mg/L)	Zinc, Dissolved (mg/L)	Zinc, Total (mg/L)
Channel Cc3																								
MW-8	1/31/2022	WV8-220131-	9.97	9.64	0.1 U	0.1 U	5E-05 U	5E-05 U	0.000621	0.00057	1.17	1.17	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.42	6.2	7.5E-05 U	7.5E-05 U	0.00266	0.00255	0.0005 U	0.0005 U
MW-8	5/9/2022	WV8-220509-	9.76	9.37	0.1 U	0.1 U	5E-05 U	5E-05 DU	0.000607	0.000594	1.17	1.18	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.64	6.06	7.5E-05 U	7.5E-05 U	0.00254	0.00247	0.0005 U	0.0005 U
MW-8	9/12/2022	WV8-220912-	9.14	9.17	0.418	0.1 U	5E-05 U	5E-05 U	0.000646	0.000611	1.09	1.08	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.02	6.08	7.5E-05 U	7.5E-05 U	0.00261	0.0025	0.000554	0.000644
MW-8	11/7/2022	WV8-221107-	9.23	9.32	1.38	0.1 U	5E-05 U	5E-05 U	0.000468	0.000571	1.09	1.11	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.99	6.04	7.5E-05 U	7.5E-05 U	0.00256	0.00252	0.00269	0.00059
MW-36	1/31/2022	WV36220131-	9.48	9.56	0.481	1.33	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.67	2.76	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.05	6.1	7.5E-05 U	7.5E-05 U	0.00193	0.00199	0.0005 U	0.0005 U
MW-36	5/10/2022	WV36220510-	9.84	9.49	0.46	0.725	5E-05 U	5E-05 DU	0.000102	0.0001 U	2.81	2.75	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.57	5.99	7.5E-05 U	7.5E-05 U	0.00188 D	0.00184	0.0005 U	0.0005 U
MW-36	5/10/2022	WV36220510D	10.1	9.81	0.465	0.736	5E-05 U	5E-05 DU	0.0001 U	0.000101	2.8	2.89	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.63	6.3	7.5E-05 U	7.5E-05 U	0.00185 D	0.0019	0.0005 U	0.0005 U
MW-36	9/13/2022	WV36220913-	9.75	9.57	0.354	1.03	5E-05 U	5E-05 U	0.000165	0.000227	2.62	2.63	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.34	6.19	7.5E-05 U	7.5E-05 U	0.00192	0.00194	0.000856	0.000751
MW-36	11/8/2022	WV36221108-	9.65	9.5	0.254	0.631	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.65	2.68	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.11	6.07	7.5E-05 U	7.5E-05 U	0.00188	0.00181	0.0005 U	0.0005 U
Unit D Aquifer																								
MW-7	2/1/2022	WV7-220201-	9.69	10.2	140	205	5E-05 U	5E-05 U	0.0001 DU	0.0001 U	2.69	2.78	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.87	6.08	7.5E-05 U	7.5E-05 U	0.000169	0.000168	0.0005 U	0.000667
MW-7	5/10/2022	WV7-220510-	10.2	10	126	306	5E-05 DU	5E-05 DU	0.000162	0.000275	2.76	2.83	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.12	6.15	7.5E-05 U	7.5E-05 U	0.000209	0.000286	0.00314	0.00398
MW-7	9/13/2022	WV7-220913-	9.89	10	145	305	5E-05 U	5E-05 U	0.000353	0.00057	2.63	2.67	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.19	6.08	7.5E-05 U	7.5E-05 U	0.000175	0.000165	0.00116	0.00263
MW-7	11/8/2022	WV7-221108-	9.95	9.86	110	849	5E-05 U	5E-05 U	0.000164	0.00034	2.69	2.69	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.04	5.89	7.5E-05 U	7.5E-05 U	0.000146	0.000244	0.000845	0.00353
MW-12	1/31/2022	WV12220131-	9.99	9.47	0.1 U	0.141	5E-05 U	5E-05 U	0.000254	0.00024	1.85	1.81	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.91	5.58	7.5E-05 U	7.5E-05 U	0.00556	0.00507	0.0005 U	0.0005 U
MW-12	5/9/2022	WV12220509-	9.68	9.21	0.1 U	0.125	5E-05 U	5E-05 DU	0.000201	0.000227	1.91	1.87	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.35	5.42	7.5E-05 U	7.5E-05 U	0.00508	0.00492	0.0005 U	0.0005 U
MW-12	9/13/2022	WV12220913-	9.9	9.65	2.4	2.75	5E-05 U	5E-05 U	0.000333	0.000354	1.81	1.78	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.85	5.82	7.5E-05 U	7.5E-05 U	0.00531	0.00534	0.000704	0.00145
MW-12	11/8/2022	WV12221108-	9.6	9.41	0.586	0.872	5E-05 U	5E-05 U	0.000169	0.000226	1.79	1.76	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.62	5.41	7.5E-05 U	7.5E-05 U	0.00511	0.00498	0.0005 U	0.0005 U
MW-19	2/2/2022	WV19220202-	13.6	14.6	491	517	5E-05 U	5E-05 U	0.0001 DU	0.000135	2.34	2.43	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.4	6.63	7.5E-05 U	7.5E-05 U	0.000103	0.00012	0.0005 U	0.0005 U
MW-19	5/10/2022	WV19220510-	14.7	14.4	465	487	5E-05 U	5E-05 DU	0.0001 U	0.000101	2.54	2.59	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.07	6.85	7.5E-05 U	7.5E-05 U	7.5E-05 DU	0.000172	0.0005 U	0.0005 U
MW-19	9/13/2022	WV19220913-	14.2	13.8	487	526	5E-05 U	5E-05 U	0.000239	0.000388	2.32	2.31	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.91	6.67	7.5E-05 U	7.5E-05 U	0.000143	9.69E-05	0.000725	0.00178
MW-19	11/8/2022	WV19221108-	14.1	13.9	492	507	5E-05 U	5E-05 U	0.00012	0.000147	2.37	2.39	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.69	6.49	7.5E-05 U	7.5E-05 U	8.24E-05	8.45E-05	0.000705	0.000887
MW-19	11/8/2022	WV19221108D	13.8	13.7	487	497	5E-05 U	5E-05 U	0.0001 U	0.000165	2.32	2.37	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.62	6.5	7.5E-05 U	7.5E-05 U	8.89E-05	8.64E-05	0.000568	0.00108
MW-26	2/2/2022	WV26220202-	6.89	7.53	58.9	69.3	5E-05 U	5E-05 U	0.000154 D	0.000375	2.92	3.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.59	9.02	7.5E-05 U	7.5E-05 U	0.000111	0.000245	0.0005 U	0.00535
MW-26	5/10/2022	WV26220510-	7.32	7.48	62.1	68.4	5E-05 DU	5E-05 DU	0.000139	0.000357	3.24	3.18	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.27	9.29	7.5E-05 U	7.5E-05 U	0.00014	0.00037	0.000501	0.0126
MW-26	9/13/2022	WV26220913-	7.21	7.27	63.7	67.4	5E-05 U	5E-05 U	0.00038	0.000615	2.98	2.97	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.4	9.59	7.5E-05 U	7.5E-05 U	0.000166	0.000271	0.00147	0.0127
MW-26	11/8/2022	WV26221108-	7.31	7.21	58.4	73.3	5E-05 U	5E-05 U	0.000262	0.000626	3.02	3.03	0.0005 U	0.0005 U	4E-05 U	4E-05 U	9.69	9.38	7.5E-05 U	7.5E-05 U	0.000108	0.000221	0.00104	0.011
MW-29	2/2/2022	WV29220202-	13.7	15.1	81.9	104	5E-05 U	5E-05 U	0.00011 D	0.000236	2.07	2.21	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.04	6.59	7.5E-05 U	7.5E-05 U	7.5E-05 U	0.000171	0.0005 U	0.000668
MW-29	5/10/2022	WV29220510-	14.5	13.9	99.3	186	5E-05 DU	5E-05 DU	0.000134	0.000233	2.16	2.18	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.45	6.16	7.5E-05 U	7.5E-05 U	9.46E-05	0.000257	0.0005 U	0.000951
MW-29	9/15/2022	WV29220915-	14.2	14.3	88.9	99.4	5E-05 U	5E-05 U	0.000119	0.000303	2.13	2.27	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.34	6.45	7.5E-05 U	7.5E-05 U	8.01E-05	0.000574	0.0005 U	0.000928
MW-29	11/8/2022	WV29221108-	14.3	14	86.4	88.8	5E-05 U	5E-05 U	0.000188	0.0001 U	2.1	2.12	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.43	6.35	7.5E-05 U	7.5E-05 U	7.77E-05	7.77E-05	0.000897	0.0005 U
MW-34	2/1/2022	WV34220201-	11.9	12.4	0.1 U	0.169	5E-05 U	5E-05 U	0.00124 D	0.00123	1.46	1.51	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.18	6.57	7.5E-05 U	7.5E-05 U	0.00277	0.00272	0.0005 U	0.0005 U
MW-34	5/9/2022	WV34220509-	12.7	12.3	0.1 U	0.167	5E-05 U	5E-05 DU	0.00133	0.00132	1.63	1.64	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.81	6.53	7.5E-05 U	7.5E-05 U	0.00279	0.00271	0.0005 U	0.0005 U
MW-34	9/12/2022	WV34220912-	12.1	12.3	0.193	2.92	5E-05 U	5E-05 U	0.00143	0.00192	1.48	1.49	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.55	6.52	7.5E-05 U	7.5E-05 U	0.0028	0.00291	0.000845	0.00274
MW-34	11/7/2022	WV34221107-	12.2	12.2	0.1 U	0.283	5E-05 U	5E-05 U	0.00115	0.00122	1.49	1.47	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.54	6.38	7.5E-05 U	7.5E-05 U	0.00269	0.00266	0.0005 U	0.0005 U
Field Blanks																								
FIELD BLANK	2/1/2022	WV7-220201F	0.05 U	0.05 U	0.1 U	0.1 U	5E-05 U	5E-05 U	0.0001 DU	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	0.000822	0.00111
FIELD BLANK	2/7/2022	WV85220207F	0.05 U	0.05 U	0.1 U	0.1 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	0.00021	0.000188	0.0005 U	0.0005 U
FIELD BLANK	5/12/2022	WV2-220512F	0.05 U	0.05 U	0.1 U	0.1 U	5E-05 DU	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	0.000101	7.61E-05	0.0005 U	0.0005 U
FIELD BLANK	9/13/2022	WV9-220913F	0.05 U	0.05 U	0.1 U	0.1 U	5E-05 U	5E-05 U	0.000142	0.000145	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	9.11E-05	7.5E-05 U	0.000783	0.000856
FIELD BLANK	11/9/2022	WV37221109F	0.05 U	0.05 U	0.172	0.1 U	5E-05 U	5E-05 U	0.000129	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	0.00102	0.000794
Offsite Domestic Wells																								
DW-85	2/7/2022	WV85220207-	6.6	6.54	52.9	54.3	5E-05 U	5E-05 U	0.0001 U	0.0001 U	2.68	2.65	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.92	5.73	7.5E-05 U	7.5E-05 U	0.000252	0.000274	0.0005 U	0.0005 U
DW-85	9/14/2022	WV85220914-	6.43	6.6	52	54.6	5E-05 U	5E-05 U	0.000224	0.000227	2.48	2.69	0.0005 U	0.0005 U	4E-05 U	4E-05 U	5.73	5.92	7.5E-05 U	7.5E-05 U	0.000132	0.00049	0.00126	0.00504
DW-LS	2/7/2022	WVLS220207-	17.4	17.5	2.59	7.82	5E-05 U	5E-05 U	0.00041	0.000499	1.79	1.79	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.87	7.68	7.5E-05 U	7.5E-05 U	0.00481	0.00513	0.0383	0.0467
DW-LS	9/14/2022	WVLS220914-	17.2	17.3	0.575	1.63	5E-05 U	5E-05 U	0.000525	0.00362	1.68	1.81	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.88	7.89	7.5E-05 U	7.5E-05 U	0.0047	0.00515	0.0819	0.0905
DW-PA	2/7/2022	WVPA220207-	11.1	11.3	0.663	0.796	5E-05 U	5E-05 U	0.000529	0.00064	1.64	1.63	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.46	6.35	7.5E-05 U	7.5E-05 U	0.00291	0.00302	0.00337	0.00808
DW-PA	9/14/2022	WVPA220914-	10.6	11.2	0.295	0.313	5E-05 U	5E-05 U	0.000801	0.000769	1.51	1.63	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.18	6.52	7.5E-05 U	7.5E-05 U	0.00337	0.00373	0.00378	0.00392
Water and Land Resources Division Monitoring Well																								
W-73	11/9/2022	WV73221109-	11.3	12.6	213	274	5E-05 U	5E-05 U	0.00176	0.00897	2.54	2.8	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.69	7.13	7.5E-05 U	7.5E-05 U	0.000122	0.00535	0.0005 U	0.00757

Notes:

-- = parameter is not sampled for

*Insufficient water to collect a sample

[1] MW-37 was installed on 5/18/2022.

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)
Channel Cc1																											
MW-3	2/1/2022	WV3-220201-	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	5/11/2022	WV3-220511-	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	9/13/2022	WV3-220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	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	5/9/2022	WV10220509-	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	9/12/2022	WV10220912-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-10	11/7/2022	WV10221107-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-13	1/31/2022	WV13220131-	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	5/9/2022	WV13220509-	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	9/13/2022	WV13220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-13	11/8/2022	WV13221107-	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 DU	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	2/3/2022	WV2-220203-	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	2/3/2022	WV2-220203D	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	5/12/2022	WV2-220512-	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	7.23	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	9/15/2022	WV2-220915-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-2	11/9/2022	WV2-221109-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-9	2/2/2022	WV9-220202-	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	5/10/2022	WV9-220510-	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	9/13/2022	WV9-220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-9	11/8/2022	WV9-221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	2/3/2022	WV20220203-	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	5/12/2022	WV20220512-	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	8.46	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	9/15/2022	WV20220915-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	9/15/2022	WV20220915D	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-20	11/9/2022	WV20221109-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-21	2/3/2022	WV21220203-	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	5/12/2022	WV21220512-	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	9/15/2022	WV21220915-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-21	11/9/2022	WV21221109-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	2/3/2022	WV33220203-	0.25 U	0.1 U	0.1 U	0.1 U	1.91	0.216	0.1 U	2.5 U	0.1 U	0.1 U	0.142 JT	6.36	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.811	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	5/12/2022	WV33220512-	0.25 U	0.1 U	0.1 U	0.1 U	0.727	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	4.64	0.1 U	1 U	0.5 U	2.5 U	4.94 JT	0.035 U	0.579	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	9/15/2022	WV33220915-	0.25 U	0.1 U	0.1 U	0.1 U	1.17	0.119 JT	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	5.41	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 DU	0.672	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-33	11/9/2022	WV33221109-	0.25 U	0.1 U	0.1 U	0.1 U	1.31	0.133 JT	0.1 U	2.5 U	0.1 U	0.1 U	0.109 JT	6.05	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 DU	0.736	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	2/3/2022	WV35220203-	0.25 U	0.1 U	0.1 U	0.1 U	0.296	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.389	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.485	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	5/12/2022	WV35220512-	0.25 U	0.1 U	0.1 U	0.1 U	0.217	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.328	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 U	0.476	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	9/15/2022	WV35220915-	0.25 U	0.1 U	0.1 U	0.1 U	0.196 JT	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.371	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 DU	0.449	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-35	11/9/2022	WV35221109-	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	0.402	0.1 U	1 U	0.5 U	2.5 U	2.5 U	0.035 DU	0.482	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-37[1]	6/30/2022	WV37220630-	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-37[1]	9/15/2022	WV37220915-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-37[1]	11/9/2022	WV37221109-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U

Table H-6
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)
Channel Cc1																										
MW-3	2/1/2022	WV3-220201-	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	0.166 JT	0.1 U	0.01 U
MW-3	5/11/2022	WV3-220511-	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-3	9/13/2022	WV3-220913-	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 DU
MW-3*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-4	9/14/2022	WV4-220914-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	1.14	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 DU
MW-4*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-10	1/31/2022	WV10220131-	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	5/9/2022	WV10220509-	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	9/12/2022	WV10220912-	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 DU
MW-10	11/7/2022	WV10221107-	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 DU
MW-13	1/31/2022	WV13220131-	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	5/9/2022	WV13220509-	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	9/13/2022	WV13220913-	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 DU
MW-13	11/8/2022	WV13221107-	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 DU
Channel Cc2																										
MW-2	2/3/2022	WV2-220203-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.139 JT	0.25 U	0.1 U	2.86	0.1 U	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	2.45	0.1 U	0.0135 JT
MW-2	2/3/2022	WV2-220203D	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.131 JT	0.25 U	0.1 U	2.78	0.1 U	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	2.36	0.1 U	0.0136 JT
MW-2	5/12/2022	WV2-220512-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.221	0.25 U	0.1 U	3.24	0.1 U	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	1.97	0.1 U	0.01 U
MW-2	9/15/2022	WV2-220915-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.246	0.25 U	0.1 U	2.16	0.1 U	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	0.783	0.1 U	0.0474 D
MW-2	11/9/2022	WV2-221109-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.331	0.25 U	0.1 U	1.59	0.1 U	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	0.733	0.1 U	0.0235 D
MW-9	2/2/2022	WV9-220202-	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	5/10/2022	WV9-220510-	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	9/13/2022	WV9-220913-	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 DU
MW-9	11/8/2022	WV9-221108-	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 DU
MW-20	2/3/2022	WV20220203-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.217	0.1 U	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	5/12/2022	WV20220512-	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	9/15/2022	WV20220915-	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 DU
MW-20	9/15/2022	WV20220915D	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 DU
MW-20	11/9/2022	WV20221109-	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 DU
MW-21	2/3/2022	WV21220203-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.56	0.25 U	0.1 U	2.2	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	5 U	0.1 U	1.6	0.1 U	0.0687
MW-21	5/12/2022	WV21220512-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.538	0.25 U	0.1 U	1.66	0.1 U	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	0.0375
MW-21	9/15/2022	WV21220915-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.478	0.25 U	0.1 U	1.27	0.1 U	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	0.519	0.1 U	0.0368 D
MW-21	11/9/2022	WV21221109-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.463	0.25 U	0.1 U	1.28	0.1 U	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	0.619	0.1 U	0.0388 D
MW-33	2/3/2022	WV33220203-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	32.5	0.25 U	0.1 U	4.4	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	1.05	0.5 U	5 U	0.192 JT	0.1 U	0.1 U	21.9
MW-33	5/12/2022	WV33220512-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	23.3	0.25 U	0.1 U	2.91	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.469	0.5 U	5 U	0.147 JT	0.1 U	0.1 U	11.4
MW-33	9/15/2022	WV33220915-	0.1 U	0.5 U	0.196 JT	0.1 U	0.25 U	22.8	0.25 U	0.1 U	4.19	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.764	0.5 U	5 U	0.146 JT	0.1 U	0.1 U	21.8 D
MW-33	11/9/2022	WV33221109-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	25.1	0.25 U	0.1 U	3.52	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.764	0.5 U	5 U	0.167 JT	0.1 U	0.1 U	21.1 D
MW-35	2/3/2022	WV35220203-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3.22	0.25 U	0.1 U	0.909	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.257	0.5 U	5 U	1.29	0.1 U	0.1 U	6.66
MW-35	5/12/2022	WV35220512-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3.22	0.25 U	0.1 U	0.752	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.239	0.5 U	5 U	1.17	0.1 U	0.1 U	4.56
MW-35	9/15/2022	WV35220915-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	2.9	0.25 U	0.1 U	0.602	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.183 JT	0.5 U	5 U	0.92	0.1 U	0.1 U	4.18 D
MW-35	11/9/2022	WV35221109-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	3.26	0.25 U	0.1 U	0.494	0.1 U	0.1 U	0.1 U	2.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.194 JT	0.5 U	5 U	1.06	0.1 U	0.1 U	3.87 D
MW-37[1]	6/30/2022	WV37220630-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.152 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	0.231	0.32	0.1 U	0.01 U
MW-37[1]	9/15/2022	WV37220915-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.114 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	0.179 JT	0.28	0.1 U	0.01 DU
MW-37[1]	11/9/2022	WV37221109-	0.1 U	0.5 U	0.1 U	0.1 U	0.25 U	0.1 U	0.25 U	0.1 U	0.123 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	0.212	0.284	0.1 U	0.01 DU

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)
Channel Cc3																											
MW-8	1/31/2022	WV8-220131-	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	5/9/2022	WV8-220509-	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	9/12/2022	WV8-220912-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-8	11/7/2022	WV8-221107-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	1/31/2022	WV36220131-	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	5/10/2022	WV36220510-	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	5/10/2022	WV36220510D	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	9/13/2022	WV36220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-36	11/8/2022	WV36221108-	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 DU	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	2/1/2022	WV7-220201-	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	5/10/2022	WV7-220510-	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	9/13/2022	WV7-220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-7	11/8/2022	WV7-221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-12	1/31/2022	WV12220131-	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	5/9/2022	WV12220509-	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	9/13/2022	WV12220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-12	11/8/2022	WV12221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	2/2/2022	WV19220202-	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	5/10/2022	WV19220510-	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	9/13/2022	WV19220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	11/8/2022	WV19221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-19	11/8/2022	WV19221108D	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-26	2/2/2022	WV26220202-	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	5/10/2022	WV26220510-	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	9/13/2022	WV26220913-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-26	11/8/2022	WV26221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-29	2/2/2022	WV29220202-	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	5/10/2022	WV29220510-	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	9/15/2022	WV29220915-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-29	11/8/2022	WV29221108-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-34	2/1/2022	WV34220201-	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	5/9/2022	WV34220509-	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	9/12/2022	WV34220912-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
MW-34	11/7/2022	WV34221107-	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 DU	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	2/1/2022	WV7-220201F	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	2/7/2022	WV85220207F	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	2.41 JT	0.5 U	2.5 U	7.66	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	5/12/2022	WV2-220512F	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	9/13/2022	WV9-220913F	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	8.01	0.5 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.114 JT	0.25 U
FIELD BLANK	11/9/2022	WV37221109F	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 DU	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	2/7/2022	WV85220207-	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	9/14/2022	WV85220914-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-LS	2/7/2022	WVLS220207-	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	9/14/2022	WVLS220914-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
DW-PA	2/7/2022	WVPA220207-	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	9/14/2022	WVPA220914-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
Water and Land Resources Division Monitoring Well																											
W-73	11/9/2022	WV73221109-	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U

Notes:

-- = parameter is not sampled for

*Insufficient water to collect a sample

[1] MW-37 was installed on 5/18/2022.

Table H-6
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)
Channel Cc3																										
MW-8	1/31/2022	WV8-220131-	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	5/9/2022	WV8-220509-	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	9/12/2022	WV8-220912-	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 DU
MW-8	11/7/2022	WV8-221107-	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 DU
MW-36	1/31/2022	WV36220131-	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	5/10/2022	WV36220510-	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	5/10/2022	WV36220510D	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	9/13/2022	WV36220913-	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 DU
MW-36	11/8/2022	WV36221108-	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 DU
Unit D Aquifer																										
MW-7	2/1/2022	WV7-220201-	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	5/10/2022	WV7-220510-	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	9/13/2022	WV7-220913-	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 DU
MW-7	11/8/2022	WV7-221108-	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 DU
MW-12	1/31/2022	WV12220131-	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	5/9/2022	WV12220509-	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	9/13/2022	WV12220913-	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 DU
MW-12	11/8/2022	WV12221108-	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 DU
MW-19	2/2/2022	WV19220202-	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	5/10/2022	WV19220510-	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	9/13/2022	WV19220913-	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 DU
MW-19	11/8/2022	WV19221108-	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 DU
MW-19	11/8/2022	WV19221108D	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 DU
MW-26	2/2/2022	WV26220202-	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	5/10/2022	WV26220510-	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	9/13/2022	WV26220913-	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 DU
MW-26	11/8/2022	WV26221108-	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 DU
MW-29	2/2/2022	WV29220202-	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	5/10/2022	WV29220510-	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	9/15/2022	WV29220915-	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 DU
MW-29	11/8/2022	WV29221108-	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 DU
MW-34	2/1/2022	WV34220201-	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	5/9/2022	WV34220509-	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	9/12/2022	WV34220912-	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 DU
MW-34	11/7/2022	WV34221107-	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 DU
Field Blank																										
FIELD BLANK	2/1/2022	WV7-220201F	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	2/7/2022	WV85220207F	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	5/12/2022	WV2-220512F	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	9/13/2022	WV9-220913F	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 DU
FIELD BLANK	11/9/2022	WV37221109F	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 DU
Offsite Domestic Wells																										
DW-85	2/7/2022	WV85220207-	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-85	9/14/2022	WV85220914-	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 DU
DW-LS	2/7/2022	WVLS220207-	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	9/14/2022	WVLS220914-	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 DU
DW-PA	2/7/2022	WVPA220207-	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	9/14/2022	WVPA220914-	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	0.118 JT	0.1 U	0.5 U	5 U	0.1 U	0.1 U	0.1 U	0.01 DU
Water and Land Resources Division Monitoring Well																										
W-73	11/9/2022	WV73221109-	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 DU

Notes:
-- = parameter is not sampled for
*Insufficient water to collect a sample
[1] MW-37 was installed on 5/18/2022.

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	2-Methyl-1-Propanol	4-Methyl-2-Pentanone	Acetone	Acrylonitrile	Benzene	Bromochloro-methane	Bromodichloro-methane	Bromofor m	Bromo-methane	Carbon Disulfide
		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	78-83-1	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
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	1/27/2022	VTRP220131Z	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
VOA TRIP BLANK	1/31/2022	VTRP220131X	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
VOA TRIP BLANK	1/31/2022	VTRP220201X	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
VOA TRIP BLANK	1/31/2022	VTRP220201Z	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
VOA TRIP BLANK	2/1/2022	VTRP220202X	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
VOA TRIP BLANK	2/1/2022	VTRP220202Z	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
VOA TRIP BLANK	2/2/2022	VTRP220207Y	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
VOA TRIP BLANK	2/3/2022	VTRP220203X	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 U	2.5 U	12.5	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	2/3/2022	VTRP220203Y	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 U	2.5 U	12	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	2/3/2022	VTRP220203Z	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 U	2.5 U	11.9	0.035 U	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	5/6/2022	VTRP220509Y	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
VOA TRIP BLANK	5/6/2022	VTRP220509Z	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
VOA TRIP BLANK	5/9/2022	VTRP220510Y	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
VOA TRIP BLANK	5/9/2022	VTRP220510Z	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
VOA TRIP BLANK	5/10/2022	VTRP220511Y	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
VOA TRIP BLANK	5/11/2022	VTRP220512Y	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 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
VOA TRIP BLANK	5/11/2022	VTRP220512Z2	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 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
VOA TRIP BLANK	6/29/2022	VTRP220630Z	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 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
VOA TRIP BLANK	9/9/2022	VTRP220912Y	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/12/2022	VTRP220913X	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/12/2022	VTRP220913Y	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/12/2022	VTRP220913Z	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/13/2022	VTRP220914Y3	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/13/2022	VTRP220914Z	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/13/2022	VTRP220915Y	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/14/2022	VTRP220915X	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 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/14/2022	VTRP220915Y2	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 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	9/14/2022	VTRP220915Z	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 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/1/2022	VTRP221109Z2	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/3/2022	VTRP221107X	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/3/2022	VTRP221107Y	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/3/2022	VTRP221108Z	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/7/2022	VTRP221108X	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/7/2022	VTRP221108Y	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/8/2022	VTRP221109X	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/8/2022	VTRP221109Y	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 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U
VOA TRIP BLANK	11/8/2022	VTRP221109Z	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 U	2.5 U	2.5 U	0.035 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U

Notes:

-- = parameter is not sampled for

Table H-7
Groundwater - Volatile Organic Compounds Trip Blanks

Groundwater - Volatile Organic Compounds Trip Blanks			Carbon Tetrachloride	Chlorobenzene	Chlorodibromomethane	Chloroethane	Chloroform	Chloromethane	Cis-1-2-Dichloroethene	Cis-1,3-Dichloropropene	Dibromomethane	Dichlorodifluoromethane	Ethylbenzene	M & P Xylene	Methyl Iodide	Methylene Chloride	O-Xylene	Styrene	Tetrachloroethene	Toluene	Trans-1-2-Dichloroethene	Trans-1-3-Dichloropropene	Trans-1-4-Dichloro-2-Butene	Trichloroethene	Trichlorofluoromethane	Vinyl Acetate	Vinyl Chloride
		CAS #	56-23-5	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)
VOA TRIP BLANK	1/27/2022	VTRP220131Z	0.25 U	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
VOA TRIP BLANK	1/31/2022	VTRP220131X	0.25 U	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
VOA TRIP BLANK	1/31/2022	VTRP220201X	0.25 U	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
VOA TRIP BLANK	1/31/2022	VTRP220201Z	0.25 U	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
VOA TRIP BLANK	2/1/2022	VTRP220202X	0.25 U	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
VOA TRIP BLANK	2/1/2022	VTRP220202Z	0.25 U	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
VOA TRIP BLANK	2/2/2022	VTRP220207Y	0.25 U	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
VOA TRIP BLANK	2/3/2022	VTRP220203X	0.25 U	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
VOA TRIP BLANK	2/3/2022	VTRP220203Y	0.25 U	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
VOA TRIP BLANK	2/3/2022	VTRP220203Z	0.25 U	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
VOA TRIP BLANK	5/6/2022	VTRP220509Y	0.25 U	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
VOA TRIP BLANK	5/6/2022	VTRP220509Z	0.25 U	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
VOA TRIP BLANK	5/9/2022	VTRP220510Y	0.25 U	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
VOA TRIP BLANK	5/9/2022	VTRP220510Z	0.25 U	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
VOA TRIP BLANK	5/10/2022	VTRP220511Y	0.25 U	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
VOA TRIP BLANK	5/11/2022	VTRP220512Y	0.25 U	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
VOA TRIP BLANK	5/11/2022	VTRP220512Z2	0.25 U	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
VOA TRIP BLANK	6/29/2022	VTRP220630Z	0.25 U	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
VOA TRIP BLANK	9/9/2022	VTRP220912Y	0.25 U	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 DU
VOA TRIP BLANK	9/12/2022	VTRP220913X	0.25 U	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 DU
VOA TRIP BLANK	9/12/2022	VTRP220913Y	0.25 U	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 DU
VOA TRIP BLANK	9/12/2022	VTRP220913Z	0.25 U	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 DU
VOA TRIP BLANK	9/13/2022	VTRP220914Y3	0.25 U	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 DU
VOA TRIP BLANK	9/13/2022	VTRP220914Z	0.25 U	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 DU
VOA TRIP BLANK	9/13/2022	VTRP220915Y	0.25 U	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 DU
VOA TRIP BLANK	9/14/2022	VTRP220915X	0.25 U	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 DU
VOA TRIP BLANK	9/14/2022	VTRP220915Y2	0.25 U	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 DU
VOA TRIP BLANK	9/14/2022	VTRP220915Z	0.25 U	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 DU
VOA TRIP BLANK	11/1/2022	VTRP221109Z2	0.25 U	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 DU
VOA TRIP BLANK	11/3/2022	VTRP221107X	0.25 U	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 DU
VOA TRIP BLANK	11/3/2022	VTRP221107Y	0.25 U	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 DU
VOA TRIP BLANK	11/3/2022	VTRP221108Z	0.25 U	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 DU
VOA TRIP BLANK	11/7/2022	VTRP221108X	0.25 U	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 DU
VOA TRIP BLANK	11/7/2022	VTRP221108Y	0.25 U	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 DU
VOA TRIP BLANK	11/8/2022	VTRP221109X	0.25 U	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 DU
VOA TRIP BLANK	11/8/2022	VTRP221109Y	0.25 U	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 DU
VOA TRIP BLANK	11/8/2022	VTRP221109Z	0.25 U	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 DU

Notes:

-- = parameter is not sampled for

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	2/3/2022	WV2-220203-	0.0101 U	2 U	0.236 U	0.472 U	0.472 U
MW-2	2/3/2022	WV2-220203D	0.0101 U	2 U	0.236 U	0.472 U	0.472 U
MW-2	5/12/2022	WV2-220512-	0.0102 U	2 U	0.266 U	0.532 U	0.532 U
MW-2	9/15/2022	WV2-220915-	0.00952 U	2 U	0.238 U	0.476 U	0.476 U
MW-2	11/9/2022	WV2-221109-	0.0112 U	2 U	0.25 U	19.1 L	0.5 U
MW-20	2/3/2022	WV20220203-	0.0116 U	2 U	0.278 U	0.556 U	0.556 U
MW-20	5/12/2022	WV20220512-	0.0104 U	2 U	0.253 U	4.27 J	0.505 U
MW-20	9/15/2022	WV20220915-	0.01 U	2 U	0.248 U	1.04	0.495 U
MW-20	9/15/2022	WV20220915D	0.0098 U	2 U	0.245 U	0.49 U	0.49 U
MW-20	11/9/2022	WV20221109-	0.0113 U	2 U	0.26 U	7.4 L	0.521 U
MW-21	2/3/2022	WV21220203-	0.01 U	2 U	0.236 U	0.472 U	0.472 U
MW-21	5/12/2022	WV21220512-	0.0104 U	2 U	0.272 U	0.543 U	0.543 U
MW-21	9/15/2022	WV21220915-	0.00962 U	2 U	0.236 U	0.472 U	0.472 U
MW-21	11/9/2022	WV21221109-	0.0108 U	2 U	0.258 U	4.72 L	0.551 JT
MW-33	2/3/2022	WV33220203-	0.0501	2 U	3.37	0.792 JT	0.901 JT
MW-33	5/12/2022	WV33220512-	0.0387	2 U	3.67	0.521 U	1.07
MW-33	9/15/2022	WV33220915-	0.0271	2 U	3.51	1.59	0.943 JT
MW-33	11/9/2022	WV33221109-	0.0325	2 U	2.46	15.2 L	1.46
MW-35	2/3/2022	WV35220203-	0.0472	2 U	0.86	0.662 JT	0.485 U
MW-35	5/12/2022	WV35220512-	0.0106 U	2 U	0.769	1.05	0.521 U
MW-35	9/15/2022	WV35220915-	0.0335	2 U	0.24 U	2.75	0.481 U
MW-35	11/9/2022	WV35221109-	0.0111 U	2 U	0.855	0.526 U	0.526 U
MW-37[1]	6/30/2022	WV37220630-	0.00952 U	2 U	0.238 U	7.27 BJ	0.633 BGJT
MW-37[1]	9/15/2022	WV37220915-	0.0098 U	2 U	0.236 U	0.472 U	0.472 U
MW-37[1]	11/9/2022	WV37221109-	0.0119 U	2 U	0.291 U	6.56 L	0.581 U
Field Blanks							
FIELD BLANK	5/12/2022	WV2-220512F	0.0109 U	2 U	0.269 U	0.538 U	0.538 U
FIELD BLANK	11/9/2022	WV37221109F	0.0113 U	2 U	0.266 U	39.6 L	0.532 U

Notes:

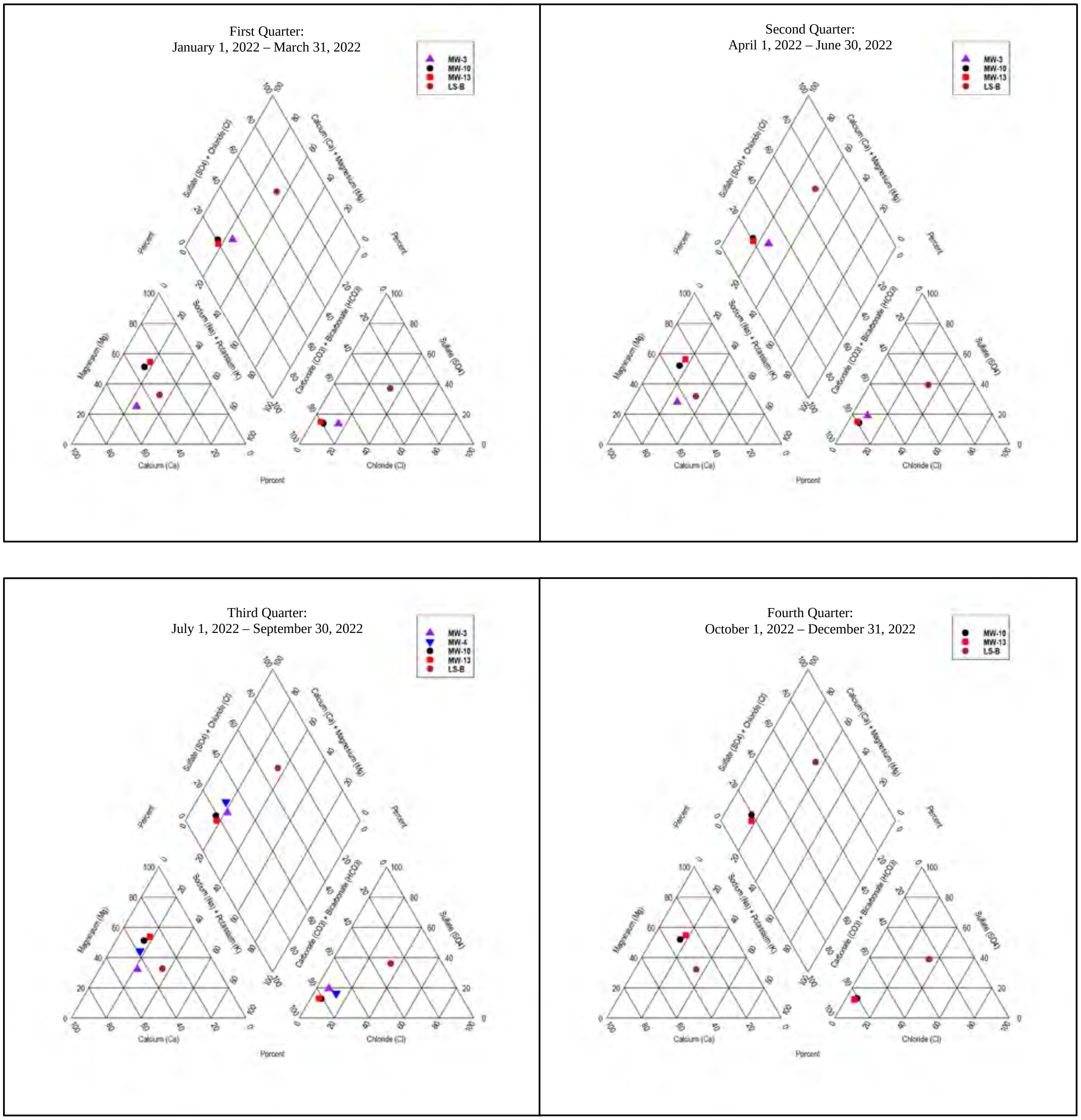
[1] MW-37 was installed on 5/18/2022.

Appendix I

Ion Balance Summary and
Trilinear Diagrams

Figure I-1. Channel Cc1 Trilinear Diagrams

January 1, 2022 - December 31, 2022



NOTE:

First Quarter: The water level dropped below 105.27 ft from top of casing (depth to silt contact) during purging in monitoring well MW-4 – no sample was collected.

Second Quarter: The water level dropped below 105.27 ft from top of casing (depth to silt contact) during purging in monitoring well MW-4 – no sample was collected.

Fourth Quarter: The water level was below the pump intake for monitoring well MW-2 – no sample was collected. The water level dropped below 105.27 ft from top of casing (depth to silt contact) during purging in monitoring well MW-4 – no sample was collected.

Table I-1

Channel Cc1: Ion Balance Summary for Groundwater

January 1, 2022 - March 31, 2022

		Well #	**MW-3**			**MW-10**			**MW-13**		
		Sample Date	2/1/2022			1/31/2022			1/31/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		5.65			7.17			7.1		
Conductance	--		50.6			127.3			101		
TDS	--		44.7			90			101		
Calcium	40.1	2	7.3	0.364	50.11	9.8	0.489	32.50	9.32	0.465	27.72
Magnesium	24.3	2	2.23	0.184	25.24	9.4	0.774	51.41	11.1	0.913	54.43
Potassium	39.1	1	1.5	0.038	5.28	1.41	0.036	2.40	1.7	0.043	2.59
Sodium	23.0	1	3.23	0.141	19.33	4.73	0.206	13.67	5.88	0.256	15.24
Iron	55.8	2	0.005	0.000	0.02	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2	0.0011	0.000	0.01	0.00005	0.000	0.00	0.0007	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)			**0.73**			**1.50**			**1.68**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		21.3			56.5			62.3		
Carbonate	60.0	2	0.0006	0.0000	0.0027	0.0502	0.0017	0.1148	0.0471	0.0016	0.0997
Bicarbonate	61.0	1	26.0	0.4259	61.33	68.8	1.1281	77.44	75.9	1.2442	79.03
Chloride	35.5	1	3.33	0.0939	13.53	3.42	0.0965	6.62	2.7	0.0762	4.84
Nitrate-N	14.0	1	1.29	0.0921	13.26	0.409	0.0292	2.00	0.298	0.0213	1.35
Sulfate	96.1	2	3.96	0.0824	11.87	9.67	0.2013	13.82	11.1	0.2311	14.68
	Total Anions (meq/L)			**0.69**			**1.46**			**1.57**	
	Total Ions (meq/L)			**1.42**			**2.96**			**3.25**	
	Cation/Anion Ratio			**1.05**			**1.03**			**1.07**	
	Percent Difference			**2.29**			**1.62**			**3.19**	

Table I-1 *(continued)*

Channel Cc1: Ion Balance Summary for Groundwater

April 1, 2022 - June 30, 2022

		Well #	MW-3			MW-10			MW-13		
		Sample Date	5/11/2022			5/9/2022			5/9/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		5.72			6.98			6.92		
Conductance	--		51.1			128.6			140.3		
TDS	--		42.7			104			109		
Calcium	40.1	2	5.06	0.252	45.90	9.88	0.493	32.51	9.15	0.457	27.14
Magnesium	24.3	2	1.87	0.154	27.97	9.6	0.790	52.09	11.5	0.946	56.24
Potassium	39.1	1	1.29	0.033	6.00	1.55	0.040	2.61	1.89	0.048	2.87
Sodium	23.0	1	2.54	0.110	20.08	4.45	0.194	12.76	5.31	0.231	13.73
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	0.0005	0.000	0.00	0.00005	0.000	0.00	0.0036	0.000	0.01
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)			**0.55**			**1.52**			**1.68**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		17			58.2			62.7		
Carbonate	60.0	2	0.0005	0.0000	0.0036	0.0334	0.0011	0.0740	0.0313	0.0010	0.0656
Bicarbonate	61.0	1	20.7	0.3399	68.43	70.9	1.1626	77.30	76.4	1.2527	78.71
Chloride	35.5	1	1.52	0.0429	8.63	3.46	0.0976	6.49	2.89	0.0815	5.12
Nitrate-N	14.0	1	0.333	0.0238	4.79	0.424	0.0303	2.01	0.264	0.0188	1.18
Sulfate	96.1	2	4.33	0.0902	18.15	10.2	0.2124	14.12	11.4	0.2373	14.91
	Total Anions (meq/L)			**0.50**			**1.50**			**1.59**	
	Total Ions (meq/L)			**1.05**			**3.02**			**3.27**	
	Cation/Anion Ratio			**1.11**			**1.01**			**1.06**	
	Percent Difference			**5.10**			**0.41**			**2.78**	

Table I-1 *(continued)*

Channel Cc1: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**MW-3**			**MW-4**			**MW-10**			**MW-13**		
		Sample Date	9/13/2022			9/14/2022			9/12/2022			9/13/2022		
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			7.12			7.12			6.65		
Conductance	--		46.3			191.1			130.5			134.6		
TDS	--		40			155			107			109		
Calcium	40.1	2	4.55	0.227	46.07	16.6	0.828	38.72	10.1	0.504	32.77	9.27	0.463	28.23
Magnesium	24.3	2	1.94	0.160	32.39	11.5	0.946	44.24	9.58	0.788	51.26	10.7	0.881	53.73
Potassium	39.1	1	1.06	0.027	5.50	1.07	0.027	1.28	1.41	0.036	2.35	1.59	0.041	2.48
Sodium	23.0	1	1.81	0.079	15.98	7.74	0.337	15.74	4.81	0.209	13.61	5.83	0.254	15.48
Iron	55.8	2	0.005	0.000	0.04	0.005	0.000	0.01	0.005	0.000	0.01	0.0302	0.001	0.07
Manganese	54.9	2	0.0005	0.000	0.00	0.0005	0.000	0.00	0.000307	0.000	0.00	0.0077	0.000	0.02
Ammonia-N	14.0	1	0.001	0.000	0.01	0.0031	0.000	0.01	0.001	0.000	0.00	0.001	0.000	0.00
	Total Cations (meq/L)			**0.49**			**2.14**			**1.54**			**1.64**	
Anion Parameters	Molecular Weight (g/mol)	n												
Alkalinity, Total	--		15.6			66.4			58.8			63.1		
Carbonate	60.0	2	0.0004	0.0000	0.0027	0.0526	0.0018	0.0842	0.0466	0.0016	0.1046	0.0169	0.0006	0.0362
Bicarbonate	61.0	1	19.0	0.3119	68.71	80.9	1.3260	63.68	71.6	1.1742	79.15	76.9	1.2612	80.88
Chloride	35.5	1	1.07	0.0302	6.65	8.63	0.2435	11.69	3.16	0.0891	6.01	2.62	0.0739	4.74
Nitrate-N	14.0	1	0.394	0.0281	6.20	2.87	0.2049	9.84	0.425	0.0303	2.05	0.315	0.0225	1.44
Sulfate	96.1	2	4.02	0.0837	18.44	14.7	0.3061	14.70	9.04	0.1882	12.69	9.66	0.2011	12.90
	Total Anions (meq/L)			**0.45**			**2.08**			**1.48**			**1.56**	
	Total Ions (meq/L)			**0.95**			**4.22**			**3.02**			**3.20**	
	Cation/Anion Ratio			**1.09**			**1.03**			**1.04**			**1.05**	
	Percent Difference			**4.10**			**1.35**			**1.80**			**2.49**	

Table I-1 *(continued)*

Channel Cc1: Ion Balance Summary for Groundwater

October 1, 2022 - December 31, 2022

		Well #	**MW-10**			**MW-13**		
		Sample Date	11/7/2022			11/7/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		7.05			7.18		
Conductance	--		133.2			137.9		
TDS	--		104			110		
Calcium	40.1	2	10.2	0.509	31.96	8.98	0.448	27.36
Magnesium	24.3	2	10.1	0.831	52.19	10.9	0.897	54.77
Potassium	39.1	1	1.42	0.036	2.28	1.63	0.042	2.55
Sodium	23.0	1	4.96	0.216	13.55	5.76	0.251	15.30
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2	0.000553	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
	Total Cations (meq/L)			**1.59**			**1.64**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		59.4			63		
Carbonate	60.0	2	0.0400	0.0013	0.0885	0.0573	0.0019	0.1228
Bicarbonate	61.0	1	72.4	1.1864	78.72	76.7	1.2578	80.95
Chloride	35.5	1	3.3	0.0931	6.18	2.84	0.0801	5.16
Nitrate-N	14.0	1	0.434	0.0310	2.06	0.369	0.0263	1.70
Sulfate	96.1	2	9.38	0.1953	12.96	9.01	0.1876	12.07
	Total Anions (meq/L)			**1.51**			**1.55**	
	Total Ions (meq/L)			**3.10**			**3.19**	
	Cation/Anion Ratio			**1.06**			**1.05**	
	Percent Difference			**2.75**			**2.63**	

Figure I-2. Channel Cc2 Trilinear Diagrams

January 1, 2022 - December 31, 2022

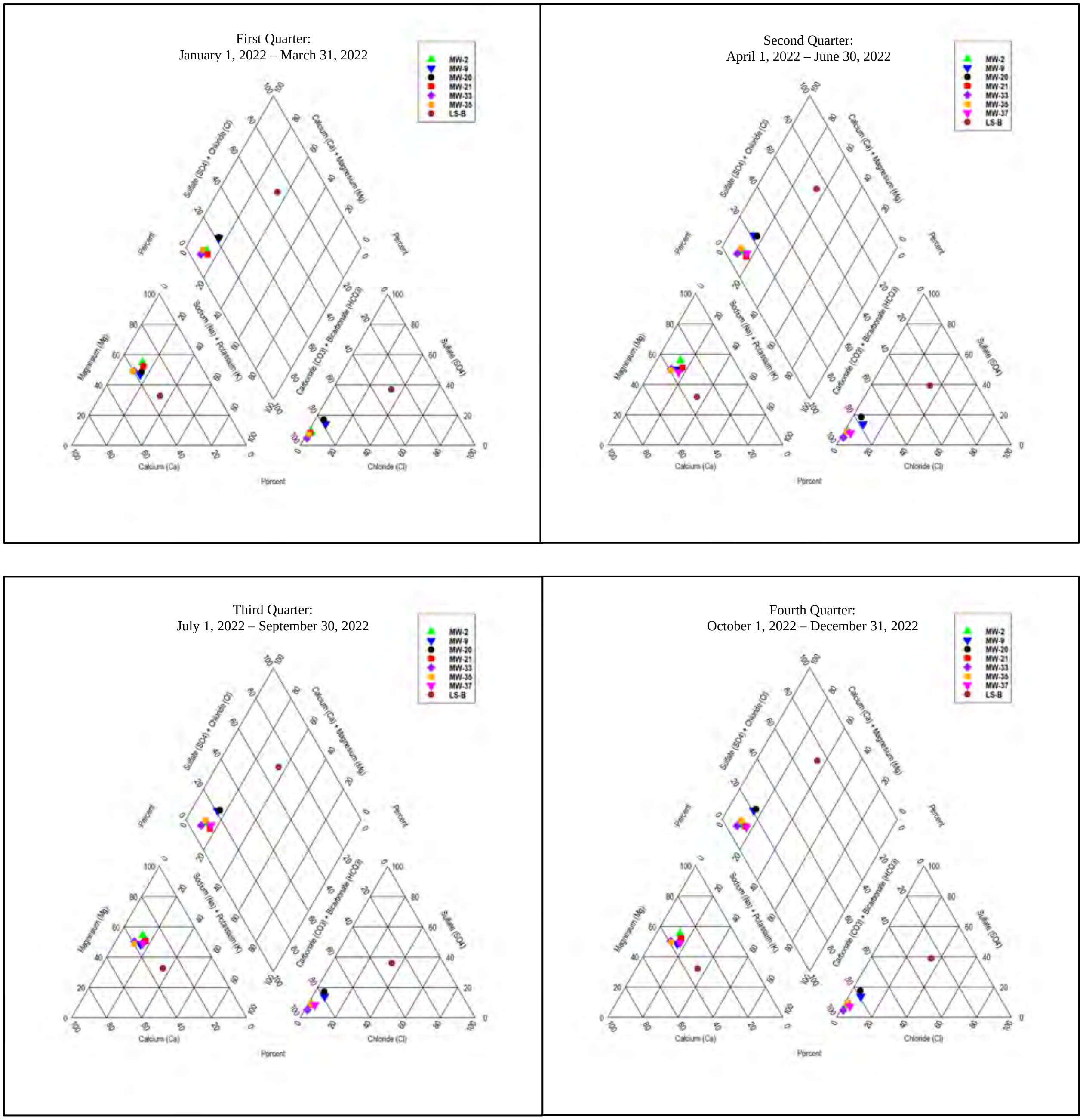


Table I-2

Channel Cc2: Ion Balance Summary for Groundwater

January 1, 2022 - March 31, 2022

		Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**			**MW-33**			**MW-35**		
		Sample Date	2/3/2022			2/2/2022			2/3/2022			2/3/2022			2/3/2022			2/3/2022		
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	--		6.74			7.02			7.8			6.91			6.65			6.43		
Conductance	--		271.2			161.9			163			270.8			539.9			572.5		
TDS	--		169			108			113			166			325			401		
Calcium	40.1	2	19.9	0.993	32.10	13.4	0.669	37.31	13.1	0.654	35.41	21	1.048	32.57	55.2	2.754	38.56	61.3	3.059	37.65
Magnesium	24.3	2	20.6	1.695	54.79	10.2	0.839	46.84	10.9	0.897	48.58	20.3	1.670	51.92	41.4	3.407	47.69	45.3	3.728	45.89
Potassium	39.1	1	2.01	0.051	1.66	2.01	0.051	2.87	1.99	0.051	2.76	2.21	0.057	1.76	3.02	0.077	1.08	3.27	0.084	1.03
Sodium	23.0	1	8.1	0.352	11.39	5.34	0.232	12.96	5.41	0.235	12.75	9.48	0.412	12.82	15.5	0.674	9.44	16.2	0.705	8.67
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01	0.103	0.004	0.20	0.457	0.016	0.51	5.47	0.196	2.74	12.8	0.458	5.64
Manganese	54.9	2	0.0433	0.002	0.05	0.00005	0.000	0.00	0.126	0.005	0.25	0.361	0.013	0.41	0.883	0.032	0.45	2.35	0.086	1.05
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00	0.016	0.001	0.06	0.01	0.001	0.02	0.0305	0.002	0.03	0.0643	0.005	0.06
	Total Cations (meq/L)			**3.09**			**1.79**			**1.85**			**3.22**			**7.14**			**8.12**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		135			67.5			70.7			140			316			331		
Carbonate	60.0	2	0.0446	0.0015	0.0476	0.0425	0.0014	0.0801	0.2666	0.0089	0.4894	0.0684	0.0023	0.0727	0.0849	0.0028	0.0419	0.0536	0.0018	0.0246
Bicarbonate	61.0	1	164.6	2.6979	86.48	82.3	1.3483	76.34	85.7	1.4048	77.38	170.7	2.7971	89.19	385.3	6.3158	93.60	403.7	6.6168	91.03
Chloride	35.5	1	2.27	0.0640	2.05	4.54	0.1281	7.25	3.16	0.0891	4.91	1.91	0.0539	1.72	3.47	0.0979	1.45	3.85	0.1086	1.49
Nitrate-N	14.0	1	1.23	0.0878	2.81	0.541	0.0386	2.19	0.005	0.0004	0.02	0.315	0.0225	0.72	0.005	0.0004	0.01	0.005	0.0004	0.00
Sulfate	96.1	2	12.9	0.2686	8.61	12	0.2498	14.15	15	0.3123	17.20	12.5	0.2603	8.30	15.9	0.3310	4.91	26	0.5413	7.45
	Total Anions (meq/L)			**3.12**			**1.77**			**1.82**			**3.14**			**6.75**			**7.27**	
	Total Ions (meq/L)			**6.21**			**3.56**			**3.66**			**6.35**			**13.89**			**15.39**	
	Cation/Anion Ratio			**0.99**			**1.01**			**1.02**			**1.03**			**1.06**			**1.12**	
	Percent Difference			**-0.42**			**0.72**			**0.84**			**1.28**			**2.84**			**5.55**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

April 1, 2022 - June 30, 2022

		Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**		
		Sample Date	5/12/2022			5/10/2022			5/12/2022			5/12/2022		
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	--		6.8			6.89			7.48			6.81		
Conductance	--		262.8			171.5			159.5			243.6		
TDS	--		174			127			121			169		
Calcium	40.1	2	20.3	1.013	30.57	14.1	0.704	35.34	12.9	0.644	33.12	19.8	0.988	31.77
Magnesium	24.3	2	22.5	1.852	55.88	12.1	0.996	50.01	11.8	0.971	49.96	19.2	1.580	50.80
Potassium	39.1	1	2.16	0.055	1.67	2.26	0.058	2.90	2.11	0.054	2.78	2.17	0.056	1.78
Sodium	23.0	1	9.01	0.392	11.83	5.37	0.234	11.73	6.1	0.265	13.65	10.9	0.474	15.24
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01	0.101	0.004	0.19	0.168	0.006	0.19
Manganese	54.9	2	0.0336	0.001	0.04	0.00005	0.000	0.00	0.133	0.005	0.25	0.168	0.006	0.20
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00	0.0158	0.001	0.06	0.0077	0.001	0.02
	Total Cations (meq/L)			**3.31**			**1.99**			**1.94**			**3.11**	
Anion Parameters	Molecular Weight (g/mol)	n												
Alkalinity, Total	--		136			71.4			68.5			127		
Carbonate	60.0	2	0.0516	0.0017	0.0554	0.0333	0.0011	0.0585	0.1240	0.0041	0.2306	0.0493	0.0016	0.0575
Bicarbonate	61.0	1	165.8	2.7177	87.65	87.0	1.4266	75.16	83.3	1.3656	76.18	154.8	2.5378	88.89
Chloride	35.5	1	2.19	0.0618	1.99	5.38	0.1518	8.00	3.17	0.0894	4.99	1.76	0.0496	1.74
Nitrate-N	14.0	1	0.856	0.0611	1.97	0.876	0.0625	3.29	0.005	0.0004	0.02	0.226	0.0161	0.57
Sulfate	96.1	2	12.4	0.2582	8.33	12.3	0.2561	13.49	16	0.3331	18.58	12	0.2498	8.75
	Total Anions (meq/L)			**3.10**			**1.90**			**1.79**			**2.86**	
	Total Ions (meq/L)			**6.41**			**3.89**			**3.74**			**5.97**	
	Cation/Anion Ratio			**1.07**			**1.05**			**1.08**			**1.09**	
	Percent Difference			**3.32**			**2.39**			**4.04**			**4.28**	

Table I-2 (continued)

Channel Cc2: Ion Balance Summary for Groundwater

April 1, 2022 - June 30, 2022

		Well #	**MW-33**			**MW-35**			**MW-37**		
		Sample Date	5/12/2022			5/12/2022			6/30/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.64			6.56			6.54		
Conductance	--		565			546			179.9		
TDS	--		370			405			154		
Calcium	40.1	2	58	2.894	37.70	56.9	2.839	36.85	16.2	0.808	35.51
Magnesium	24.3	2	45.5	3.744	48.77	43	3.538	45.93	13.3	1.094	48.08
Potassium	39.1	1	3.21	0.082	1.07	3.28	0.084	1.09	1.67	0.043	1.88
Sodium	23.0	1	16.6	0.722	9.41	16.5	0.718	9.32	7.52	0.327	14.37
Iron	55.8	2	5.61	0.201	2.62	12.2	0.437	5.67	0.0122	0.000	0.02
Manganese	54.9	2	0.877	0.032	0.42	2.29	0.083	1.08	0.0585	0.002	0.09
Ammonia-N	14.0	1	0.0306	0.002	0.03	0.0649	0.005	0.06	0.0147	0.001	0.05
	Total Cations (meq/L)			**7.68**			**7.70**			**2.28**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		328			306			93.2		
Carbonate	60.0	2	0.0861	0.0029	0.0409	0.0668	0.0022	0.0326	0.0194	0.0006	0.0297
Bicarbonate	61.0	1	400.0	6.5558	93.46	373.2	6.1165	89.56	113.7	1.8630	85.35
Chloride	35.5	1	3.52	0.0993	1.42	3.64	0.1027	1.50	3	0.0846	3.88
Nitrate-N	14.0	1	0.005	0.0004	0.01	0.005	0.0004	0.01	0.899	0.0642	2.94
Sulfate	96.1	2	17.1	0.3560	5.08	29.2	0.6079	8.90	8.18	0.1703	7.80
	Total Anions (meq/L)			**7.01**			**6.83**			**2.18**	
	Total Ions (meq/L)			**14.69**			**14.53**			**4.46**	
	Cation/Anion Ratio			**1.09**			**1.13**			**1.04**	
	Percent Difference			**4.51**			**6.02**			**2.10**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**		
		Sample Date	9/15/2022			9/13/2022			9/15/2022			9/15/2022		
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	--		6.67			6.68			7.82			6.53		
Conductance	--		260.5			185.5			161.4			246		
TDS	--		178			139			129			174		
Calcium	40.1	2	20.4	1.018	32.04	15.6	0.778	36.37	13	0.649	33.51	20.4	1.018	32.28
Magnesium	24.3	2	21	1.728	54.39	12.6	1.037	48.44	11.7	0.963	49.73	19.4	1.596	50.62
Potassium	39.1	1	2.06	0.053	1.66	2.12	0.054	2.53	2.04	0.052	2.70	2.15	0.055	1.74
Sodium	23.0	1	8.64	0.376	11.83	6.22	0.271	12.64	5.98	0.260	13.44	10.9	0.474	15.04
Iron	55.8	2	0.012	0.000	0.01	0.005	0.000	0.01	0.152	0.005	0.28	0.102	0.004	0.12
Manganese	54.9	2	0.0561	0.002	0.06	0.00005	0.000	0.00	0.146	0.005	0.27	0.158	0.006	0.18
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00	0.0187	0.001	0.07	0.0088	0.001	0.02
	Total Cations (meq/L)			**3.18**			**2.14**			**1.94**			**3.15**	
Anion Parameters	Molecular Weight (g/mol)	n												
Alkalinity, Total	--		136			79.8			71.7			131		
Carbonate	60.0	2	0.0382	0.0013	0.0415	0.0230	0.0008	0.0366	0.2830	0.0094	0.5095	0.0267	0.0009	0.0302
Bicarbonate	61.0	1	165.8	2.7182	88.43	97.3	1.5949	76.36	86.9	1.4243	76.92	159.8	2.6186	88.92
Chloride	35.5	1	2.12	0.0598	1.95	4.96	0.1399	6.70	3.36	0.0948	5.12	1.98	0.0559	1.90
Nitrate-N	14.0	1	0.278	0.0198	0.65	0.951	0.0679	3.25	0.005	0.0004	0.02	0.102	0.0073	0.25
Sulfate	96.1	2	13.2	0.2748	8.94	13.7	0.2852	13.66	15.5	0.3227	17.43	12.6	0.2623	8.91
	Total Anions (meq/L)			**3.07**			**2.09**			**1.85**			**2.94**	
	Total Ions (meq/L)			**6.25**			**4.23**			**3.79**			**6.10**	
	Cation/Anion Ratio			**1.03**			**1.02**			**1.05**			**1.07**	
	Percent Difference			**1.65**			**1.22**			**2.23**			**3.42**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**MW-33**			**MW-35**			**MW-37**		
		Sample Date	9/15/2022			9/15/2022			9/15/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.84			6.45			6.92		
Conductance	--		576			512			180.4		
TDS	--		394			401			140		
Calcium	40.1	2	57.8	2.884	37.75	55.7	2.779	37.44	15.2	0.758	34.76
Magnesium	24.3	2	45.4	3.736	48.90	41.2	3.390	45.67	13	1.070	49.02
Potassium	39.1	1	3.09	0.079	1.03	3.14	0.080	1.08	1.47	0.038	1.72
Sodium	23.0	1	16.4	0.713	9.34	16.3	0.709	9.55	7.25	0.315	14.45
Iron	55.8	2	5.41	0.194	2.54	10.6	0.380	5.11	0.005	0.000	0.01
Manganese	54.9	2	0.881	0.032	0.42	2.19	0.080	1.07	0.0217	0.001	0.04
Ammonia-N	14.0	1	0.0323	0.002	0.03	0.0657	0.005	0.06	0.001	0.000	0.00
	Total Cations (meq/L)			**7.64**			**7.42**			**2.18**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		343			310			90.5		
Carbonate	60.0	2	0.1426	0.0048	0.0646	0.0525	0.0018	0.0251	0.0452	0.0015	0.0707
Bicarbonate	61.0	1	418.2	6.8538	93.11	378.1	6.1969	88.88	110.3	1.8081	84.75
Chloride	35.5	1	4.07	0.1148	1.56	3.86	0.1089	1.56	2.99	0.0843	3.95
Nitrate-N	14.0	1	0.005	0.0004	0.00	0.005	0.0004	0.01	0.9	0.0643	3.01
Sulfate	96.1	2	18.6	0.3873	5.26	31.9	0.6642	9.53	8.42	0.1753	8.22
	Total Anions (meq/L)			**7.36**			**6.97**			**2.13**	
	Total Ions (meq/L)			**15.00**			**14.40**			**4.32**	
	Cation/Anion Ratio			**1.04**			**1.06**			**1.02**	
	Percent Difference			**1.86**			**3.13**			**1.13**	

Table I-2 *(continued)*

Channel Cc2: Ion Balance Summary for Groundwater

October 1, 2022 - December 31, 2022

		Well #	**MW-2**			**MW-9**			**MW-20**			**MW-21**		
		Sample Date	11/9/2022			11/8/2022			11/9/2022			11/9/2022		
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	--		7.07			7.21			7.7			6.9		
Conductance	--		263.7			181.4			163.3			249		
TDS	--		179			133			128			174		
Calcium	40.1	2	20.1	1.003	31.27	15.1	0.753	36.23	13	0.649	34.01	19.8	0.988	31.92
Magnesium	24.3	2	21.5	1.769	55.15	12.3	1.012	48.67	11.5	0.946	49.61	19.6	1.613	52.11
Potassium	39.1	1	2.06	0.053	1.64	2.12	0.054	2.61	2	0.051	2.68	2.1	0.054	1.74
Sodium	23.0	1	8.75	0.381	11.87	5.97	0.260	12.49	5.79	0.252	13.20	9.83	0.428	13.81
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01	0.0992	0.004	0.19	0.157	0.006	0.18
Manganese	54.9	2	0.0557	0.002	0.06	0.00005	0.000	0.00	0.13	0.005	0.25	0.186	0.007	0.22
Ammonia-N	14.0	1	0.001	0.000	0.00	0.001	0.000	0.00	0.0157	0.001	0.06	0.009	0.001	0.02
	Total Cations (meq/L)			**3.21**			**2.08**			**1.91**			**3.10**	
Anion Parameters	Molecular Weight (g/mol)	n												
Alkalinity, Total	--		141			78.1			71			131		
Carbonate	60.0	2	0.0995	0.0033	0.1058	0.0761	0.0025	0.1251	0.2129	0.0071	0.3875	0.0625	0.0021	0.0706
Bicarbonate	61.0	1	171.8	2.8161	89.79	95.1	1.5591	76.95	86.2	1.4126	77.12	159.7	2.6174	88.70
Chloride	35.5	1	2.06	0.0581	1.85	4.94	0.1394	6.88	3.15	0.0889	4.85	1.9	0.0536	1.82
Nitrate-N	14.0	1	0.154	0.0110	0.35	0.735	0.0525	2.59	0.005	0.0004	0.02	0.0987	0.0070	0.24
Sulfate	96.1	2	11.9	0.2478	7.90	13.1	0.2727	13.46	15.5	0.3227	17.62	13	0.2707	9.17
	Total Anions (meq/L)			**3.14**			**2.03**			**1.83**			**2.95**	
	Total Ions (meq/L)			**6.34**			**4.11**			**3.74**			**6.05**	
	Cation/Anion Ratio			**1.02**			**1.03**			**1.04**			**1.05**	
	Percent Difference			**1.13**			**1.31**			**2.03**			**2.39**	

Table I-2 *(continued)*

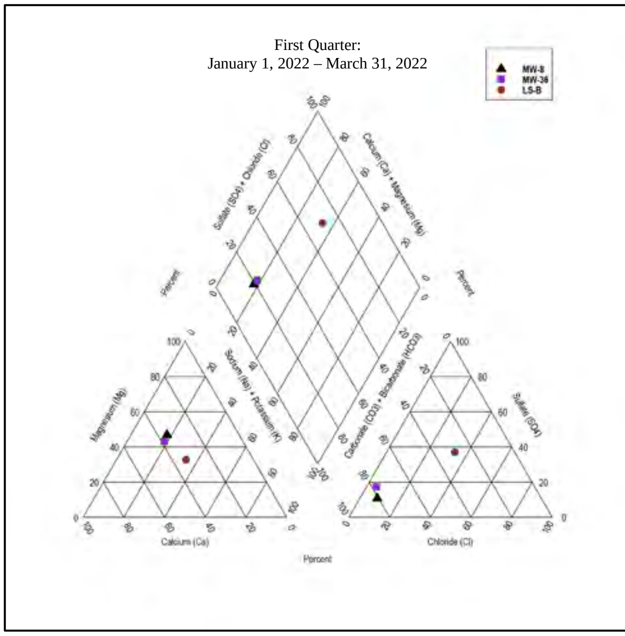
Channel Cc2: Ion Balance Summary for Groundwater

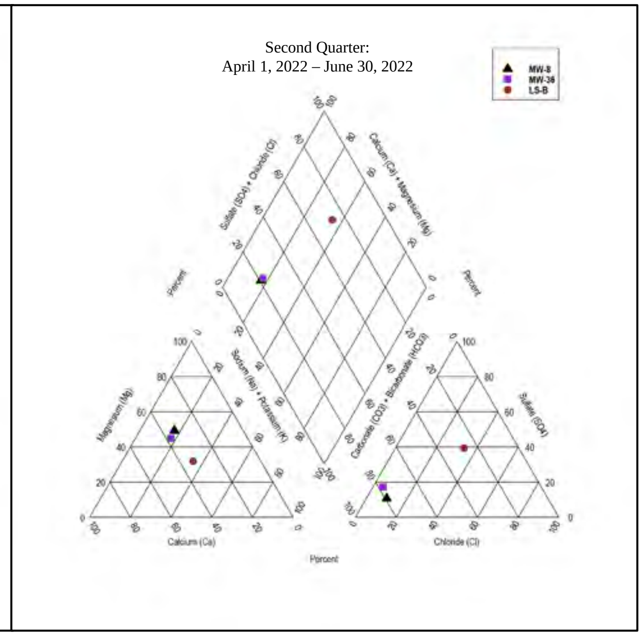
October 1, 2022 - December 31, 2022

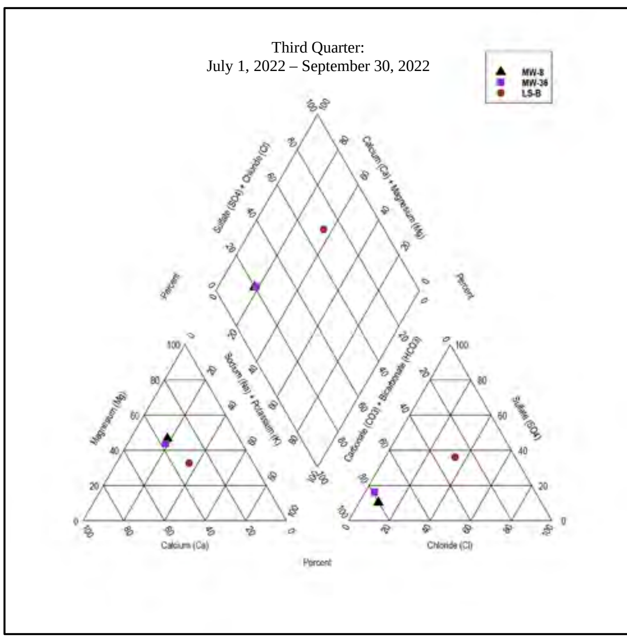
		Well #	**MW-33**			**MW-35**			**MW-37**		
		Sample Date	11/9/2022			11/9/2022			11/9/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.79			6.7			6.7		
Conductance	--		561.3			488.8			190.5		
TDS	--		373			371			137		
Calcium	40.1	2	56.7	2.829	37.76	54.2	2.705	36.67	14.9	0.744	34.36
Magnesium	24.3	2	44.5	3.662	48.88	41.7	3.431	46.52	12.9	1.062	49.05
Potassium	39.1	1	3.08	0.079	1.05	3.13	0.080	1.09	1.43	0.037	1.69
Sodium	23.0	1	16	0.696	9.29	16.2	0.705	9.55	7.37	0.321	14.81
Iron	55.8	2	5.36	0.192	2.56	10.4	0.372	5.05	0.0313	0.001	0.05
Manganese	54.9	2	0.877	0.032	0.43	2.14	0.078	1.06	0.0204	0.001	0.03
Ammonia-N	14.0	1	0.0306	0.002	0.03	0.0635	0.005	0.06	0.001	0.000	0.00
	Total Cations (meq/L)			**7.49**			**7.38**			**2.16**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		334			297			91.4		
Carbonate	60.0	2	0.1238	0.0041	0.0579	0.0895	0.0030	0.0449	0.0275	0.0009	0.0434
Bicarbonate	61.0	1	407.2	6.6745	93.61	362.2	5.9358	89.41	111.5	1.8267	86.34
Chloride	35.5	1	3.75	0.1058	1.48	3.32	0.0937	1.41	2.86	0.0807	3.81
Nitrate-N	14.0	1	0.005	0.0004	0.01	0.005	0.0004	0.01	0.781	0.0558	2.64
Sulfate	96.1	2	16.6	0.3456	4.85	29.1	0.6059	9.13	7.28	0.1516	7.16
	Total Anions (meq/L)			**7.13**			**6.64**			**2.12**	
	Total Ions (meq/L)			**14.62**			**14.01**			**4.28**	
	Cation/Anion Ratio			**1.05**			**1.11**			**1.02**	
	Percent Difference			**2.47**			**5.26**			**1.13**	

Figure I-3. Channel Cc3 Trilinear Diagrams

January 1, 2022 - December 31, 2022







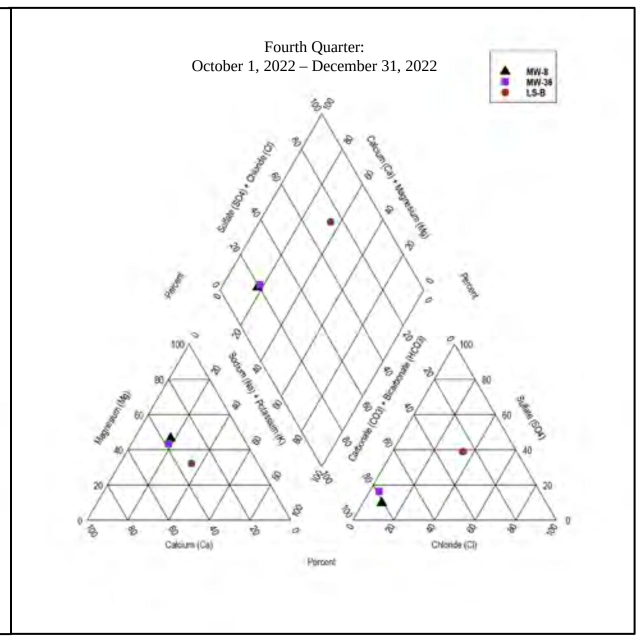


Table I-3

Channel Cc3: Ion Balance Summary for Groundwater

January 1, 2022 - March 31, 2022

		Well #	**MW-8**			**MW-36**		
		Sample Date	1/31/2022			1/31/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.37			7.65		
Conductance	--		147.1			114.1		
TDS	--		101			115		
Calcium	40.1	2	12.4	0.619	35.39	14	0.699	38.59
Magnesium	24.3	2	9.97	0.820	46.92	9.48	0.780	43.09
Potassium	39.1	1	1.17	0.030	1.71	2.67	0.068	3.77
Sodium	23.0	1	6.42	0.279	15.97	6.05	0.263	14.54
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	0.000481	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)			**1.75**			**1.81**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		55.9			68.1		
Carbonate	60.0	2	0.0079	0.0003	0.0160	0.1821	0.0061	0.3461
Bicarbonate	61.0	1	68.2	1.1175	68.28	82.7	1.3556	77.29
Chloride	35.5	1	4.15	0.1171	7.15	3.08	0.0869	4.95
Nitrate-N	14.0	1	3.53	0.2520	15.40	0.021	0.0015	0.09
Sulfate	96.1	2	7.2	0.1499	9.16	14.6	0.3040	17.33
	Total Anions (meq/L)			**1.64**			**1.75**	
	Total Ions (meq/L)			**3.39**			**3.56**	
	Cation/Anion Ratio			**1.07**			**1.03**	
	Percent Difference			**3.31**			**1.58**	

Table I-3 *(continued)*

Channel Cc3: Ion Balance Summary for Groundwater

April 1, 2022 - June 30, 2022

		Well #	**MW-8**			**MW-36**		
		Sample Date	5/9/2022			5/10/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.25			7.31		
Conductance	--		145.5			157.6		
TDS	--		121			127		
Calcium	40.1	2	11	0.549	33.73	13.6	0.679	37.64
Magnesium	24.3	2	9.76	0.803	49.35	9.84	0.810	44.91
Potassium	39.1	1	1.17	0.030	1.84	2.81	0.072	3.99
Sodium	23.0	1	5.64	0.245	15.07	5.57	0.242	13.44
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	0.00046	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)			**1.63**			**1.80**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		50.6			67.3		
Carbonate	60.0	2	0.0054	0.0002	0.0113	0.0825	0.0027	0.1585
Bicarbonate	61.0	1	61.7	1.0116	63.58	81.9	1.3430	77.44
Chloride	35.5	1	4.53	0.1278	8.03	3.09	0.0872	5.03
Nitrate-N	14.0	1	4.41	0.3148	19.79	0.02	0.0014	0.08
Sulfate	96.1	2	6.56	0.1366	8.58	14.4	0.2998	17.29
	Total Anions (meq/L)			**1.59**			**1.73**	
	Total Ions (meq/L)			**3.22**			**3.54**	
	Cation/Anion Ratio			**1.02**			**1.04**	
	Percent Difference			**1.14**			**1.94**	

Table I-3 ***(continued)***

Channel Cc3: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**MW-8**			**MW-36**		
		Sample Date	9/12/2022			9/13/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.37			7.66		
Conductance	--		144.1			156.7		
TDS	--		119			131		
Calcium	40.1	2	11.4	0.569	35.31	13.8	0.689	37.55
Magnesium	24.3	2	9.14	0.752	46.69	9.75	0.802	43.75
Potassium	39.1	1	1.09	0.028	1.73	2.62	0.067	3.65
Sodium	23.0	1	6.02	0.262	16.26	6.34	0.276	15.04
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2	0.000418	0.000	0.00	0.000354	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)			**1.61**			**1.83**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		51.9			69.8		
Carbonate	60.0	2	0.0073	0.0002	0.0152	0.1910	0.0064	0.3606
Bicarbonate	61.0	1	63.3	1.0375	64.77	84.8	1.3893	78.70
Chloride	35.5	1	4.35	0.1227	7.66	2.86	0.0807	4.57
Nitrate-N	14.0	1	4.3	0.3070	19.16	0.024	0.0017	0.10
Sulfate	96.1	2	6.45	0.1343	8.38	13.8	0.2873	16.27
	Total Anions (meq/L)			**1.60**			**1.77**	
	Total Ions (meq/L)			**3.21**			**3.60**	
	Cation/Anion Ratio			**1.01**			**1.04**	
	Percent Difference			**0.29**			**1.91**	

Table I-3 *(continued)*

Channel Cc3: Ion Balance Summary for Groundwate

October 1, 2022 - December 31, 2022

		Well #	**MW-8**			**MW-36**		
		Sample Date	11/7/2022			11/8/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		6.57			7.69		
Conductance	--		144.8			161		
TDS	--		113			132		
Calcium	40.1	2	11.7	0.584	35.77	14	0.699	38.25
Magnesium	24.3	2	9.23	0.760	46.54	9.65	0.794	43.48
Potassium	39.1	1	1.09	0.028	1.71	2.65	0.068	3.71
Sodium	23.0	1	5.99	0.261	15.96	6.11	0.266	14.55
Iron	55.8	2	0.005	0.000	0.01	0.005	0.000	0.01
Manganese	54.9	2	0.00138	0.000	0.00	0.000254	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)			**1.63**			**1.83**	
Anion Parameters	Molecular Weight (g/mol)	n						
Alkalinity, Total	--		52.9			69.7		
Carbonate	60.0	2	0.0118	0.0004	0.0249	0.2043	0.0068	0.3846
Bicarbonate	61.0	1	64.5	1.0574	66.83	84.6	1.3869	78.33
Chloride	35.5	1	4.33	0.1221	7.72	2.96	0.0835	4.72
Nitrate-N	14.0	1	3.83	0.2734	17.28	0.028	0.0020	0.11
Sulfate	96.1	2	6.19	0.1289	8.15	14	0.2915	16.46
	Total Anions (meq/L)			**1.58**			**1.77**	
	Total Ions (meq/L)			**3.21**			**3.60**	
	Cation/Anion Ratio			**1.03**			**1.03**	
	Percent Difference			**1.55**			**1.55**	

Figure I-4. Unit D Aquifer Trilinear Diagrams

January 1, 2022 - December 31, 2022

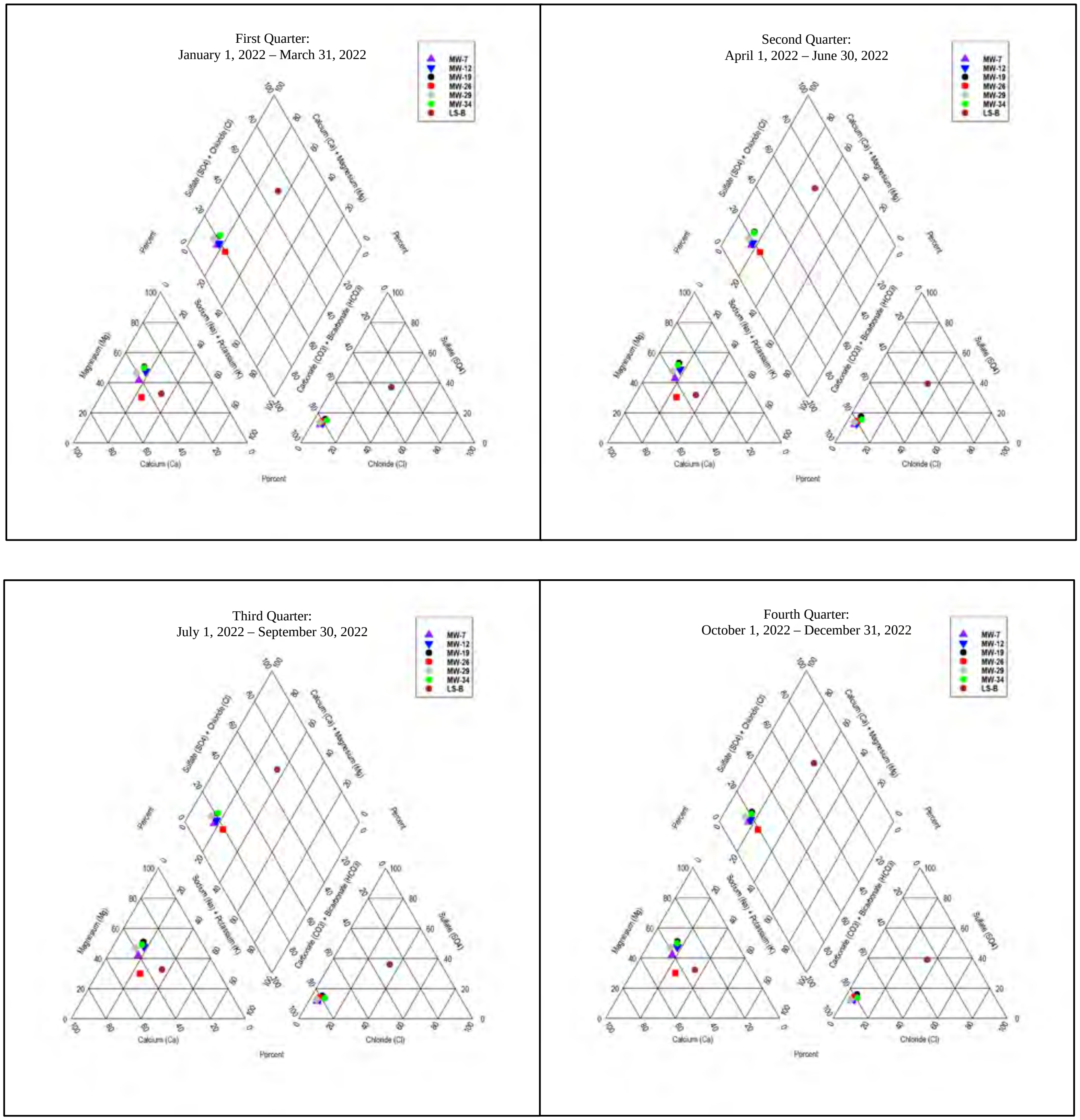


Table I-4

Unit D Aquifer: Ion Balance Summary for Groundwater

January 1, 2022 - March 31, 2022

		Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
		Sample Date	2/1/2022			1/31/2022			2/2/2022			2/2/2022			2/2/2022			2/1/2022		
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	--		7.46			7.4			7.48			7.8			7.06			6.75		
Conductance	--		163.9			102.5			194.3			167.7			207.6			172.1		
TDS	--		123			105			124			124			139			109		
Calcium	40.1	2	16	0.798	41.10	12	0.599	34.70	15.1	0.753	33.76	17.1	0.853	45.11	19.7	0.983	40.07	13.5	0.674	34.38
Magnesium	24.3	2	9.69	0.797	41.04	9.99	0.822	47.64	13.6	1.119	50.14	6.89	0.567	29.97	13.7	1.127	45.96	11.9	0.979	49.98
Potassium	39.1	1	2.69	0.069	3.54	1.85	0.047	2.74	2.34	0.060	2.68	2.92	0.075	3.95	2.07	0.053	2.16	1.46	0.037	1.91
Sodium	23.0	1	5.87	0.255	13.14	5.91	0.257	14.90	6.4	0.278	12.47	8.59	0.374	19.75	6.04	0.263	10.71	6.18	0.269	13.72
Iron	55.8	2	0.0271	0.001	0.05	0.005	0.000	0.01	0.035	0.001	0.06	0.0928	0.003	0.18	0.666	0.024	0.97	0.005	0.000	0.01
Manganese	54.9	2	0.14	0.005	0.26	0.00005	0.000	0.00	0.491	0.018	0.80	0.0589	0.002	0.11	0.0819	0.003	0.12	0.00005	0.000	0.00
Ammonia-N	14.0	1	0.235	0.017	0.86	0.001	0.000	0.00	0.029	0.002	0.09	0.245	0.017	0.92	0.0024	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)			**1.94**			**1.73**			**2.23**			**1.89**			**2.45**			**1.96**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		78.1			62			84.2			76			98.7			69.6		
Carbonate	60.0	2	0.1351	0.0045	0.2379	0.0934	0.0031	0.1967	0.1525	0.0051	0.2353	0.2866	0.0096	0.5024	0.0681	0.0023	0.0944	0.0235	0.0008	0.0407
Bicarbonate	61.0	1	95.0	1.5572	82.29	75.4500281	1.2366	78.13	102.4	1.6786	77.73	92.1	1.5101	79.43	120.3	1.9713	82.00	84.9	1.3909	72.25
Chloride	35.5	1	3.35	0.0945	4.99	3.13	0.0883	5.58	4.6	0.1298	6.01	3.72	0.1049	5.52	3.51	0.0990	4.12	4.81	0.1357	7.05
Nitrate-N	14.0	1	0.013	0.0009	0.05	0.696	0.0497	3.14	0.005	0.0004	0.02	0.025	0.0018	0.09	0.005	0.0004	0.01	1.75	0.1249	6.49
Sulfate	96.1	2	11.3	0.2353	12.43	9.85	0.2051	12.96	16.6	0.3456	16.01	13.2	0.2748	14.46	15.9	0.3310	13.77	13.1	0.2727	14.17
	Total Anions (meq/L)			**1.89**			**1.58**			**2.16**			**1.90**			**2.40**			**1.93**	
	Total Ions (meq/L)			**3.84**			**3.31**			**4.39**			**3.79**			**4.86**			**3.88**	
	Cation/Anion Ratio			**1.03**			**1.09**			**1.03**			**0.99**			**1.02**			**1.02**	
	Percent Difference			**1.31**			**4.31**			**1.66**			**-0.25**			**1.01**			**0.88**	

Table I-4 *(continued)*

Unit D Aquifer: Ion Balance Summary for Groundwater

April 1, 2022 - June 30, 2022

		Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
		Sample Date	5/10/2022			5/9/2022			5/10/2022			5/10/2022			5/10/2022			5/9/2022		
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	--		7.36			7.12			7.3			7.95			7.28			6.56		
Conductance	--		164.6			142.8			191.7			169.1			207.3			173.9		
TDS	--		132			110			140			137			156			133		
Calcium	40.1	2	15.6	0.778	39.37	11.1	0.554	33.93	14.7	0.734	32.00	17.9	0.893	44.53	19.3	0.963	38.18	13.6	0.679	33.62
Magnesium	24.3	2	10.2	0.839	42.45	9.68	0.797	48.80	14.7	1.210	52.77	7.32	0.602	30.03	14.5	1.193	47.30	12.7	1.045	51.78
Potassium	39.1	1	2.76	0.071	3.57	1.91	0.049	2.99	2.54	0.065	2.83	3.24	0.083	4.13	2.16	0.055	2.19	1.63	0.042	2.07
Sodium	23.0	1	6.12	0.266	13.47	5.35	0.233	14.26	6.07	0.264	11.52	9.27	0.403	20.11	6.45	0.281	11.12	5.81	0.253	12.52
Iron	55.8	2	0.0344	0.001	0.06	0.005	0.000	0.01	0.0315	0.001	0.05	0.103	0.004	0.18	0.741	0.027	1.05	0.005	0.000	0.01
Manganese	54.9	2	0.126	0.005	0.23	0.00005	0.000	0.00	0.465	0.017	0.74	0.0621	0.002	0.11	0.0993	0.004	0.14	0.00005	0.000	0.00
Ammonia-N	14.0	1	0.233	0.017	0.84	0.001	0.000	0.00	0.0296	0.002	0.09	0.252	0.018	0.90	0.0036	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)			**1.98**			**1.63**			**2.29**			**2.01**			**2.52**			**2.02**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		76.7			62.7			82.8			74.8			97.2			69.8		
Carbonate	60.0	2	0.1054	0.0035	0.1888	0.0496	0.0017	0.1036	0.0992	0.0033	0.1520	0.3974	0.0132	0.7052	0.1112	0.0037	0.1559	0.0152	0.0005	0.0260
Bicarbonate	61.0	1	93.4	1.5302	82.21	76.3930552	1.2521	78.43	100.8	1.6523	75.98	90.4	1.4824	78.93	118.4	1.9399	81.62	85.1	1.3952	71.39
Chloride	35.5	1	3.44	0.0970	5.21	3.25	0.0917	5.74	4.81	0.1357	6.24	3.76	0.1061	5.65	3.61	0.1018	4.28	5.01	0.1413	7.23
Nitrate-N	14.0	1	0.021	0.0015	0.08	0.674	0.0481	3.01	0.005	0.0004	0.02	0.021	0.0015	0.08	0.005	0.0004	0.02	1.85	0.1321	6.76
Sulfate	96.1	2	11	0.2290	12.30	9.75	0.2030	12.71	18.4	0.3831	17.61	13.2	0.2748	14.63	15.9	0.3310	13.93	13.7	0.2852	14.59
	Total Anions (meq/L)			**1.86**			**1.60**			**2.17**			**1.88**			**2.38**			**1.95**	
	Total Ions (meq/L)			**3.84**			**3.23**			**4.47**			**3.88**			**4.90**			**3.97**	
	Cation/Anion Ratio			**1.06**			**1.02**			**1.05**			**1.07**			**1.06**			**1.03**	
	Percent Difference			**3.02**			**1.11**			**2.63**			**3.28**			**2.97**			**1.61**	

Table I-4 *(continued)*

Unit D Aquifer: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
		Sample Date	9/13/2022			9/13/2022			9/13/2022			9/13/2022			9/15/2022			9/12/2022		
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	--		7.37			7.3			7.19			7.97			7.34			6.92		
Conductance	--		165.3			141.1			192.5			172.2			206.9			172.3		
TDS	--		134			113			143			139			149			134		
Calcium	40.1	2	15.7	0.783	40.04	11.7	0.584	34.34	15.1	0.753	32.71	18	0.898	44.79	19.8	0.988	39.22	14	0.699	34.63
Magnesium	24.3	2	9.89	0.814	41.60	9.9	0.815	47.92	14.2	1.169	50.73	7.21	0.593	29.59	14.2	1.169	46.39	12.1	0.996	49.36
Potassium	39.1	1	2.63	0.067	3.44	1.81	0.046	2.72	2.32	0.059	2.58	2.98	0.076	3.80	2.13	0.054	2.16	1.48	0.038	1.88
Sodium	23.0	1	6.19	0.269	13.76	5.85	0.254	14.97	6.91	0.301	13.05	9.4	0.409	20.39	6.34	0.276	10.95	6.55	0.285	14.12
Iron	55.8	2	0.0201	0.001	0.04	0.0107	0.000	0.02	0.0459	0.002	0.07	0.115	0.004	0.21	0.804	0.029	1.14	0.005	0.000	0.01
Manganese	54.9	2	0.145	0.005	0.27	0.0024	0.000	0.01	0.487	0.018	0.77	0.0637	0.002	0.12	0.0889	0.003	0.13	0.000193	0.000	0.00
Ammonia-N	14.0	1	0.233	0.017	0.85	0.0039	0.000	0.02	0.0321	0.002	0.10	0.312	0.022	1.11	0.0027	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)			**1.96**			**1.70**			**2.30**			**2.01**			**2.52**			**2.02**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		78.6			63.8			85.9			77.9			99.8			70.7		
Carbonate	60.0	2	0.1106	0.0037	0.1958	0.0764	0.0025	0.1578	0.0799	0.0027	0.1220	0.4332	0.0144	0.7468	0.1310	0.0044	0.1817	0.0353	0.0012	0.0602
Bicarbonate	61.0	1	95.7	1.5680	83.33	77.6806387	1.2732	78.90	104.6	1.7150	78.58	94.2	1.5432	79.82	121.5	1.9912	82.83	86.2	1.4125	72.14
Chloride	35.5	1	3.12	0.0880	4.68	3	0.0846	5.24	4.58	0.1292	5.92	3.49	0.0985	5.09	3.47	0.0979	4.07	5.25	0.1481	7.56
Nitrate-N	14.0	1	0.018	0.0013	0.07	0.65	0.0464	2.88	0.005	0.0004	0.02	0.005	0.0004	0.02	0.005	0.0004	0.01	2.05	0.1463	7.47
Sulfate	96.1	2	10.6	0.2207	11.73	9.94	0.2070	12.82	16.1	0.3352	15.36	13.3	0.2769	14.32	14.9	0.3102	12.90	12	0.2498	12.76
	Total Anions (meq/L)			**1.88**			**1.61**			**2.18**			**1.93**			**2.40**			**1.96**	
	Total Ions (meq/L)			**3.84**			**3.31**			**4.49**			**3.94**			**4.92**			**3.98**	
	Cation/Anion Ratio			**1.04**			**1.05**			**1.06**			**1.04**			**1.05**			**1.03**	
	Percent Difference			**1.95**			**2.60**			**2.70**			**1.83**			**2.34**			**1.49**	

Table I-4 *(continued)*

Unit D Aquifer: Ion Balance Summary for Groundwater

October 1, 2022 - December 31, 2022

		Well #	**MW-7**			**MW-12**			**MW-19**			**MW-26**			**MW-29**			**MW-34**		
		Sample Date	11/8/2022			11/8/2022			11/8/2022			11/8/2022			11/8/2022			11/7/2022		
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	--		7.55			7.46			7.6			8.17			7.54			6.84		
Conductance	--		165.3			138.3			194			171.1			207.2			178.4		
TDS	--		134			112			138			138			148			131		
Calcium	40.1	2	15.8	0.788	40.23	11.8	0.589	35.27	15.2	0.758	33.06	17.9	0.893	44.27	19.8	0.988	39.07	13.7	0.684	34.00
Magnesium	24.3	2	9.95	0.819	41.78	9.6	0.790	47.32	14.1	1.160	50.58	7.31	0.602	29.81	14.3	1.177	46.54	12.2	1.004	49.94
Potassium	39.1	1	2.69	0.069	3.51	1.79	0.046	2.74	2.37	0.061	2.64	3.02	0.077	3.83	2.1	0.054	2.12	1.49	0.038	1.90
Sodium	23.0	1	6.04	0.263	13.41	5.62	0.244	14.64	6.69	0.291	12.68	9.69	0.422	20.89	6.43	0.280	11.06	6.54	0.284	14.15
Iron	55.8	2	0.0124	0.000	0.02	0.005	0.000	0.01	0.0527	0.002	0.08	0.111	0.004	0.20	0.756	0.027	1.07	0.005	0.000	0.01
Manganese	54.9	2	0.11	0.004	0.20	0.000586	0.000	0.00	0.492	0.018	0.78	0.0584	0.002	0.11	0.0864	0.003	0.12	0.00005	0.000	0.00
Ammonia-N	14.0	1	0.231	0.016	0.84	0.001	0.000	0.00	0.0556	0.004	0.17	0.255	0.018	0.90	0.0021	0.000	0.01	0.001	0.000	0.00
	Total Cations (meq/L)			**1.96**			**1.67**			**2.29**			**2.02**			**2.53**			**2.01**	
Anion Parameters	Molecular Weight (g/mol)	n																		
Alkalinity, Total	--		78.1			63.5			85.5			77.7			99.6			72.2		
Carbonate	60.0	2	0.1661	0.0055	0.2945	0.1098	0.0037	0.2285	0.2039	0.0068	0.3108	0.6811	0.0227	1.1750	0.2070	0.0069	0.2899	0.0300	0.0010	0.0508
Bicarbonate	61.0	1	94.9	1.5561	82.80	77.2466891	1.2661	79.02	103.9	1.7028	77.88	93.4	1.5310	79.24	121.1	1.9847	83.39	88.0	1.4427	73.26
Chloride	35.5	1	3.23	0.0911	4.85	3.02	0.0852	5.32	4.49	0.1267	5.79	3.62	0.1021	5.29	3.35	0.0945	3.97	4.61	0.1300	6.60
Nitrate-N	14.0	1	0.024	0.0017	0.09	0.638	0.0455	2.84	0.005	0.0004	0.02	0.02	0.0014	0.07	0.005	0.0004	0.01	2.01	0.1435	7.29
Sulfate	96.1	2	10.8	0.2249	11.96	9.69	0.2017	12.59	16.8	0.3498	16.00	13.2	0.2748	14.22	14.1	0.2936	12.33	12.1	0.2519	12.79
	Total Anions (meq/L)			**1.88**			**1.60**			**2.19**			**1.93**			**2.38**			**1.97**	
	Total Ions (meq/L)			**3.84**			**3.27**			**4.48**			**3.95**			**4.91**			**3.98**	
	Cation/Anion Ratio			**1.04**			**1.04**			**1.05**			**1.04**			**1.06**			**1.02**	
	Percent Difference			**2.09**			**2.05**			**2.40**			**2.17**			**3.03**			**1.04**	

Figure I-5. Private Wells Trilinear Diagrams

January 1, 2022- December 31, 2022

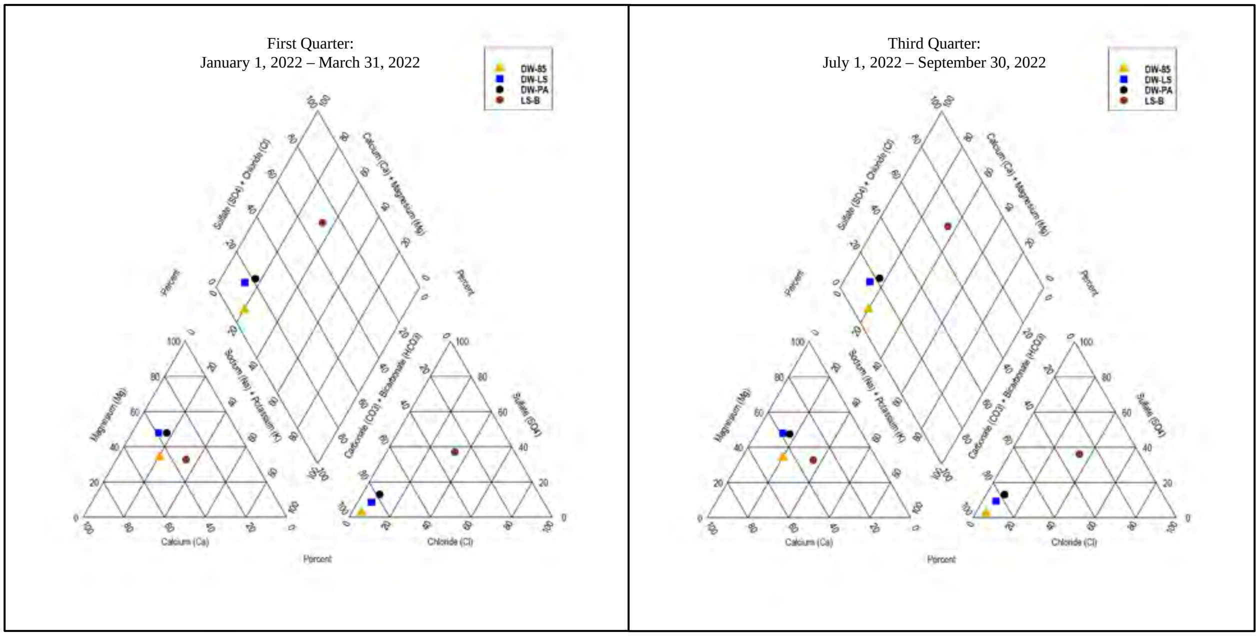


Table I-5

Private Wells: Ion Balance Summary for Groundwater

January 1, 2022 - March 31, 2022

		Well #	**DW-85**			**DW-LS**			**DW-PA**		
		Sample Date	2/7/2022			2/7/2022			2/7/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		7.62			7			6.9		
Conductance	--		135.2			248.8			164.8		
TDS	--		88			156			103		
Calcium	40.1	2	14.5	0.72355	44.7426279	23.3	1.16267	38.9766132	13.4	0.66866	35.0944636
Magnesium	24.3	2	6.6	0.543114	33.5848906	17.4	1.431846	48.000299	11.1	0.913419	47.9405825
Potassium	39.1	1	2.68	0.0685544	4.23924264	1.79	0.0457882	1.53497464	1.64	0.0419512	2.20179891
Sodium	23.0	1	5.92	0.25752	15.9244303	7.87	0.342345	11.4765571	6.46	0.28101	14.7487441
Iron	55.8	2	0.0654	0.00234197	0.14482216	0.005	0.00017905	0.00600236	0.005	0.00017905	0.0093974
Manganese	54.9	2	0.0529	0.00192556	0.1190721	0.00259	9.4276E-05	0.00316045	0.000663	2.4133E-05	0.00126663
Ammonia-N	14.0	1	0.282	0.02013198	1.24491423	0.001	0.00007139	0.00239323	0.001	0.00007139	0.00374689
	Total Cations (meq/L)			**1.62**			**2.98**			**1.91**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		68.9			113			67.6		
Carbonate	60.0	2	0.1720	0.0057	0.3851	0.0679	0.0023	0.0800	0.0323	0.0011	0.0604
Bicarbonate	61.0	1	83.7	1.37197768	92.16	137.7	2.25726278	79.81	82.4	1.35064068	75.81
Chloride	35.5	1	2.55	0.0719355	4.83	6.63	0.1870323	6.61	5.23	0.1475383	8.28
Nitrate-N	14.0	1	0.005	0.00035695	0.02	2.17	0.1549163	5.48	0.805	0.05746895	3.23
Sulfate	96.1	2	1.86	0.0387252	2.60	10.9	0.226938	8.02	10.8	0.224856	12.62
	Total Anions (meq/L)			**1.49**			**2.83**			**1.78**	
	Total Ions (meq/L)			**3.11**			**5.81**			**3.69**	
	Cation/Anion Ratio			**1.09**			**1.05**			**1.07**	
	Percent Difference			**4.13**			**2.66**			**3.36**	

Table I-5 *(continued)*

Private Wells: Ion Balance Summary for Groundwater

July 1, 2022 - September 30, 2022

		Well #	**DW-85**			**DW-LS**			**DW-PA**		
		Sample Date	9/14/2022			9/14/2022			9/14/2022		
Cation Parameters	Molecular Weight (g/mol)	n	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)	mg/L	meq/L	% (meq)
pH	--		8.11			7.26			7.11		
Conductance	--		133.3			243			161.7		
TDS	--		107			175			121		
Calcium	40.1	2	14.2	0.70858	45.0150831	22.9	1.14271	38.8078246	13.1	0.65369	35.6372497
Magnesium	24.3	2	6.43	0.5291247	33.6145423	17.2	1.415388	48.0683019	10.6	0.872274	47.5538043
Potassium	39.1	1	2.48	0.0634384	4.03015164	1.68	0.0429744	1.45946301	1.51	0.0386258	2.10576463
Sodium	23.0	1	5.73	0.249255	15.8348169	7.88	0.34278	11.6412267	6.18	0.26883	14.6558183
Iron	55.8	2	0.0726	0.00259981	0.16516199	0.0119	0.00042614	0.0144722	0.0118	0.00042256	0.02303662
Manganese	54.9	2	0.052	0.0018928	0.1202469	0.000575	0.00002093	0.00071081	0.000295	1.0738E-05	0.0005854
Ammonia-N	14.0	1	0.269	0.01920391	1.21999718	0.0033	0.00023559	0.00800082	0.0061	0.00043548	0.02374103
	Total Cations (meq/L)			**1.57**			**2.94**			**1.83**	
Anion Parameters	Molecular Weight (g/mol)	n									
Alkalinity, Total	--		70.5			113			68.8		
Carbonate	60.0	2	0.5393	0.0180	1.1748	0.1234	0.0041	0.1436	0.0532	0.0018	0.0966
Bicarbonate	61.0	1	84.9	1.39173234	90.97	137.6	2.25541148	78.69	83.8	1.37393686	74.80
Chloride	35.5	1	2.8	0.078988	5.16	6.35	0.1791335	6.25	5.55	0.1565655	8.52
Nitrate-N	14.0	1	0.005	0.00035695	0.02	2.37	0.1691943	5.90	1	0.07139	3.89
Sulfate	96.1	2	1.96	0.0408072	2.67	12.4	0.258168	9.01	11.2	0.233184	12.69
	Total Anions (meq/L)			**1.53**			**2.87**			**1.84**	
	Total Ions (meq/L)			**3.10**			**5.81**			**3.67**	
	Cation/Anion Ratio			**1.03**			**1.03**			**1.00**	
	Percent Difference			**1.43**			**1.35**			**-0.07**	

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	2/7/2022	SVW1220207Q	11.4	174.4	7.5	168.3	7.851	19.4
SW-W1	5/11/2022	SVW1220511Q	10.67	156.6	7.49	158.1	8.986	15.5
SW-W1	9/14/2022	SVW1220914Q	9.49	-104.8	7.71	180.7	13.549	4.32
SW-W1	11/16/2022	SVW1221116Q	11.08	18.4	7.56	176.6	7.366	4.86
SW-W2	2/7/2022	SVW2220207Q	11.85	28.4	7.98	381	7.563	15.2
SW-W2	5/11/2022	SVW2220511Q	11.22	194.7	7.94	460.7	8.776	14.5
SW-W2	9/14/2022	SVW2220914Q	10.31	126.4	8.19	503.8	12.575	9.74
SW-W2	11/16/2022	SVW2221116Q	11.79	186.6	7.9	504	7.309	6.43
SW-W3	2/7/2022	SVW3220207Q	11.16	93.4	7.49	241.1	8.57	29.2
SW-W3	5/11/2022	SVW3220511Q	10.75	187.9	7.62	240.4	9.468	13.9
SW-W3	9/14/2022	SVW3220914Q	10.22	-41.4	7.81	261	12.118	4.04
SW-W3	11/16/2022	SVW3221116Q	11.3	99	7.74	235.4	8.615	6.6
SW-E	2/7/2022	SVE-220207Q	11.86	204.2	7.79	173.8	8.049	6.21
SW-E	5/11/2022	SVE-220511Q	11.8	324.7	7.62	173.3	7.763	7.48
SW-E	9/14/2022	SVE-220914Q	10.71	111.4	7.97	190.9	12.092	9.07
SW-E	11/16/2022	SVE-221116Q	11.93	273.6	7.65	191.3	7.857	3.24

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	2/7/2022	SVW1220207Q	65.1	0.0114	2.38	15 T	6.38	1	510	0.002 U	0.1 U	84.8	2.43	2.43	0.0297	0.109	188	7.69	130	0.365	4.59	146	18	9.5
SW-W1	5/11/2022	SVW1220511Q	66.9	0.0121	2 U	16 T	5.73	4	500	0.002 U	0.1 U	80.7	1.86	1.86	0.0288	0.131	181	6.32	134 J	0.472	7.61	209 J	26.3 J	15
SW-W1	9/14/2022	SVW1220914Q	81.3	0.0152	2 U	18 T	6.27	4	320	0.002 U	0.04 U	91.7	0.906	0.906	0.0395	0.139	200	7.86	146	0.31	4.62	164	15.1	6.85
SW-W1	11/16/2022	SVW1221116Q	74.7	0.0121	2 U	5 U	6.41	4	670	0.002 U	0.04 U	85.4	0.788	0.788	0.0334	0.0783	189	8.16	137	0.235	3.82	149	5.58	6.27
SW-W2	2/7/2022	SVW2220207Q	255	0.006 T	2 U	21.4	16.3	1 U	110	0.002 U	0.1 U	275	0.129	0.129	0.0131	0.0839	547	15.6	317	0.316	6.08	343	22.4	16.2
SW-W2	5/11/2022	SVW2220511Q	252	0.0066 T	2 U	16 T	16.7	5	250	0.002 U	0.1 U	271	0.169	0.169	0.0144	0.0785	531	14.7	324	0.325	5.38	364	20.8	14.4
SW-W2	9/14/2022	SVW2220914Q	280	0.0037 T	2 U	13 T	18.5	2	340	0.002 U	0.1 U	304	0.0931	0.0931	0.0151	0.0763	572	16.2	365	0.239	5.13	407	95.3	17.9
SW-W2	11/16/2022	SVW2221116Q	254	0.0022 T	2 U	13 T	16.3	1 U	21	0.002 U	0.1 U	270	0.0875	0.0875	0.0104	0.0304	528	16.2	330	0.2 T	5.13	341	6.9	4.09
SW-W3	2/7/2022	SVW3220207Q	114	0.0091 T	2 U	18 T	8.25	2	140	0.002 U	0.1 U	131	0.525	0.525	0.0625	0.221	277	11.8	167	0.244	4.66	277	114	26.6
SW-W3	5/11/2022	SVW3220511Q	114	0.0098 T	2 U	11 T	7.96	1	170	0.002 U	0.1 U	127	0.457	0.457	0.0625	0.162	276	12.2	181	0.328	5.58	215	32.5	11.2
SW-W3	9/14/2022	SVW3220914Q	130	0.0067 T	2 U	9.4 T	8.27	10	210	0.002 U	0.1 U	141	0.225	0.225	0.0656	0.176	295	12.4	200	0.278	4.69	222	20	9.27
SW-W3	11/16/2022	SVW3221116Q	120	0.0054 T	2 U	9 T	8.3	1	230	0.002 U	0.1 U	133	0.224	0.224	0.0609	0.108	280	11.7	190	0.17 T	3.97	200	10	5.55
SW-E	2/7/2022	SVE-220207Q	--	--	--	--	--	--	--	--	--	89.5	--	--	--	--	197	--	--	--	--	--	--	5.56
SW-E	5/11/2022	SVE-220511Q	--	--	--	--	--	--	--	--	--	89.9	--	--	--	--	198	--	--	--	--	--	--	6.92
SW-E	9/14/2022	SVE-220914Q	--	--	--	--	--	--	--	--	--	100	--	--	--	--	213	--	--	--	--	--	--	6.09
SW-E	11/16/2022	SVE-221116Q	--	--	--	--	--	--	--	--	--	97.2	--	--	--	--	206	--	--	--	--	--	--	3.77

Note:
-- = 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)	(ug/L)	(ug/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)	(ug/L)	(ug/L)
SW-W1	2/7/2022	SVW1220207Q	0.005 U	0.306	0.0003 U	0.0003 U	1.89	6.35	0.000522	0.00788	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.8	14.8	0.000503	0.00193	5.66E-05	0.00102	0.00038	0.00156	0.0911	3.43	0.0001 U	0.000975	11.4	11.6	148	1170
SW-W1	5/11/2022	SVW1220511Q	0.005 U	0.171	0.0003 U	0.0003 U	1.72	3.79	0.000914	0.00562	0.0001 U	0.0001 U	5E-05 U	5E-05 U	13.6	14.2	0.000452	0.00149	5.43E-05	0.000795	0.000597	0.00131	0.0758	1.91	0.0001 U	0.000894	11.3	11	137	691
SW-W1	9/14/2022	SVW1220914Q	0.005 U	0.0715	0.0003 U	0.0003 U	2.95	4.1	0.000886	0.00245	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.5	16.2	0.000435	0.000967	8.02E-05	0.000319	0.000303	0.000625	0.183	0.944	0.0001 U	0.000273	12.6	12.4	373	528 D
SW-W1	11/16/2022	SVW1221116Q	0.005 U	0.0628	0.0003 U	0.0003 U	2.75	3.66	0.000783	0.00205	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.8	15.3	0.000481	0.000707	6.06E-05	0.000201	0.00032	0.000523	0.26	0.941	0.0001 U	0.000242	12.1	11.5	262	424
SW-W2	2/7/2022	SVW2220207Q	0.005 U	0.136	0.0003 U	0.0003 U	1.32	3.93	0.00287	0.0101	0.0001 U	0.0001 U	5E-05 U	5E-05 U	46.6	47.6	0.000207	0.000635	5E-05 U	0.000247	0.000221	0.000713	0.0127	2.98	0.0001 U	0.000386	38.3	38	23	600
SW-W2	5/11/2022	SVW2220511Q	0.005 U	0.0846	0.0003 U	0.0003 U	1.43	3.38	0.00289	0.0085	0.0001 U	0.0001 U	5E-05 U	5.33E-05	44.6	47.9	0.000241	0.00055	5E-05 U	0.000194	0.000262	0.000551	0.016	2.04	0.0001 U	0.000285	38	36.8	23.7	412
SW-W2	9/14/2022	SVW2220914Q	0.005 U	0.094	0.0003 U	0.0003 U	1.62	3.5	0.00376	0.00878	0.0001 U	0.0001 U	5E-05 U	5E-05 U	52.3	52.9	0.000352	0.000517	5.14E-05	0.000191	0.000241	0.000438	0.0307	2.21	0.0001 U	0.000246	41.2	41.7	79.6	529 D
SW-W2	11/16/2022	SVW2221116Q	0.005 U	0.0622	0.0003 U	0.0003 U	1.27	2.19	0.00341	0.00642	0.0001 U	0.0001 U	5E-05 U	5E-05 U	46.2	47.6	0.000365	0.000481	5E-05 U	0.000115	0.000229	0.000402	0.0266	1.03	0.0001 U	0.000213	37.6	36.8	42.3	265
SW-W3	2/7/2022	SVW3220207Q	0.005 U	1.04	0.0003 U	0.0003 U	3.05	4.44	0.00579	0.0152	0.0001 U	0.0001 U	5E-05 U	5E-05 U	21.4	22.2	0.000271	0.00311	0.000126	0.000902	0.000313	0.00249	0.0492	2.14	0.0001 U	0.000746	18.4	18.3	461	692
SW-W3	5/11/2022	SVW3220511Q	0.005 U	0.256	0.0003 U	0.0003 U	2.92	4.45	0.004	0.00918	0.0001 U	0.0001 U	5E-05 U	5E-05 U	20.9	21.8	0.00029	0.00125	0.000101	0.000431	0.000338	0.00118	0.045	1.23	0.0001 U	0.000653	18.1	17.7	375	650
SW-W3	9/14/2022	SVW3220914Q	0.005 U	0.112	0.0003 U	0.0003 U	3.66	4.95	0.00451	0.00713	0.0001 U	0.0001 U	5E-05 U	5E-05 U	24.3	24.2	0.000496	0.000838	0.000112	0.000278	0.000247	0.000647	0.0569	0.878	0.0001 U	0.000406	19	19.6	420	643 D
SW-W3	11/16/2022	SVW3221116Q	0.005 U	0.0987	0.0003 U	0.0003 U	3.16	3.98	0.00484	0.00699	0.0001 U	0.0001 U	5E-05 U	5E-05 U	22.8	22.8	0.000372	0.000699	0.000103	0.00021	0.000241	0.000556	0.0613	0.689	0.0001 U	0.00032	19.2	18.4	390	550
SW-E	2/7/2022	SVE-220207Q	0.0127	0.16	0.0003 U	0.0003 U	1.76	1.97	0.00569	0.00696	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.3	14.8	0.0012	0.0018	5E-05 U	0.00014	0.000444	0.000834	0.0484	0.366	0.0001 U	0.000256	12.8	12.7	8.74	44.2
SW-E	5/11/2022	SVE-220511Q	0.0128	0.204	0.0003 U	0.0003 U	1.82	2.1	0.00499	0.0074	0.0001 U	0.0001 U	5E-05 U	5E-05 U	14.1	15	0.00122	0.00215	5E-05 U	0.000197	0.000444	0.00118	0.0593	0.482	0.0001 U	0.000396	13.3	12.7	10.8	59.5
SW-E	9/14/2022	SVE-220914Q	0.00736	0.164	0.0003 U	0.0003 U	2.19	2.44	0.00515	0.00669	0.0001 U	0.0001 U	5E-05 U	5E-05 U	16.2	16.5	0.00144	0.00216	5E-05 U	0.000164	0.000313	0.00078	0.0516	0.421	0.0001 U	0.000296	13.6	14.3	11	61.1
SW-E	11/16/2022	SVE-221116Q	0.023	1.6	0.0003 U	0.0003 U	1.8	2.6	0.00471	0.0194	0.0001 U	0.0001 U	5E-05 U	5.15E-05	15.4	16.2	0.00138	0.0055	5E-05 U	0.0015	0.000346	0.00321	0.0883	2.97	0.0001 U	0.00161	14.1	13.8	10.7	99.2

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	2/7/2022	SVW1220207Q	5E-05 U	0.00058	0.00426	0.926	0.953	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.83	6.59	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000516	0.00256	0.0005 U	0.00356
SW-W1	5/11/2022	SVW1220511Q	5E-05 U	0.000592	0.00341	0.799	0.805	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.52	6.28	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000494	0.00194 D	0.00167	0.00293
SW-W1	9/14/2022	SVW1220914Q	5E-05 U	0.000866	0.00188	1.06	1.07	0.0005 U	0.0005 U	4E-05 U	4E-05 U	7.24	7.13	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000784	0.00118	0.00151	0.00264
SW-W1	11/16/2022	SVW1221116Q	5E-05 U	0.000828	0.00136	0.933	0.918	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.22	6.34	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000419	0.000807	0.00154	0.00237
SW-W2	2/7/2022	SVW2220207Q	5E-05 U	0.00197	0.00269	3.02	3.01	0.0005 U	0.0005 U	4E-05 U	6.52E-05	15	14.4	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000454	0.00103	0.0005 U	0.00174
SW-W2	5/11/2022	SVW2220511Q	5E-05 U	0.00195	0.00244	2.75	2.84	0.0005 U	0.0005 U	4E-05 U	4E-05 U	14.9	14	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000346	0.000692 D	0.0005 U	0.000877
SW-W2	9/14/2022	SVW2220914Q	5E-05 U	0.00237	0.00296	3.08	3.22	0.0005 U	0.0005 U	4E-05 U	4E-05 U	16	16.4	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000362	0.000715	0.0018	0.00139
SW-W2	11/16/2022	SVW2221116Q	5E-05 U	0.00204	0.00228	3.03	3.02	0.0005 U	0.0005 U	4E-05 U	4E-05 U	15.7	14.3	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000244	0.000503	0.00161	0.00238
SW-W3	2/7/2022	SVW3220207Q	5E-05 U	0.00107	0.00493	2.08	2.14	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.81	8.42	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000884 D	0.0046	0.000935	0.00577
SW-W3	5/11/2022	SVW3220511Q	5E-05 U	0.000987	0.00241	2.01	2.09	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.49	8.25	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000684	0.00192 D	0.0005 U	0.00182
SW-W3	9/14/2022	SVW3220914Q	5E-05 U	0.00119	0.00195	2.27	2.33	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.94	9.47	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.000806	0.00141	0.000995	0.00192
SW-W3	11/16/2022	SVW3221116Q	5E-05 U	0.00105	0.00152	2.19	2.12	0.0005 U	0.0005 U	4E-05 U	4E-05 U	8.36	8.55	7.5E-05 U	7.5E-05 U	0.0005 U	0.000872	0.000578	0.00104	0.00149	0.0032
SW-E	2/7/2022	SVE-220207Q	--	0.000703	0.00127	1.9	1.93	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.64	6.33	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.00284 D	0.00374	0.00157	0.00258
SW-E	5/11/2022	SVE-220511Q	5E-05 U	0.000724	0.00149	1.79	1.95	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.83	6.57	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.00285	0.00364 D	0.0005 U	0.00209
SW-E	9/14/2022	SVE-220914Q	5E-05 U	0.000684	0.00137	1.95	2.05	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.92	7.34	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.0032	0.00384	0.00132	0.00234
SW-E	11/16/2022	SVE-221116Q	5E-05 U	0.000746	0.00809	1.93	2.02	0.0005 U	0.0005 U	4E-05 U	4E-05 U	6.77	6.58	7.5E-05 U	7.5E-05 U	0.0005 U	0.0005 U	0.00262	0.00782	0.00156	0.00866

Note:
-- = 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	Bromofor m	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	2/7/2022	SVW1220207Q	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	5/11/2022	SVW1220511Q	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	3.32 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-W1	9/14/2022	SVW1220914Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W1	11/16/2022	SVW1221116Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W2	2/7/2022	SVW2220207Q	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	5/11/2022	SVW2220511Q	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	21.6	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	9/14/2022	SVW2220914Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W2	11/16/2022	SVW2221116Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W3	2/7/2022	SVW3220207Q	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	5/11/2022	SVW3220511Q	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	4.92 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-W3	9/14/2022	SVW3220914Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-W3	11/16/2022	SVW3221116Q	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
SW-E	2/7/2022	SVE-220207Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	5/11/2022	SVE-220511Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	9/14/2022	SVE-220914Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SW-E	11/16/2022	SVE-221116Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	2/3/2022	VTRP220207X	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	2/3/2022	VTRP220207X2	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	5/10/2022	VTRP220511Y2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	5/10/2022	VTRP220511Z	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	9/13/2022	VTRP220914Y2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	9/13/2022	VTRP220914Z2	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 DU	0.1 U	0.1 U	0.25 U	0.5 U	0.1 U	0.1 U	0.25 U
VOA TRIP BLANK	11/9/2022	VTRP221116X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOA TRIP BLANK	11/9/2022	VTRP221116Y	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 DU	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)
SW-W1	2/7/2022	SVW1220207Q	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 JT
SW-W1	5/11/2022	SVW1220511Q	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	0.012 JT
SW-W1	9/14/2022	SVW1220914Q	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	0.0114 DJT
SW-W1	11/16/2022	SVW1221116Q	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	0.015 DJT
SW-W2	2/7/2022	SVW2220207Q	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
SW-W2	5/11/2022	SVW2220511Q	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
SW-W2	9/14/2022	SVW2220914Q	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 DU
SW-W2	11/16/2022	SVW2221116Q	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 DU
SW-W3	2/7/2022	SVW3220207Q	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	0.0642
SW-W3	5/11/2022	SVW3220511Q	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	0.035
SW-W3	9/14/2022	SVW3220914Q	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	0.0391 D
SW-W3	11/16/2022	SVW3221116Q	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	0.0331 D
SW-E	2/7/2022	SVE-220207Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	5/11/2022	SVE-220511Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
SW-E	9/14/2022	SVE-220914Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 DU
SW-E	11/16/2022	SVE-221116Q	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 DU
VOA TRIP BLANK	2/3/2022	VTRP220207X	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
VOA TRIP BLANK	2/3/2022	VTRP220207X2	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
VOA TRIP BLANK	5/10/2022	VTRP220511Y2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U
VOA TRIP BLANK	5/10/2022	VTRP220511Z	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
VOA TRIP BLANK	9/13/2022	VTRP220914Y2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 DU
VOA TRIP BLANK	9/13/2022	VTRP220914Z2	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 DU
VOA TRIP BLANK	11/9/2022	VTRP221116X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 DU
VOA TRIP BLANK	11/9/2022	VTRP221116Y	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 DU

Note:
-- = 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	2/7/2022	SVW1220207Q	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-W1	5/11/2022	SVW1220511Q	0.0255 U	0.0255 U	0.051 U	0.0255 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W1	9/14/2022	SVW1220914Q	0.0266 U	0.0266 U	0.0532 U	0.0266 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W1	11/16/2022	SVW1221116Q	0.0267 U	0.0267 U	0.0534 U	0.0267 U	0.013 U	0.013 U	0.0651 U	1.3 U
SW-W2	2/7/2022	SVW2220207Q	0.0253 U	0.0253 U	0.0505 U	0.0298 J	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	5/11/2022	SVW2220511Q	0.0278 U	0.0278 U	0.0556 U	0.0278 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	9/14/2022	SVW2220914Q	0.0266 U	0.0266 U	0.0532 U	0.0266 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W2	11/16/2022	SVW2221116Q	0.0262 U	0.0262 U	0.0524 U	0.0262 U	0.0128 U	0.0128 U	0.0638 U	1.28 U
SW-W3	2/7/2022	SVW3220207Q	0.0255 U	0.0255 U	0.051 U	0.0255 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	5/11/2022	SVW3220511Q	0.0266 U	0.0266 U	0.0532 U	0.0266 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	9/14/2022	SVW3220914Q	0.026 U	0.026 U	0.0521 U	0.026 U	0.0125 U	0.0125 U	0.0625 U	1.25 U
SW-W3	11/16/2022	SVW3221116Q	0.0267 U	0.0267 U	0.0534 U	0.0267 U	0.0126 U	0.0126 U	0.0631 U	1.26 U

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	3/9/2022	LVT-220309P	0.1 U	7.15	299.7	6.6
LS-LVT	6/23/2022	LVT-220623P	0.1 U	7.36	336.3	16
LS-LVT	9/16/2022	LVT-220916P	0.1 U	7.83	412.7	16.7
LS-LVT	12/15/2022	LVT-221215P	0.1 U	7.29	371.9	6.1
LS-PS1	2/7/2022	LVP-220207D	--	8.16	315.8	6.1
LS-PS1	2/7/2022	LVP-220207Q	--	8.16	315.8	6.1
LS-PS1	5/11/2022	LVP-220511Q	--	6.6	100.1	12.4
LS-PS1	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	--	7.36	269.9	9.8
LS-B	2/7/2022	LVB-220207Q	--	7	2922	11.2
LS-B	5/12/2022	LVB-220512Q	--	6.32	2670	12.6
LS-B	9/15/2022	LVB-220915Q	--	7.61	4074	17.6
LS-B	11/16/2022	LVB-221116Q	--	6.75	3196	13.9

Note:

-- = parameter is not sampled for

* = No sample taken in 3rd quarter 2022 due to safety concerns (no fall protection).

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	3/9/2022	LVT-220309P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	6/23/2022	LVT-220623P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	9/16/2022	LVT-220916P	--	--	--	--	--	--	--	--	--	--	--
LS-LVT	12/15/2022	LVT-221215P	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	2/7/2022	LVP-220207D	89.2	0.002 U	3.31	30.8	23	1	1100	0.002 U	0.0545	0.01 U	0.0005 U
LS-PS1	2/7/2022	LVP-220207Q	89.2	0.0023 T	3.21	31.4	23.4	1	800	0.002 U	0.0565	0.01 U	0.0005 U
LS-PS1	5/11/2022	LVP-220511Q	44.1	0.021	2 U	5 U	2.88	1 U	330	0.002 U	0.2 U	0.0954	0.0093
LS-PS1*	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	71.8	0.186	2 U	23.7	20.9	1 U	41	0.002 U	0.046	0.596	0.0135
LS-B	2/7/2022	LVB-220207Q	514	0.0248	3.24	74.6	413	1 U	9 C	0.0032 T	0.15 T	1.07	0.0005 U
LS-B	5/12/2022	LVB-220512Q	441	0.0183	6.89 EL	70.7	392	1 U	400	0.0023 T	0.17 T	1.58	0.00306
LS-B	9/15/2022	LVB-220915Q	728	0.0108	3.79 EL	111	595	1 U	1	0.0035 T	0.3 T	0.04 T	0.004
LS-B	11/16/2022	LVB-221116Q	504	0.0107	2 U	77.6	469	1 U	5	0.002 U	0.13 T	2.64	0.00321

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	03/09/22	LVT-220309P	--	--	--	--	1.8 U	--	--	--	--	--
LS-LVT	06/23/22	LVT-220623P	--	--	--	--	1.8 T	--	--	--	--	--
LS-LVT	09/16/22	LVT-220916P	--	--	--	--	1.9 U	--	--	--	--	--
LS-LVT	12/15/22	LVT-221215P	--	--	--	--	1.9 T	--	--	--	--	--
LS-PS1	02/07/22	LVP-220207D	0.992 U	343	39.3	0.01 T	1.5 U	1.2	9.63	41.2	38.7	17.6
LS-PS1	02/07/22	LVP-220207Q	0.993 U	343	40	0.01 U	1.5 U	1.2	9.66	38.4	52	16.8
LS-PS1*	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	05/11/22	LVP-220511Q	0.997 U	121	7.09	0.01 U	3 BT	0.352	4.11	1.6 T	15 T	1 T
LS-PS1	11/16/22	LVP-221116Q	0.1 U	290	33.1	0.01 U	10.4	0.862	9.29	1.8 T	68	1.4 T
LS-B	02/07/22	LVB-220207Q	0.995 U	3180	624	0.05 U	1.5 U	1.79	32.4	0.6 T	504	0.7 T
LS-B	05/12/22	LVB-220512Q	0.994 U	2860	619	0.05 U	2.9 BT	1.79	26.9	1.4	376	0.9 T
LS-B	09/15/22	LVB-220915Q	0.1 U	4270	855	0.02 U	2 U	2.06	44.1	1.6	697 E	0.8 T
LS-B	11/16/22	LVB-221116Q	0.1 U	3430	715	0.05 U	5.8 T	1.99	33.5	0.6 T	572	0.5 T

Note:

-- = parameter is not sampled for

* = No sample taken in 3rd quarter 2022 due to safety concerns (no fall protection).

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)	(ug/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	3/9/2022	LVT-220309P	--	--	1.9	--	--	0.000496 U	--	0.00199 U	--	0.00951	--	0.00304
LS-LVT	6/23/2022	LVT-220623P	--	--	4.96	--	--	0.000497 U	--	0.00585	--	0.0287	--	0.00993
LS-LVT	9/16/2022	LVT-220916P	--	--	2.02	--	--	0.0005 U	--	0.002 U	--	0.0116	--	0.00218
LS-LVT	12/15/2022	LVT-221215P	--	--	1.39	--	--	0.000499 U	--	0.00199 U	--	0.00597	--	0.00133
LS-PS1	2/7/2022	LVP-220207D	0.346	0.00298 U	1.38	0.0366	0.000992 U	0.000496 U	36.6	0.00198 U	0.000708	0.0058	1.02	0.00177
LS-PS1	2/7/2022	LVP-220207Q	0.341	0.00298 U	1.36	0.0371	0.000993 U	0.000496 U	36.7	0.00199 U	0.000701	0.00584	1.04	0.00178
LS-PS1	5/11/2022	LVP-220511Q	0.263	0.00299 U	0.498 U	0.0206	0.000997 U	0.000498 U	13.3	0.00201 U	0.000498 U	0.00576	0.325	0.000997 U
LS-PS1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	0.0621	0.000316	1.01	0.0216	0.0001 U	5E-05 U	27	0.000431	0.000256	0.00357	0.221	0.000166
LS-B	2/7/2022	LVB-220207Q	0.0498 U	0.00299 U	2.02	0.109	0.000995 U	0.000804	239	0.00199 U	0.0237	0.00868	0.124	0.000995 U
LS-B	5/12/2022	LVB-220512Q	0.0497 U	0.00298 U	1.51	0.0918	0.000994 U	0.000541	210	0.00205 U	0.0179	0.00578	0.0994 U	0.000994 U
LS-B	9/15/2022	LVB-220915Q	0.005 U	0.0003 U	2.42	0.0912	0.0001 U	0.000317	325 D	0.000905	0.021	0.00438	0.114	0.0001 U
LS-B	11/16/2022	LVB-221116Q	0.005 U	0.0003 U	1.74	0.0892	0.0001 U	0.000279	265 D	0.000593	0.00976	0.00516	0.0529	0.0001 U

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)	(ug/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
LS-LVT	3/9/2022	LVT-220309P	--	--	--	0.00774	--	--	0.000397 U	--	--	--	--	0.0337
LS-LVT	6/23/2022	LVT-220623P	--	--	--	0.0155	--	--	0.000398 U	--	--	--	--	0.128
LS-LVT	9/16/2022	LVT-220916P	--	--	--	0.0099	--	--	0.0004 U	--	--	--	--	0.0434
LS-LVT	12/15/2022	LVT-221215P	--	--	--	0.00744	--	--	0.000399 U	--	--	--	--	0.0215
LS-PS1	2/7/2022	LVP-220207D	10.7	294	0.0001 U	0.00746	3.98	0.00496 U	0.000397 U	16.2	0.000744 U	0.00496 U	0.00155	0.0194
LS-PS1	2/7/2022	LVP-220207Q	10.6	295	0.0001 U	0.00746	4.02	0.00496 U	0.000397 U	16.1	0.000744 U	0.00496 U	0.00136	0.0205
LS-PS1	5/11/2022	LVP-220511Q	2.54	34.3	0.0001 U	0.00306	1.32	0.00498 U	0.000399 U	3.49	0.000747 U	0.00498 U	0.00122	0.0229
LS-PS1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	9.61	49.3	0.0001 U	0.00538	3.45	0.0005 U	4E-05 U	14.4	7.5E-05 U	0.0005 U	0.000545	0.00881
LS-B	2/7/2022	LVB-220207Q	144	9850	0.0001 U	0.201	33.7	0.00498 U	0.000398 U	263	0.000746 U	0.00498 U	0.00108	0.148
LS-B	5/12/2022	LVB-220512Q	122	5670	0.0001 U	0.149	29.4	0.00497 U	0.000398 U	234	0.000745 U	0.00497 U	0.000778	0.123
LS-B	9/15/2022	LVB-220915Q	205 D	6360 D	0.0001 U	0.209	44.7	0.000633	4E-05 U	395 D	7.5E-05 U	0.0005 U	0.000446	0.0692
LS-B	11/16/2022	LVB-221116Q	158 D	3450 D	0.0001 U	0.146	36.7	0.000547	4E-05 U	303 D	7.5E-05 U	0.0005 U	0.000291	0.0799

Note:

-- = parameter is not sampled for

* = No sample taken in 3rd quarter 2022 due to safety concerns (no fall protection).

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	2/7/2022	LVP-220207D	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	2/7/2022	LVP-220207Q	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	5/11/2022	LVP-220511Q	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	5.27	5 U	2.5 U
LS-PS1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	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 DU	0.1 U	2.5 U	2.5 U	5 U	2.5 U
LS-B	2/7/2022	LVB-220207Q	0.25 U	0.1 U	0.1 U	0.1 U	0.162 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	0.1 GU	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	5/12/2022	LVB-220512Q	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	0.107 JT	0.1 U	0.25 U	0.5 U	5 U	0.1 U	2.5 U	8.41	5 U	2.5 U
LS-B	9/15/2022	LVB-220915Q	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	11/16/2022	LVB-221116Q	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 DU	0.1 U	2.5 U	2.5 U	5 U	2.5 U
VOA TRIP BLANK	2/3/2022	VTRP220207Z	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	13	5 U	2.5 U
VOA TRIP BLANK	5/10/2022	VTRP220512Z	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	5.68	5 U	2.5 U
VOA TRIP BLANK	5/10/2022	VTRP220511Y3	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	5.81	5 U	2.5 U
VOA TRIP BLANK	9/13/2022	VTRP220915Z2	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	11/9/2022	VTRP221116Y2	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 DU	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)
LS-PS1	2/7/2022	LVP-220207D	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	2/7/2022	LVP-220207Q	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	5/11/2022	LVP-220511Q	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*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	0.035 DU	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-B	2/7/2022	LVB-220207Q	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-B	5/12/2022	LVB-220512Q	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-B	9/15/2022	LVB-220915Q	0.035 DU	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-B	11/16/2022	LVB-221116Q	0.035 DU	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
VOA TRIP BLANK	2/3/2022	VTRP220207Z	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
VOA TRIP BLANK	5/10/2022	VTRP220512Z	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
VOA TRIP BLANK	5/10/2022	VTRP220511Y3	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
VOA TRIP BLANK	9/13/2022	VTRP220915Z2	0.035 DU	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
VOA TRIP BLANK	11/9/2022	VTRP221116Y2	0.035 DU	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

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	2/7/2022	LVP-220207D	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	2/7/2022	LVP-220207Q	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	5/11/2022	LVP-220511Q	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*	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	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 DU
LS-B	2/7/2022	LVB-220207Q	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	5/12/2022	LVB-220512Q	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	9/15/2022	LVB-220915Q	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 DU
LS-B	11/16/2022	LVB-221116Q	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 DU
VOA TRIP BLANK	2/3/2022	VTRP220207Z	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	5/10/2022	VTRP220512Z	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	5/10/2022	VTRP220511Y3	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	9/13/2022	VTRP220915Z2	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 DU
VOA TRIP BLANK	11/9/2022	VTRP221116Y2	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 DU

Note:
-- = parameter is not sampled for
* = No sample taken in 3rd quarter 2022 due to safety concerns (no fall protection).

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	2/7/2022	LVP-220207D	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	2/7/2022	LVP-220207Q	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	5/11/2022	LVP-220511Q	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*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/2022	LVP-221116Q	0.25 U	0.25 U	0.5 U	0.0109 U	0.0109 U	0.0109 U	0.0109	0.0109 U	0.0109 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.0109 U
LS-B	2/7/2022	LVB-220207Q	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	5/12/2022	LVB-220512Q	0.25 U	0.25 U	0.5 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.02 U
LS-B	9/15/2022	LVB-220915Q	0.25 U	0.25 U	0.5 U	0.03 U	0.01 U	0.04 U	0.01 U	0.01 U	0.03 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	11/16/2022	LVB-221116Q	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	02/07/22	LVP-220207D	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	02/07/22	LVP-220207Q	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	05/11/22	LVP-220511Q	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*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
LS-PS1	11/16/22	LVP-221116Q	0.0109 U	0.0109 U	0.25 U	0.0109 U	0.0109 U	0.0109 U	0.0109	0.0109 U	0.0109 U	0.0109 U	0.0109 U	0.0109 U	0.0543 U	0.026 U	1.09 U	0.0109 U
LS-B	02/07/22	LVB-220207Q	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-B	05/12/22	LVB-220512Q	0.02 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-B	09/15/22	LVB-220915Q	0.01 U	0.01 U	0.25 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.04 U	0.01 U	0.05 U	0.025 U	1 U	0.05 U
LS-B	11/16/22	LVB-221116Q	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	0.04 U

Note:

-- = parameter is not sampled for

* = No sample taken in 3rd quarter 2022 due to safety concerns (no fall protection).

Appendix L

Landfill Gas Monitoring Data

Table L-1

Landfill Gas Monitoring Data

January 1, 2022 - March 31, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-001	1/21/2022	0	0.1	20.8	0	-2.01	GP-1
GP-001	2/7/2022	0	0.5	20.9	0	-0.9	
GP-001	3/8/2022	0	0.4	20.4	0	0.93	
GP-002	1/21/2022	0	1.8	18.7	0	0.04	GP-2
GP-002	2/7/2022	0	2.1	18.4	0	-0.02	
GP-002	3/8/2022	0	2.4	17.9	0	0.05	
GP-01D	1/21/2022	0	0.1	20.8	0	-4.71	NP-1
GP-01D	2/7/2022	0	0.4	18.2	0	-0.59	
GP-01D	3/8/2022	0	0.2	22	0	1.33	
GP-01I	1/21/2022	0	0.1	20.8	0	-3.13	
GP-01I	2/7/2022	0	0.4	18.9	0	-0.06	
GP-01I	3/8/2022	0	0.3	22	0	0.74	
GP-01S	1/21/2022	0	0.3	20.7	0	-0.04	
GP-01S	2/7/2022	0	0.3	21	0	0	
GP-01S	3/8/2022	0	0.8	20.9	0	-0.03	
GP-02D	1/21/2022	0	0.1	20.8	0	-4.34	NP-2
GP-02D	2/7/2022	0	0.5	19.3	0	-0.67	
GP-02D	3/8/2022	0	0.2	21	0	1.44	
GP-02I	1/21/2022	0	0.1	20.8	0	-4.17	
GP-02I	2/7/2022	0	0.4	18.4	0	-0.78	
GP-02I	3/8/2022	0	0.2	21	0	1.35	
GP-02S	1/21/2022	0	0.1	20.8	0	0.09	
GP-02S	2/7/2022	0	0.2	21	0	0.05	
GP-02S	3/8/2022	0	0.3	21	0	0	
GP-03D	1/21/2022	0	1.9	17.9	0	-3.69	NP-3
GP-03D	2/7/2022	0	1.7	18.4	0	-0.97	
GP-03D	3/8/2022	0	1.9	17.7	0	1.8	
GP-03I	1/21/2022	0	1.2	19.8	0	-3.63	
GP-03I	2/7/2022	0	1.6	18.9	0	-0.97	
GP-03I	3/8/2022	0	1.9	18.3	0	1.47	
GP-03S	1/21/2022	0	0.2	20.7	0	0.04	
GP-03S	2/7/2022	0	1.2	19.3	0	-0.23	
GP-03S	3/8/2022	0	1.5	18.7	0	0.06	
GP-04D	1/21/2022	0	0.2	20.7	0	0.04	NP-4
GP-04D	2/7/2022	0	1.2	19.3	0	-0.23	
GP-04D	3/8/2022	0	1.5	18.7	0	0.06	
GP-04I	1/21/2022	0	0.3	20	0	-2.27	
GP-04I	2/7/2022	0	1	20.2	0	-0.99	
GP-04I	3/8/2022	0	0.9	19.9	0	1.19	
GP-04S	1/21/2022	0	2.9	18.5	0	0.84	
GP-04S	2/7/2022	0	2.3	18.4	0	-1.03	
GP-04S	3/8/2022	0	3.4	15.6	0	7.8	

Table L-1

Landfill Gas Monitoring Data

January 1, 2022 - March 31, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-05D	1/21/2022	0	0.2	20.2	0	-0.66	NP-5
GP-05D	2/7/2022	0	0.5	20.9	0	-1.3	
GP-05D	3/8/2022	0	1.6	18.9	0	0.47	
GP-05I	1/21/2022	0	1.7	19.2	0	-0.38	
GP-05I	2/7/2022	0	2.5	18.7	0	-0.77	
GP-05I	3/8/2022	0	2.8	18.3	0	0.25	
GP-05S	1/21/2022	0	0.2	19.2	0	-0.12	
GP-05S	2/7/2022	0	0.2	21	0	-0.38	
GP-05S	3/8/2022	0	4.5	15.2	0	0.13	
GP-06D	1/21/2022	0	0.2	20.5	0	-1.43	NP-6
GP-06D	2/7/2022	0	0.5	20.5	0	-0.91	
GP-06D	3/8/2022	0	0.7	20.1	0	0.94	
GP-06I	1/21/2022	0	0.1	20.1	0	-0.49	
GP-06I	2/7/2022	0	0.4	20.7	0	-0.23	
GP-06I	3/8/2022	0	0.5	20.4	0	0.38	
GP-06S	1/21/2022	0	2.1	18.8	0	0.05	
GP-06S	2/7/2022	0	3.5	16	0	-0.08	
GP-06S	3/8/2022	0	3.7	15.6	0	0.11	
GP-07D	1/21/2022	0	1.5	19	0	0.17	NP-7
GP-07D	2/7/2022	0	0.7	19.3	0	-0.23	
GP-07D	3/8/2022	0	3	12.3	0	0.81	
GP-07I	1/21/2022	0	0.1	20.7	0	-2.25	
GP-07I	2/7/2022	0	0.2	20.9	0	-0.63	
GP-07I	3/8/2022	0	0.3	20.7	0	0.88	
GP-07S	1/21/2022	0	0.2	20.5	0	-2.81	
GP-07S	2/7/2022	0	0.1	21	0	-0.79	
GP-07S	3/8/2022	0	1	18.3	0	1.3	
GP-08D	1/21/2022	0	0.7	15.5	0	-4.49	NP-8
GP-08D	2/7/2022	0	0.8	15.8	0	-0.56	
GP-08D	3/8/2022	0	0.3	20.6	0	1.42	
GP-08I	1/21/2022	0	0.2	15.5	0	-4.3	
GP-08I	2/7/2022	0	0.3	20.9	0	-0.66	
GP-08I	3/8/2022	0	0.4	20.4	0	1.36	
GP-08S	1/21/2022	0	4	1.5	0	-5.38	
GP-08S	2/7/2022	0	4.4	6.2	0	-0.01	
GP-08S	3/8/2022	0	5.1	1.4	0	0	

Table L-2

Landfill Gas Monitoring Data

April 1, 2022 - June 30, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-001	4/8/2022	0	0.5	20.3	0	-0.17	GP-1
GP-001	5/17/2022	0	0.2	20.8	0	-0.82	
GP-001	6/7/2022	0	0.1	20.1	0	1.09	
GP-002	4/8/2022	0	0.3	20.6	0	0	GP-2
GP-002	5/17/2022	0	2.1	17.3	0	0.42	
GP-002	6/7/2022	0	1.7	17.5	0	0.6	
GP-01D	4/8/2022	0	0.1	20.9	0	-0.44	NP-1
GP-01D	5/17/2022	0	0.2	21	0	-2.09	
GP-01D	6/7/2022	0	0.4	17	0	0.46	
GP-01I	4/8/2022	0	0.1	20.7	0	-0.02	
GP-01I	5/17/2022	0	0.2	21	0	-1.16	
GP-01I	6/7/2022	0	0.1	20.6	0	0.06	
GP-01S	4/8/2022	0	0.2	20.7	0	0.16	
GP-01S	5/17/2022	0	0.2	21	0	-0.12	
GP-01S	6/7/2022	0	0.5	19.5	0	0.37	
GP-02D	4/8/2022	0	0.1	21	0	-0.47	NP-2
GP-02D	5/17/2022	0	0.2	21	0	-1.68	
GP-02D	6/7/2022	0	0.1	20.2	0	1	
GP-02I	4/8/2022	0	0.1	20.9	0	-0.46	
GP-02I	5/17/2022	0	0.2	21	0	-1.88	
GP-02I	6/7/2022	0	0.1	20.5	0	0.51	
GP-02S	4/8/2022	0	0.1	20.9	0	0.1	
GP-02S	5/17/2022	0	0.2	21	0	-0.02	
GP-02S	6/7/2022	0	0.2	20.1	0	0.01	
GP-03D	4/8/2022	0	1.5	18.7	0	-0.44	NP-3
GP-03D	5/17/2022	0	1.6	18	0	-1.36	
GP-03D	6/7/2022	0	1.2	17.7	0	1.09	
GP-03I	4/8/2022	0	1.6	18.8	0	-0.47	
GP-03I	5/17/2022	0	2	18.2	0	-1.59	
GP-03I	6/7/2022	0	1.6	18	0	1.12	
GP-03S	4/8/2022	0	1	19.6	0	-0.03	
GP-03S	5/17/2022	0	1.2	18.8	0	-0.05	
GP-03S	6/7/2022	0	0.6	19.2	0	0.09	
GP-04D	4/8/2022	0	0.3	20.5	0	-0.33	NP-4
GP-04D	5/17/2022	0	0.6	20	0	-1.62	
GP-04D	6/7/2022	0	0.7	18.6	0	1.33	
GP-04I	4/8/2022	0	0.4	20.5	0	-0.25	
GP-04I	5/17/2022	0	0.8	20	0	-0.93	
GP-04I	6/7/2022	0	0.5	19.4	0	0.92	
GP-04S	4/8/2022	0	2.1	17.9	0	-0.03	
GP-04S	5/17/2022	0	2.9	17.5	0	-1	
GP-04S	6/7/2022	0	1.9	17.6	0	0.83	

Table L-2

Landfill Gas Monitoring Data

April 1, 2022 - June 30, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-05D	4/8/2022	0	1.9	18.2	0	-0.25	NP-5
GP-05D	5/17/2022	0	0.9	19.5	0	-0.35	
GP-05D	6/7/2022	0	1.5	18.4	0	0.93	
GP-05I	4/8/2022	0	2.3	18.6	0	0.48	
GP-05I	5/17/2022	0	2.7	18	0	-0.07	
GP-05I	6/7/2022	0	2.3	18	0	0.75	
GP-05S	4/8/2022	0	0.1	20.6	0	0.01	
GP-05S	5/17/2022	0	0.3	20.2	0	-0.09	
GP-05S	6/7/2022	0	3.6	14.7	0	0.29	
GP-06D	4/8/2022	0	0.4	20.3	0	-0.22	NP-6
GP-06D	5/17/2022	0	0.6	19.7	0	-0.86	
GP-06D	6/7/2022	0	0.4	19.6	0	1.3	
GP-06I	4/8/2022	0	0.2	20.5	0	-0.02	
GP-06I	5/17/2022	0	0.3	20	0	-0.16	
GP-06I	6/7/2022	0	0.3	19.9	0	0.73	
GP-06S	4/8/2022	0	3.3	15.3	0	-0.04	
GP-06S	5/17/2022	0	3.9	13.8	0	0	
GP-06S	6/7/2022	0	3.3	14.4	0	0.2	
GP-07D	4/8/2022	0	1.2	16.3	0	0.03	NP-7
GP-07D	5/17/2022	0	1.8	13.5	0	-0.02	
GP-07D	6/7/2022	0	1.5	13.7	0	0.35	
GP-07I	4/8/2022	0	0.1	20.7	0	-0.25	
GP-07I	5/17/2022	0	0.2	20.5	0	-1.16	
GP-07I	6/7/2022	0	0.1	20.3	0	0.88	
GP-07S	4/8/2022	0	0.1	20.7	0	-0.28	
GP-07S	5/17/2022	0	0.2	20.4	0	-1.5	
GP-07S	6/7/2022	0	0.1	20.2	0	1	
GP-08D	4/8/2022	0	0.1	20.1	0	-0.54	NP-8
GP-08D	5/17/2022	0	0.2	21	0	-2.02	
GP-08D	6/7/2022	0	0.1	20.6	0	0.47	
GP-08I	4/8/2022	0	0.1	19.9	0	-0.27	
GP-08I	5/17/2022	0	0.4	20.9	0	-1.72	
GP-08I	6/7/2022	0	0.9	18.2	0	0.2	
GP-08S	4/8/2022	0	5.9	3.5	0	-0.54	
GP-08S	5/17/2022	0	6.5	0.4	0	-0.8	
GP-08S	6/7/2022	0	6	0.6	0	0.06	

Table L-3

Landfill Gas Monitoring Data

July 1, 2022 - September 30, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-001	7/12/2022	0	1.8	18.8	0.0	0.76	GP-1
GP-001	8/2/2022	0	0.0	20.7	0.0	-0.62	
GP-001	9/2/2022	0	0.4	20.3	0.0	0.07	
GP-002	7/12/2022	0	1.6	17.9	0.0	0.03	GP-2
GP-002	8/2/2022	0	1.6	18.3	0.0	0.12	
GP-002	9/2/2022	0	1.4	18.0	0.0	0.02	
GP-01D	7/12/2022	0	0.0	20.4	0.0	2.11	NP-1
GP-01D	8/2/2022	0	0.0	20.7	0.0	-1.61	
GP-01D	9/2/2022	0	0.1	20.3	0.0	0.96	
GP-01I	7/12/2022	0	0.3	17.7	0.0	1.15	
GP-01I	8/2/2022	0	0.0	20.6	0.0	-0.93	
GP-01I	9/2/2022	0	0.1	20.2	0.0	0.56	
GP-01S	7/12/2022	0	0.8	18.1	0.0	0.19	
GP-01S	8/2/2022	0	0.2	20.0	0.0	-0.32	
GP-01S	9/2/2022	0	0.7	18.6	0.0	0.00	
GP-02D	7/12/2022	0	0.4	17.9	0.0	1.68	NP-2
GP-02D	8/2/2022	0	0.0	20.7	0.0	-1.51	
GP-02D	9/2/2022	0	0.1	20.5	0.0	0.84	
GP-02I	7/12/2022	0	0.3	17.0	0.0	1.48	
GP-02I	8/2/2022	0	0.0	20.7	0.0	-1.45	
GP-02I	9/2/2022	0	0.2	19.7	0.0	0.82	
GP-02S	7/12/2022	0	0.1	20.2	0.0	0.03	
GP-02S	8/2/2022	0	0.1	20.5	0.0	0.06	
GP-02S	9/2/2022	0	0.4	20.0	0.0	-0.01	
GP-03D	7/12/2022	0	1.5	17.5	0.0	1.40	NP-3
GP-03D	8/2/2022	0	1.5	17.8	0.0	-1.24	
GP-03D	9/2/2022	0	1.5	18.1	0.0	0.71	
GP-03I	7/12/2022	0	1.7	17.8	0.0	1.40	
GP-03I	8/2/2022	0	2.0	17.8	0.0	-1.27	
GP-03I	9/2/2022	0	1.7	18.2	0.0	0.69	
GP-03S	7/12/2022	0	1.1	18.1	0.0	0.06	
GP-03S	8/2/2022	0	1.3	18.2	0.0	0.03	
GP-03S	9/2/2022	0	1.0	19.1	0.0	0.01	
GP-04D	7/12/2022	0	0.5	20.0	0.0	1.62	NP-4
GP-04D	8/2/2022	0	0.7	18.9	0.0	-1.23	
GP-04D	9/2/2022	0	0.6	19.7	0.0	0.72	
GP-04I	7/12/2022	0	0.8	19.8	0.0	1.03	
GP-04I	8/2/2022	0	1.0	19.2	0.0	-0.73	
GP-04I	9/2/2022	0	0.8	19.7	0.0	0.40	
GP-04S	7/12/2022	0	2.2	17.3	0.0	0.32	
GP-04S	8/2/2022	0	2.3	17.5	0.0	0.02	
GP-04S	9/2/2022	0	2.0	18.6	0.0	0.02	

Table L-3

Landfill Gas Monitoring Data

July 1, 2022 - September 30, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (% LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-05D	7/12/2022	0	1.8	18.9	0.0	0.37	NP-5
GP-05D	8/2/2022	0	2.0	18.3	0.0	-0.14	
GP-05D	9/2/2022	0	2.0	17.7	0.0	0.02	
GP-05I	7/12/2022	0	2.3	19.0	0.0	0.24	
GP-05I	8/2/2022	0	2.4	18.6	0.0	-0.06	
GP-05I	9/2/2022	0	2.1	18.2	0.0	0.01	
GP-05S	7/12/2022	0	3.4	15.9	0.0	0.07	
GP-05S	8/2/2022	0	0.2	20.8	0.0	0.04	
GP-05S	9/2/2022	0	2.2	17.5	0.0	0.03	
GP-06D	7/12/2022	0	0.5	19.9	0.0	0.75	NP-6
GP-06D	8/2/2022	0	0.5	20.0	0.0	-0.31	
GP-06D	9/2/2022	0	0.5	19.9	0.0	0.50	
GP-06I	7/12/2022	0	0.6	18.6	0.0	0.26	
GP-06I	8/2/2022	0	0.2	20.5	0.0	-0.04	
GP-06I	9/2/2022	0	0.5	19.4	0.0	-0.05	
GP-06S	7/12/2022	0	3.6	14.3	0.0	0.01	
GP-06S	8/2/2022	0	3.8	15.0	0.0	-0.05	
GP-06S	9/2/2022	0	3.2	16.7	0.0	0.02	
GP-07D	7/12/2022	0	1.6	13.8	0.0	0.00	NP-7
GP-07D	8/2/2022	0	1.7	12.0	0.0	0.04	
GP-07D	9/2/2022	0	1.5	13.8	0.0	-0.06	
GP-07I	7/12/2022	0	0.1	20.8	0.0	1.01	
GP-07I	8/2/2022	0	0.1	20.6	0.0	-0.47	
GP-07I	9/2/2022	0	0.3	19.9	0.0	0.49	
GP-07S	7/12/2022	0	0.6	18.4	0.0	1.46	
GP-07S	8/2/2022	0	0.0	21.0	0.0	-0.67	
GP-07S	9/2/2022	0	0.6	17.8	0.0	0.71	
GP-08D	7/12/2022	0	0.5	15.0	0.0	1.99	NP-8
GP-08D	8/2/2022	0	0.0	20.6	0.0	-1.49	
GP-08D	9/2/2022	0	0.5	14.2	0.0	1.00	
GP-08I	7/12/2022	0	2.8	15.4	0.0	1.88	
GP-08I	8/2/2022	0	0.1	20.6	0.0	-1.43	
GP-08I	9/2/2022	0	2.6	15.4	0.0	0.80	
GP-08S	7/12/2022	0	6.3	0.9	0.0	0.10	
GP-08S	8/2/2022	0	0.1	20.5	0.0	-0.04	
GP-08S	9/2/2022	0	7.0	2.2	0.0	0.02	

Table L-4

Landfill Gas Monitoring Data

October 1, 2022 - December 31, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (%LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-001	10/3/2022	0	0.2	19.6	0.0	-0.39	GP-1
GP-001	11/1/2022	0	2.6	18.3	0.0	0.76	
GP-001	12/15/2022	0	0.1	20.6	0.0	-0.01	
GP-002	10/3/2022	0	1.6	17.3	0.0	0.02	GP-2
GP-002	11/1/2022	0	1.8	18.4	0.0	0.33	
GP-002	12/15/2022	0	2.0	17.8	0.0	0.04	
GP-01D	10/3/2022	0	0.1	19.7	0.0	-1.05	NP-1
GP-01D	11/1/2022	0	0.5	17.0	0.0	2.19	
GP-01D	12/15/2022	0	0.1	20.4	0.0	-2.72	
GP-01I	10/3/2022	0	0.1	19.6	0.0	-0.82	
GP-01I	11/1/2022	0	0.4	17.9	0.0	2.03	
GP-01I	12/15/2022	0	0.1	20.2	0.0	-2.68	
GP-01S	10/3/2022	0	0.9	17.3	0.0	-0.01	
GP-01S	11/1/2022	0	1.4	17.4	0.0	0.11	
GP-01S	12/15/2022	0	1.7	17.0	0.0	0.92	
GP-02D	10/3/2022	0	0.1	19.9	0.0	-1.04	NP-2
GP-02D	11/1/2022	0	0.5	18.4	0.0	2.04	
GP-02D	12/15/2022	0	0.1	20.3	0.0	-2.05	
GP-02I	10/3/2022	0	0.1	19.8	0.0	-0.92	
GP-02I	11/1/2022	0	0.4	17.6	0.0	1.80	
GP-02I	12/15/2022	0	0.1	20.1	0.0	-1.95	
GP-02S	10/3/2022	0	0.8	18.9	0.0	-0.01	
GP-02S	11/1/2022	0	0.9	19.9	0.0	-0.01	
GP-02S	12/15/2022	0	1.7	18.4	0.0	0.43	
GP-03D	10/3/2022	0	1.6	17.4	0.0	-0.57	NP-3
GP-03D	11/1/2022	0	1.5	18.6	0.0	1.43	
GP-03D	12/15/2022	0	1.1	18.6	0.0	-1.27	
GP-03I	10/3/2022	0	1.9	17.4	0.0	-0.91	
GP-03I	11/1/2022	0	2.1	18.3	0.0	1.41	
GP-03I	12/15/2022	0	1.5	18.5	0.0	-1.18	
GP-03S	10/3/2022	0	1.1	18.4	0.0	-0.01	
GP-03S	11/1/2022	0	1.3	19.1	0.0	0.03	
GP-03S	12/15/2022	0	1.2	18.5	0.0	0.23	
GP-04D	10/3/2022	0	0.8	18.0	0.0	-0.99	NP-4
GP-04D	11/1/2022	0	1.0	19.3	0.0	1.21	
GP-04D	12/15/2022	0	1.0	18.7	0.0	-0.94	
GP-04I	10/3/2022	0	0.8	18.8	0.0	-0.48	
GP-04I	11/1/2022	0	1.1	20.1	0.0	0.71	
GP-04I	12/15/2022	0	0.1	20.4	0.0	-0.45	
GP-04S	10/3/2022	0	2.2	18.1	0.0	-0.27	
GP-04S	11/1/2022	0	2.4	19.4	0.0	0.29	
GP-04S	12/15/2022	0	0.8	19.8	0.0	-0.11	

Table L-4

Landfill Gas Monitoring Data

October 1, 2022 - December 31, 2022

Sample ID	Date/Time	CH4 (% Vol)	CO2 (% Vol)	O2 (% Vol)	CH4 (%LEL)	Static Pressure (in H2O)	Map Location (see Fig. 7)
GP-05D	10/3/2022	0	2.1	17.5	0.0	-0.06	NP-5
GP-05D	11/1/2022	0	2.3	18.6	0.0	0.22	
GP-05D	12/15/2022	0	2.8	17.3	0.0	0.11	
GP-05I	10/3/2022	0	2.4	17.7	0.0	-0.01	
GP-05I	11/1/2022	0	2.9	18.3	0.0	0.17	
GP-05I	12/15/2022	0	2.2	18.5	0.0	0.11	
GP-05S	10/3/2022	0	0.4	19.7	0.0	0.00	
GP-05S	11/1/2022	0	4.2	16.5	0.0	0.05	
GP-05S	12/15/2022	0	0.3	20.3	0.0	0.07	
GP-06D	10/3/2022	0	0.5	19.0	0.0	-0.20	NP-6
GP-06D	11/1/2022	0	0.6	20.2	0.0	0.78	
GP-06D	12/15/2022	0	0.3	20.2	0.0	-0.08	
GP-06I	10/3/2022	0	0.3	19.0	0.0	0.15	
GP-06I	11/1/2022	0	5.1	12.7	0.0	0.27	
GP-06I	12/15/2022	0	0.2	20.3	0.0	0.13	
GP-06S	10/3/2022	0	4.3	15.8	0.0	-0.01	
GP-06S	11/1/2022	0	4.2	17.6	0.0	-0.02	
GP-06S	12/15/2022	0	3.0	17.3	0.0	0.13	
GP-07D	10/3/2022	0	2.0	13.2	0.0	-0.05	NP-7
GP-07D	11/1/2022	0	2.9	13.3	0.0	0.04	
GP-07D	12/15/2022	0	2.0	15.7	0.0	0.30	
GP-07I	10/3/2022	0	0.1	19.5	0.0	-0.30	
GP-07I	11/1/2022	0	0.8	19.2	0.0	1.18	
GP-07I	12/15/2022	0	0.1	20.6	0.0	-0.81	
GP-07S	10/3/2022	0	0.0	19.7	0.0	-0.37	
GP-07S	11/1/2022	0	0.1	21.0	0.0	1.56	
GP-07S	12/15/2022	0	0.1	20.6	0.0	-1.01	
GP-08D	10/3/2022	0	0.1	19.8	0.0	-0.96	NP-8
GP-08D	11/1/2022	0	0.6	15.0	0.0	2.16	
GP-08D	12/15/2022	0	0.1	20.7	0.0	-2.45	
GP-08I	10/3/2022	0	0.1	19.8	0.0	-0.96	
GP-08I	11/1/2022	0	3.2	15.3	0.0	2.03	
GP-08I	12/15/2022	0	3.4	14.6	0.0	-2.28	
GP-08S	10/3/2022	0	0.1	19.8	0.0	-0.12	
GP-08S	11/1/2022	0	8.7	1.4	0.0	0.35	
GP-08S	12/15/2022	0	8.2	1.8	0.0	1.15	

Appendix M

Financial Summary

King County Solid Waste Division
Vashon Island Closed Landfill
2022 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

Post Closure Maintenance Fund	**Annual Budget**
SALARIES & WAGES	$212,209
SUPPLIES	$2,000
SERVICES	$114,964
LABORATORY SERVICES	$135,000
EQUIPMENT	$18,830
INTRAGOVERNMENTAL SERVICES	$29,580
Post Closure Maintenance Fund Total	**$512,583**
Capital Improvement Project	**Approved Budget**
Solid Waste Vashon Feasibilty Study (now to 2028)	**$8,240,503**