Spring 2019
Semi-Annual Water Quality Report
Gude Landfill
Montgomery County, Maryland

Prepared for

Department of Environmental Protection
Division of Solid Waste Services
Montgomery County, Maryland 20850

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Microgram(s) per liter
COMAR	Code of Maryland Regulations
DEP	Department of Environmental Protection
DSWS	Division of Solid Waste Services
EA	EA Engineering, Science, and Technology, Inc., PBC
EPA	U.S. Environmental Protection Agency
GW&SWMP	Groundwater and Surface Water Monitoring Plan
M-NCPPC	Maryland-National Capital Park and Planning Commission
MCL	Maximum contaminant level
MDE	Maryland Department of the Environment
mg/L	Milligram(s) per liter
PCE	Tetrachloroethene
RPD	Relative percent difference
TCE	Trichloroethene
VC	Vinyl chloride
VOC	Volatile organic compound

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1. INTRODUCTION

1.1 INTRODUCTION

The Montgomery County (the County) Department of Environmental Protection (DEP) completed the semi-annual ground and surface water sampling for Gude Landfill (the Landfill) located in Rockville, Maryland, for the Spring 2019 sampling event. This report summarizes, interprets, and statistically analyzes the analytical results for the semi-annual sampling event performed in April 2019.

In accordance with the approved Groundwater and Surface Water Monitoring Plan (GW&SWMP) (Montgomery County DEP 2009), EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared the semi-annual report on water quality at the Landfill. The analytical results, historical data tables, required statistical analysis, groundwater elevations, and groundwater contour map with the most recent topography of the site are included in the report. The County is currently in the process of finalizing an updated GW&SWMP that addresses the transition to low-flow sampling methods and other changes made to the program.

1.2 BACKGROUND

1.2.1 Site Description

The Landfill is located at 600 East Gude Drive, Rockville, Maryland 20850. The site has road access at two locations: East Gude Drive and Southlawn Lane. A site location map is provided as Figure 1.

The Landfill is currently owned and maintained by the County DEP Division of Solid Waste Services (DSWS). The Landfill was used for the disposal of municipal solid waste and incinerator residues from 1964 to 1982. The Landfill property encompasses approximately 162 acres, of which approximately 140 acres was used for waste disposal. An additional 17 acres of waste disposal area was delineated in 2009 on Maryland-National Capital Park and Planning Commission (M-NCPPC) property, beyond the northeastern property boundary of the Landfill. A land exchange between the County and M-NCPPC on October 21, 2014, transferred ownership of this additional waste disposal area to the County in exchange for a similar area of land without waste, which was transferred to M-NCPPC.

1.2.2 Site History

The Landfill was initially permitted by the County in 1963. The Landfill was subsequently operated and closed under several facility names and refuse disposal permits from 1964 to 1982. The facility name of the Gude-Southlawn Landfill was modified by reference to the Gude Landfill. There is no current refuse disposal permit that is applicable to the Landfill.

The Landfill was constructed and operated prior to modern solid waste management disposal and facility design and closure standards that were implemented by the U.S. Environmental

Protection Agency (EPA) under the Resource Conservation and Recovery Act. Therefore, the Landfill was not originally constructed with a geosynthetic liner or compacted clay bottom liner, a leachate collection system, a landfill gas collection system, or a stormwater management system. Reportedly, soil was used as daily cover during waste filling, and a 2-foot (minimum) final layer of soil was reportedly placed over the waste mass during closure of the landfill (in 1982) to support the vegetative cover.

Since 1982, the County has voluntarily, or through regulatory mandates, implemented and maintained best management practices for pre-regulatory era landfills to ensure compliance with Code of Maryland Regulations (COMAR) requirements. These best management practices include soil and vegetative cover system installation, cover system maintenance, water quality and landfill gas monitoring, and stormwater infrastructure improvements. The County currently maintains an active landfill gas collection system including flares, over 100 gas extraction wells, and horizontal gas conveyance piping. A network of onsite and offsite groundwater monitoring wells; a network of onsite landfill gas monitoring wells; environmental monitoring programs for groundwater, surface water, and landfill gas; and stormwater management infrastructure are also maintained at and for the Landfill site.

Since 1984, to monitor the quality of ground and surface water, Montgomery County DEP has been collecting groundwater samples at a total of 25 monitoring sites, which include 20 observation wells and 5 stream locations. Beginning in Fall 2010, as part of a Nature and Extent Study, 16 additional monitoring wells were installed at the site. The purpose of the Nature and Extent Study, directed by the Maryland Department of the Environment (MDE) and managed by the County, was to assess and investigate the nature and extent of environmental impacts near and potentially resulting from the Landfill.

The Gude Landfill Assessment of Corrective Measures, dated April 2016 (EA 2016), included a Work Plan for the Recommended Corrective Measure Alternative – toupee capping and additional landfill gas collection. As part of the Work Plan, a total of 9 groundwater monitoring well shallow and deep pairs (18 total groundwater monitoring wells) was proposed. In 2017, 12 of these wells were installed (MW-16A/B, MW-19A/B, MW-21A/B, MW-22A/B, MW-23A/B, MW-24A/B), per the updated GW&SWMP. MW-17A/B and MW-18A/B (along the west/northwestern property boundary) are in an area that will be impacted by the capping project; therefore, DSWS plans to install these well pairs during construction of the cap. Monitoring well pair MW-20A/B will not be installed due to the site conditions as acknowledged by MDE in correspondence dated 12 October 2016 (Hynson 2016). Sampling and analysis are conducted semi-annually and include laboratory analysis for volatile organic compounds (VOCs), heavy metals, field parameters (temperature, pH, and conductivity), and other water quality parameters.

In July 2018, it was confirmed that the caps and lids for flush-mounted wells MW-23A and MW-23B were switched. It is our understanding that this has been the case since installation. EA field staff verified the issue and corrected the situation when onsite prior to the Fall 2018 sampling event. The wells are now correctly labeled and all data have been updated to reflect the correct designation.

Starting with the Spring 2019 sampling event, the County has contracted EA to perform the semi-annual sampling and analysis. The County is currently in the process of preparing the design for the Recommended Corrective Measure Alternative – toupee capping and additional landfill gas collection.

1.2.3 Hydrogeologic Setting

The uplands section of the Piedmont is underlain by three principal types of bedrock aquifers: crystalline-rock and undifferentiated sedimentary-rock aquifers, aquifers in early Mesozoic basins, and carbonate-rock aquifers (Trapp and Horn 1997). The landfill is underlain by the crystalline rock aquifer that extends over approximately 86 percent of the Piedmont Plateau Physiographic Province. At the Landfill, the crystalline rock that comprises the regional aquifer is overlain by unconsolidated material consisting of interbedded silts and clays and saprolite. Recorded logs from onsite and offsite borings for the groundwater monitoring wells correlated well with these general geological descriptions.

Based on information from site boring logs and well gauging, groundwater is present in the unconsolidated material, as well as the bedrock at the Landfill site. The groundwater table is typically present in the unconsolidated material along the perimeter of the Landfill and under the Derwood Station development, at depths ranging from approximately 3 to 60 feet below ground surface. Groundwater recharge at the Landfill is variable and is primarily determined by precipitation and runoff. Topographic relief, unconsolidated material, and surface recharge variations created by the Landfill may significantly affect the groundwater flow.

Groundwater flow is highly dependent on the composition and grain size of the sediments and, therefore, water likely moves more readily in the unconsolidated material than in the underlying bedrock. Groundwater in the bedrock (typically 20-60 feet below grade) is stored in, and moves through, fractures. No documentation of the degree of fracturing or orientation of bedrock fractures at the Landfill is available.

Based on site topography, some amount of surface water infiltration likely occurs through the natural cover system (grassy surface and soil layer) of the Landfill. Some of the infiltrating water likely moves vertically into the bedrock, while a portion also moves laterally along the boundary between the unconsolidated material and the surface of the bedrock and discharges to nearby streams and surface depressions.

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2. SAMPLING PROCEDURES

On behalf of DSWS, EA performed the semi-annual ground and surface water sampling for the Landfill. Upon arrival at each well, the condition of the well and surrounding area was noted. This process checks for evidence of tampering, evidence of physical damage, well integrity, evidence of breakage or heaving of the concrete pad (if present), and evidence of surface infiltration. After the physical inspection was completed, the static water levels were determined for all wells prior to initiation of any purging and sampling activities using an electronic water level indicator.

Prior to sample acquisition, wells were purged to ensure that the sample collection was as representative as possible of that in the aquifer. Low-flow purging and sampling methods (less than 0.5 liters per minute) were performed and achieved for the Spring 2019 sampling event at all monitoring well locations.

Temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity were measured in the field during groundwater purging, unless noted otherwise. These determinations were made using a YSI meter. All instrumentation was calibrated prior to transport to the field and recalibrated during the event daily.

During purging of the well, water quality parameters as well as purge rate and depth to water were monitored and recorded every 5 minutes. Purging of the standing water was considered complete when three consecutive readings of the water quality indicator parameters agreed within approximately 10 percent. The water quality parameters of temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential reached stabilization prior to sampling. Due to the characteristics of some of the wells, stabilization and the low turbidity goal of turbidity levels below 10 nephelometric turbidity units were not achieved prior to sampling.

After sampling parameters had stabilized to within 10 percent of each other, sample containers were filled by allowing the pump discharge to flow gently down the inside of the containers with as little agitation or aeration as possible. The first sample aliquot was used to fill the volatile organics parameter vials and was collected in a manner that minimized aeration and kept the glass containers free of bubbles and headspace. Containers that contained preservative were not filled to overflowing and were thoroughly mixed after filling by upending. Each pre-labeled container was placed in a cooler containing ice and a sample entry was made on the chain-of-custody form.

In addition, surface water samples were collected from five locations near the perimeter of the Landfill (ST015, ST065, ST70, ST80, and ST120). Surface water was collected using a clean, non-preservative bottle, which was rinsed several times with the surface water from the sampling location and then transferred into the proper sample container. Water quality parameters (temperature, pH, specific conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) were measured in the field and recorded.

Information regarding low-flow well purging was recorded on field data sheets, which are presented in Appendix A. The chain-of-custody documents are provided in Appendix B. Groundwater elevations are presented in Table 1. Results of field-measured parameters, along with laboratory results, are shown in Table 2.

3. SUMMARY OF GROUNDWATER AND SURFACE WATER RESULTS

During the Spring 2019 semi-annual sampling event (April 8–12 and 15–19, 2019), EA sampled 51 groundwater monitoring wells and 5 surface water locations at the Gude landfill. This sampling event completes the first of two semi-annual monitoring events at the Gude Landfill for the 2019 calendar year monitoring period in accordance with the March 2009 GW&SWMP.

During the Spring 2019 sampling event, groundwater monitoring well samples were analyzed by Maryland Spectral Services Laboratory located in Baltimore, Maryland. The laboratory utilized the following methods for analyses:

- Inorganics (total metals) (EPA 3010A/6020A)
- Mercury (EPA 3010A/6020A)
- Ammonia (EPA 350.1)
- Chloride (EPA 300.0)
- Nitrate (EPA 300.0)
- VOCs (EPA 8260B)
- Chemical oxygen demand (EPA 410.4)
- Sulfate (EPA 300.0)
- Alkalinity (SM 2320B)
- Total hardness (SM 2340B/C)
- Total dissolved solids (SM 2540C)
- Total suspended solids (USGS I-3765-85).

The laboratory reports are provided in Appendix C.

The monitoring program is designed to evaluate how the Landfill is affecting the groundwater quality. This section discusses groundwater quality for VOCs, total metals, and physical and general parameters. The analytical methods and parameters utilized during this event are in compliance with 40 Code of Federal Regulations, Part 258, Criteria for Municipal Solid Waste Landfills, and the GW&SWMP. Samples are analyzed semi-annually. All analytical results below practical quantitation limits that were reported are identified with a “J” qualifier; non-detect analytical results are identified with a “U” qualifier.

3.1 GROUNDWATER FLOW

Based on the data collected from new and existing groundwater monitoring wells, the groundwater flow direction was inferred. The data indicated that groundwater flows in an easterly flow direction across the Landfill site, with minor northerly, northeasterly, and southeasterly flow components. Surface water elevations measured in 2011, as part of the Nature and Extent Study, from temporary stream gauges were consistent with groundwater table elevations from adjacent groundwater monitoring wells and locations, indicating a hydraulic connection between groundwater and surface water. In September 2015, temporary piezometers were installed through the waste mass, allowing for additional groundwater table elevation data

to be collected. Groundwater elevation data collected were utilized to prepare a groundwater contour map for the Spring 2019 sampling event. The inferred groundwater flow contours have been overlain on the site topographic map and are presented on Figure 2. Groundwater elevations for Spring 2019 are presented in Table 1.

3.2 ANALYTICAL RESULTS

3.2.1 Quality Control Samples

During the Spring 2019 sampling event, 3 field duplicate samples were collected at monitoring wells MW-13B (duplicate OB30), MW-24B (duplicate OB40), and OB11 (duplicate OB50) and analyzed for general water quality parameters, total metals, and VOCs.

The relative percent differences (RPDs) between sampling locations and corresponding duplicates were evaluated for the Spring 2019 sampling event to obtain an estimate of laboratory method precision. As shown in Table 3, no VOCs were detected with an RPD greater than 20 percent between the duplicates and corresponding samples. However, as shown in Table 4, the RPD for some inorganic parameters was greater than 20 percent, which is indicated by the gray shading. The RPD exceedances with the laboratory are likely related to the sample aliquots.

3.2.2 Volatile Organic Compounds

EA performed semi-annual sampling, which included groundwater and surface water. A complete summary of Spring 2019 analytical results is provided in Table 2.

Thirteen monitoring wells had maximum contaminant level (MCL) exceedances for one or more parameters. Historical MCL exceedance graphs and historical analytical data tables are presented in Appendix D and Appendix E, respectively. Monitoring wells MW-21A and MW-21B had first time MCL exceedances. This was the fourth sampling event for these wells. The MCL exceedances are summarized in Table 5. There were no VOC detections in the surface water monitoring locations (ST015, ST065, ST70, ST80, and ST120) with an exception of acetone being detected in ST015, ST070, ST080, and ST120. Acetone was detected in some of the associated blank samples and is not likely present. The following is a summary of the MCL exceedances based on well locations:

- ***Northwest***—Groundwater along the Northwest portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB03, OB03A, OB04, OB04A, OB105, MW-8, MW-11A, MW-11B, MW-12, MW-13A, MW-13B, MW-16A, and MW-16B) has historically been impacted by VOCs. During this sampling event, MW-13A, MW-13B, OB03, and OB03A had MCL exceedances. Tetrachloroethene (PCE) was detected above the MCL (5 micrograms per liter [µg/L]) in MW-13A (7.1 µg/L) and MW-13B (9.7 µg/L); trichloroethene (TCE) was detected above the MCL (5 µg/L) in MW-13A (11.7 µg/L) and MW-13B (12.3 µg/L); and vinyl chloride (VC) was detected above the MCL (2 µg/L) in all 4 wells: MW-13A (3.8 µg/L), MW-13B (6 µg/L), OB03 (5.8 µg/L), and OB03A (3.1 µg/L). 1,2-Dichloropropane exceeded the MCL (5 µg/L) in

well MW-13B (5.3 µg/L) during the Spring 2019 sampling event. These exceedances are consistent with past events.

- ***West***—Groundwater along the West portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB01, OB02, OB02A, MW-6, MW-7, MW-9, MW-10, MW-14A, MW-14B, MW-15, MW-19A, and MW-19B) has historically been impacted by VOCs at lower concentrations than the Northwest portion of the Landfill. PCE was detected above the MCL (5 µg/L) in only MW-9 (8.4 µg/L) during this sampling event, which is consistent with past events.

- ***Southwest***—Groundwater along the Southwest portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB015, OB12, MW-21A, and MW-21B) has historically been impacted by VOCs at concentrations lower than the Northwest portion of the Landfill, but higher than in the West portion. During this sampling event, wells OB12, MW-21A, and MW-21B had MCL exceedances in this area of the Landfill. 1,2-Dichloropropane was detected above the MCL (5 µg/L) in OB12 (8.1 µg/L); PCE was detected above the MCL (5 µg/L) only in OB12 (13 µg/L); TCE was detected above the MCL (5 µg/L) in OB12 (12.3 µg/L), MW-21A (5.6 µg/L), and MW-21B (11.7 µg/L); and VC was detected above the MCL (2 µg/L) in OB12 (7.1 µg/L) and MW-21B (2.4 µg/L). MW-21A and MW-21B had first time MCL exceedances; all other exceedances are consistent with past events.

- ***South***—Groundwater along the South portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB11, OB11A, OB025, MW-22A, MW-22B, MW-23A, and MW-23B) has historically been impacted by VOCs at concentrations of a magnitude similar to those reported in the Northwest portion of the Landfill. During this sampling event, only wells OB11 and OB11A had MCL exceedances in this area of the Landfill. *Cis*-1,2-dichloroethene was detected above the MCL (70 µg/L) in OB11 (89.5 µg/L); methylene chloride was detected above the MCL (5 µg/L) in OB11 (5.6 µg/L); PCE was detected above the MCL (5 µg/L) in OB11 (10.1 µg/L); TCE was detected above the MCL (5 µg/L) in OB11 (11.3 µg/L); and VC was detected above the MCL (2 µg/L) in OB11 (13.9 µg/L) and OB11A (6.9 µg/L). These exceedances are consistent with past events.

- ***Southeast***—Groundwater along the Southeast portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB08, OB08A, OB10, MW-3A, MW-3B, MW-4, MW-24A, and MW-24B) has historically been impacted by VOCs at relatively low concentrations. During this sampling event, wells MW-24A, MW-24B, and OB10 had MCL exceedances in this area of the Landfill. Benzene was detected above the MCL (5 µg/L) in MW-24B (5.4 µg/L); TCE was detected above the MCL (5 µg/L) in OB10 (5.8 µg/L); and VC was detected above the MCL (2 µg/L) in MW-24A (2.4 µg/L) and OB10 (20.9 µg/L). These exceedances are consistent with past events.

- ***Northeast***—Groundwater along the Northeast portion of the Landfill boundary (in the vicinity of groundwater monitoring wells OB06, OB07, OB07A, OB102, MW-1B, MW-2A, and MW-2B) has historically had limited VOC detections. No MCL exceedances for VOCs were detected during this sampling event.

3.2.3 Inorganics

In Spring 2015, based on recommendations by MDE, the method of collecting samples changed from the three well volume purge method to the low-flow/low stress method. The primary reason for this change in collection was to reduce the sample turbidity level, as turbidity could potentially interfere with the accuracy of metal analyses.

Two groundwater monitoring wells had MCL exceedances in the Southern (OB11) and Southeastern (MW-24B) portions of the Landfill. A summary of the metals MCL exceedances is shown in Table 6. Total cadmium was detected above the MCL (0.005 milligrams per liter [mg/L]) in OB11 (0.0141 mg/L). Total mercury was detected above the MCL (0.002 mg/L) in OB11 (0.004 mg/L). Total arsenic was detected above the MCL (0.01 mg/L) in MW-24B (0.0323 mg/L). All the exceedances are consistent with historical data.

All 5 surface monitoring locations had detections for barium, calcium, copper, iron, magnesium, manganese, nickel, potassium, and sodium, but had no MCL exceedances. Chromium was detected below the MCL in ST70 and ST80; cobalt was detected below the MCL in ST015, ST70, and ST80; and zinc was detected below the MCL in ST015, ST070, ST080, and ST120. All the detections are consistent with the historical data.

3.2.4 General Water Quality Parameters

None of the measured general water quality parameters had MCL exceedances. This is generally consistent with historical data. Nitrate is the only indicator parameter to have had past MCL exceedances, in MW-8. However, MW-8 has not had a nitrate MCL exceedance for the past eight sampling events.

The 5 surface water monitoring wells (ST015, ST065, ST70, ST80, and ST120) did not have any MCL exceedances for any of the general water quality parameters.

3.2.5 Methane

EA also measured the headspace within the groundwater monitoring well casings for methane. Historical methane concentrations recorded within the wells are presented in Table 7. Methane was detected in 4 wells: OB03A, MW-2A, MW-2B, and MW-07. Of those with detections, only MW-2A exceeded the lower explosive limit (5 percent by volume). MW-2A had a methane reading of 13.3 percent by volume in the well.

Although the detection was greater than 5 percent, EA purged the well prior to sampling. The recorded methane was higher than what is normally reported and will be evaluated by the County DEP. Based on the field data logs, the increase in methane content may have occurred due to heavy precipitation that caused saturated conditions, which limited the efficiency of the landfill gas collection system.

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4. STATISTICAL ANALYSIS

EA performed statistical analysis for Gude Landfill groundwater monitoring data for the Spring 2019 sampling event. Statistical analysis was performed for wells within the Landfill groundwater monitoring network using data collected from 2001 through October 2018, when available.

Groundwater monitoring wells OB01, OB02, OB02A, OB03, OB03A, OB04, OB04A, OB06, OB07, OB07A, OB08, OB08A, OB10, OB11, OB11A, OB12, OB015, OB025, OB102, and OB105 were installed between 1984 and 1988. The statistical trend analysis for these wells used monitoring data since 2001. Groundwater monitoring wells MW-1B, MW-2A, MW-2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A, and MW-13B were installed in 2010 and first sampled in July 2010. All available data were used in the statistical analysis for these wells.

Groundwater monitoring wells MW-14A, MW-14B, and MW-15 were installed in 2011 and only sampled twice, in September 2011 and April 2019. Twelve additional groundwater monitoring wells (MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, MW-23B, MW-24A, and MW-24B) were installed in January through March 2017.

Low-flow groundwater sampling methods were employed beginning with the Spring 2015 event and will continue to be utilized by the County during future monitoring events. Previously, three volume well purge methods, which use higher flow rates, had been used. Higher flow rates can be associated with higher turbidity and can impact concentrations of constituents in groundwater samples. As a result, this change in methodologies may require further evaluation to exclude the historical data prior to employing the low-flow sampling method and potential modification of the statistical methods used as part of the semi-annual groundwater evaluation.

Intrawell statistical analysis was performed; however, interwell statistical analysis was not performed due to insufficient data from an offsite/background well. If interwell analysis is required in the future, background data will need to be collected from an offsite/background well (i.e., MW-14A/B).

4.1 METHODOLOGY

Gude Landfill ceased accepting waste in 1982 and is, therefore, only governed by the State of Maryland under COMAR and as directed by MDE. Since 1982, the County has voluntarily, or through regulatory mandates, implemented and maintained best management practices for pre-regulatory era landfills to ensure compliance with COMAR requirements, including routine monitoring of groundwater and surface water. Part of routine water monitoring includes statistical analysis of groundwater data.

Interwell statistical analysis, if performed, would measure the statistical difference between constituent concentrations in offsite/background monitoring well(s) and downgradient monitoring wells, whereas intrawell statistical analysis measures the statistical change in

constituent concentrations in each individual well over time. Due to the lack of data for an offsite/background well, the intrawell Mann-Kendall test for trend, which is consistent with the EPA Unified Guidance (EPA 2009), was used to evaluate potential trends in the data.

The Mann-Kendall test for monotonic trend (Gilbert 1987) was used to identify constituents with concentrations that display an increasing or decreasing trend over time, at the 95 percent significance level. The basic principle of the Mann-Kendall test is to examine the sign of pairwise differences of observed values. The test does not have distributional assumptions (i.e., it does not require the data to be normally distributed or follow any other distribution) and the test also can handle non-detects and irregular sampling intervals. The data are ordered by sampling date for each well/parameter pair, and each concentration is compared to previous/historical concentrations. The test statistics are calculated based on the number of increases and decreases from one sampling event to another. The significance probability of an increasing or decreasing trend is then calculated from the test statistic and the number of sampling events for each well/parameter pair. Reported concentrations less than the laboratory detection limit were treated as 0. Exact two-sided probabilities for the null distribution of the Mann-Kendall test were obtained from Hollander and Wolfe (1973). The null hypothesis of no trend was evaluated against the two-sided alternative hypothesis. Rejection of the null hypothesis at the 95 percent significance level (i.e., two-sided $p < 0.05$) led to the conclusion that the monitoring data contain a statistically significant trend. Statistically significant trends were characterized as increasing ($S > 0$) or decreasing ($S < 0$).

The statistical test does not evaluate the magnitude of the increase or decrease associated with the results of the analysis.

A trend analysis was performed for each chemical constituent at every monitoring well if:

1. The monitoring well had been sampled on at least four independent time periods

2. At least 4 sample results for a constituent exceeded the analytical laboratory detection limit.

4.2 GROUNDWATER TREND RESULTS

Trend analysis results for VOCs, metals, and general indicator parameters in groundwater are discussed in this section. Table 8 identifies parameters with statistically increasing trends and Table 9 identifies parameters with statistically decreasing trends.

4.2.1 Volatile Organic Compounds

Thirteen VOCs were identified as having increasing statistical trends, and 17 of the groundwater monitoring wells had one or more VOCs with increasing statistical trends (Table 8). Fourteen VOCs were identified as having decreasing trends, and 18 of the groundwater monitoring wells had one or more VOCs with decreasing statistical trends (Table 9).

Ten VOCs (1,1-dichloroethane, 1,4-dichlorobenzene, benzene, chlorobenzene, *cis*-1,2-dichhloroethene, methylene chloride, PCE, *trans*-1,2-dichloroethene, TCE, and VC) had both decreasing and increasing trends. Three VOCs had only increasing trends: 1,2-dichlorobenzene (OB03, OB11, and OB11A), 1,2-dichloroethane (OB12), and 1,2-dichloropropane (OB12). Three VOCs had only decreasing trends: chloroethane (OB03 and OB03A), dichlorodifluoromethane (MW-13A, MW-13B, OB03, OB03A, OB04A, OB10, OB11, and OB11A), and trichlorofluoromethane (OB11A).

The following is a summary of the trends based on well locations.

Northwest—This area represents groundwater along the Northwest portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB03, OB03A, OB04, OB04A, OB105, MW-8, MW-11A, MW-11B, MW-12, MW-13A, MW-13B, MW-16A, and MW-16B.

- MW-8, MW-11A, and MW-12 had no statistically significant increasing or decreasing VOC trends this event.
- MW-13A and MW-13B had no statistically significant increasing VOC trends this event.
- OB04, OB105, and MW-11B had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB03 (2 parameters), OB03A (1 parameter), OB04 (4 parameters), OB04A (4 parameters), OB105 (2 parameters), and MW-11B (3 parameters).
- Statistically significant decreasing VOC trends were observed for OB03 (8 parameters), OB03A (7 parameters), OB04A (2 parameters), MW-13A (9 parameters), and MW-13B (11 parameters).
- MW-16A and MW-16B were installed in 2017 and, therefore, there was not sufficient data for statistical trend analysis.

West—This area represents groundwater along the West portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB01, OB02, OB02A, MW-6, MW-7, MW-9, MW-10, MW-14A, MW-14B, MW-15, MW-19A, and MW-19B.

- MW-9 and MW-10 had no statistically significant increasing or decreasing VOC trends this event.
- OB01, OB02, OB02A, and MW-6 had no statistically significant increasing VOC trends this event.
- MW-7 had no statistically significant decreasing VOC trends this event.

- Statistically significant increasing VOC trends were observed only for MW-7 (3 parameters).

- Statistically significant decreasing VOC trends were observed for OB01 (4 parameters), OB02 (1 parameter), OB02A (2 parameters), and MW-6 (2 parameters).

- MW-14A, MW-14B, and MW-15 were installed in 2017 and this is the second sampling event; therefore, there was not sufficient data for statistical trend analysis.

- MW-19A and MW-19B were installed in 2017 and, therefore, there was not sufficient data for statistical trend analysis.

Southwest—This area represents groundwater along the Southwest portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB015, OB12, MW-21A, and MW-21B.

- OB015 had no statistically significant increasing VOC trends this event.

- OB12 had no statistically significant decreasing VOC trends this event.

- Statistically significant increasing VOC trends were observed for OB12 (8 parameters).

- Statistically significant decreasing VOC trends were observed for OB015 (1 parameter).

- MW-21A and MW-21B were installed in 2017 and this is the fourth sampling event; therefore, there was not sufficient data for statistical trend analysis.

South—This area represents groundwater along the South portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB11, OB11A, OB025, MW-22A, MW-22B, MW-23A, and MW-23B.

- OB025 had no statistically significant decreasing VOC trends this event.

- Statistically significant increasing VOC trends were observed for OB11 (2 parameters), OB11A (2 parameters), and OB025 (1 parameter).

- Statistically significant decreasing VOC trends were observed for OB011 (2 parameters) and OB11A (9 parameters).

- MW-22A, MW-22B, MW-23A, and MW-23B were installed in 2017 and, therefore, there was not sufficient data for statistical trend analysis.

Southeast—This area represents groundwater along the Southeast portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB08, OB08A, OB10, MW-3A, MW-3B, MW-4, MW-24A, and MW-24B.

- MW-3A, MW-3B, and MW-4 had no statistically significant increasing or decreasing VOC trends this event.
- OB08 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB08 (4 parameters), OB08A (2 parameters), and OB10 (4 parameters).
- Statistically significant decreasing VOC trends were observed for OB08A (1 parameter) and OB10 (2 parameters).
- MW-24A and MW-24B were installed in 2017 and, therefore, there was not sufficient data for statistical trend analysis.

Northeast—This area represents groundwater along the Northeast portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB06, OB07, OB07A, OB102, MW-1B, MW-2A, and MW-2B.

- MW-1B had no statistically significant increasing or decreasing VOC trends this event.
- OB07A, MW-2A, and MW-2B had no statistically significant increasing VOC trends this event.
- OB102 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB06 (1 parameter), OB07 (1 parameter), and OB102 (1 parameter).
- Statistically significant decreasing VOC trends were observed for OB06 (1 parameter) and OB07A (2 parameters), MW-2A (1 parameter) and MW-2B (1 parameter).

4.2.2 Metals

Fourteen metals (total) were identified as having increasing statistical trends, and 21 of the groundwater monitoring wells had one or more metals with increasing statistical trends (Table 8). Sixteen metals (total) were identified as having decreasing statistical trends, and 28 of the groundwater monitoring wells had one or more metals with decreasing statistical trends (Table 9). The trend analysis does not indicate an overall trend of improvement or degradation in the groundwater quality with respect to metals concentrations. Beginning with the Spring 2015 sampling event, low-flow groundwater sampling methods were employed due to issues

with high metal concentrations potentially related to high turbidity. Future data will be assessed to determine whether the reported concentrations of metals in samples collected using low-flow sampling methods, once the low-flow method is performed accurately at all well locations, are consistently lower than the concentrations reported using the old methodology. If such a difference is observed, the changed sampling methodology could result in artificial decreasing trends in total metals, which do not reflect changes in groundwater chemistry. If needed, the statistical methods used as part of the semi-annual groundwater evaluation could be modified to address such artificial trends. In order to conduct meaningful comparisons, it is recommended that a minimum of 4 years of low-flow sampling (eight events) be collected before conducting hypothesis testing to compare the low-flow methodology to those obtained using three well volume purge methods.

4.2.3 General Indicator Parameters

Twenty-eight groundwater monitoring well locations were determined to have statistically increasing trends for one or more general indicator parameters (Table 8), and 30 groundwater monitoring well locations were determined to have statistically decreasing trends for general indicator parameters (Table 9).

5. CONCLUSIONS

This report summarizes the groundwater data obtained from the Spring 2019 semi-annual sampling event and historical data dating back to 2001. All historical data have been evaluated and statistical testing and analysis were performed as described in Section 4. The groundwater and surface water results are consistent with historical data and trends.

Semi-annual monitoring will continue with the Fall 2019 event in accordance with the updated GW&SWMP.

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6. REFERENCES

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Figures

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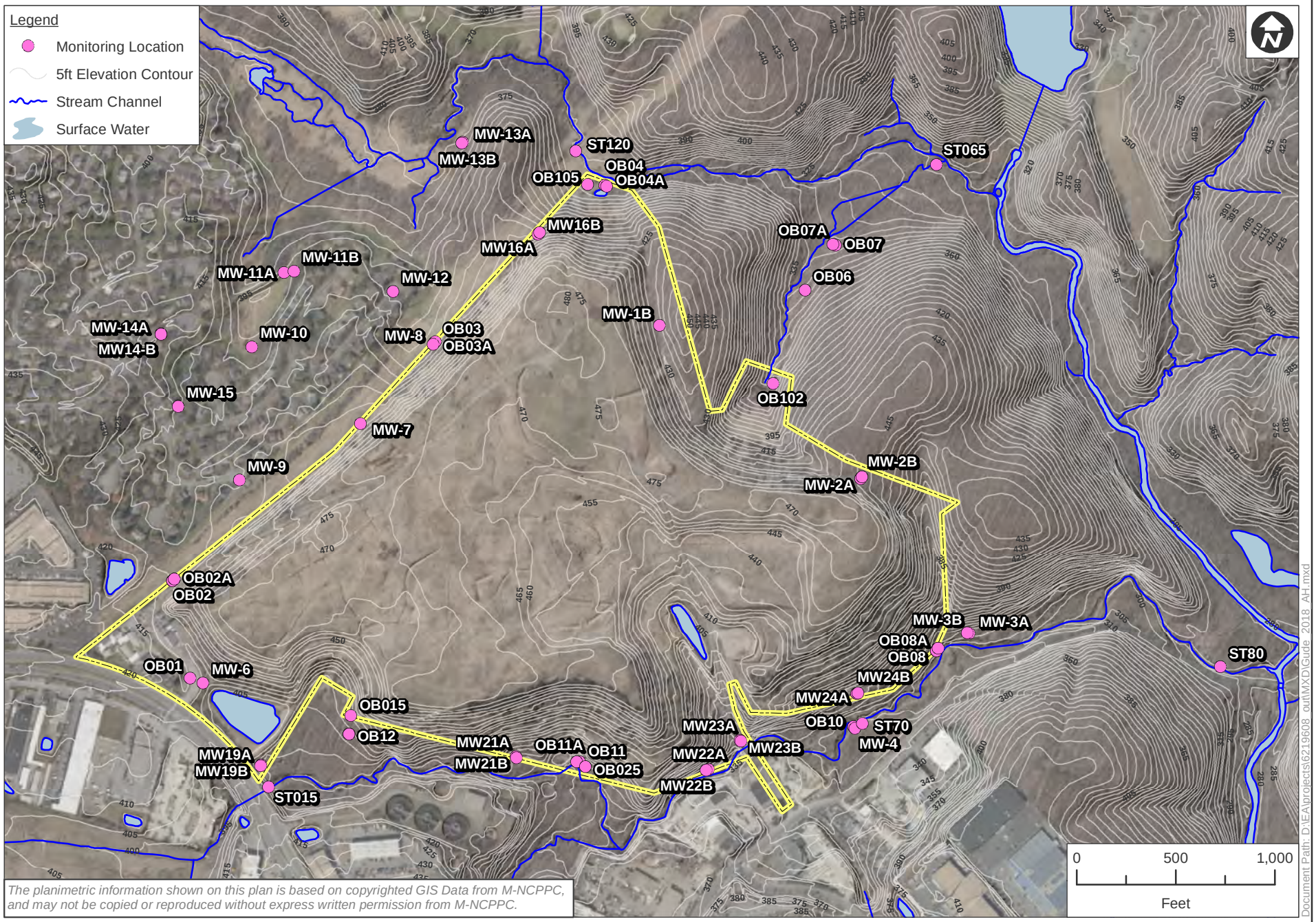

Gude Landfill
Montgomery County, Maryland

Figure 1.
Groundwater and Surface Water Monitoring Locations
May 2017

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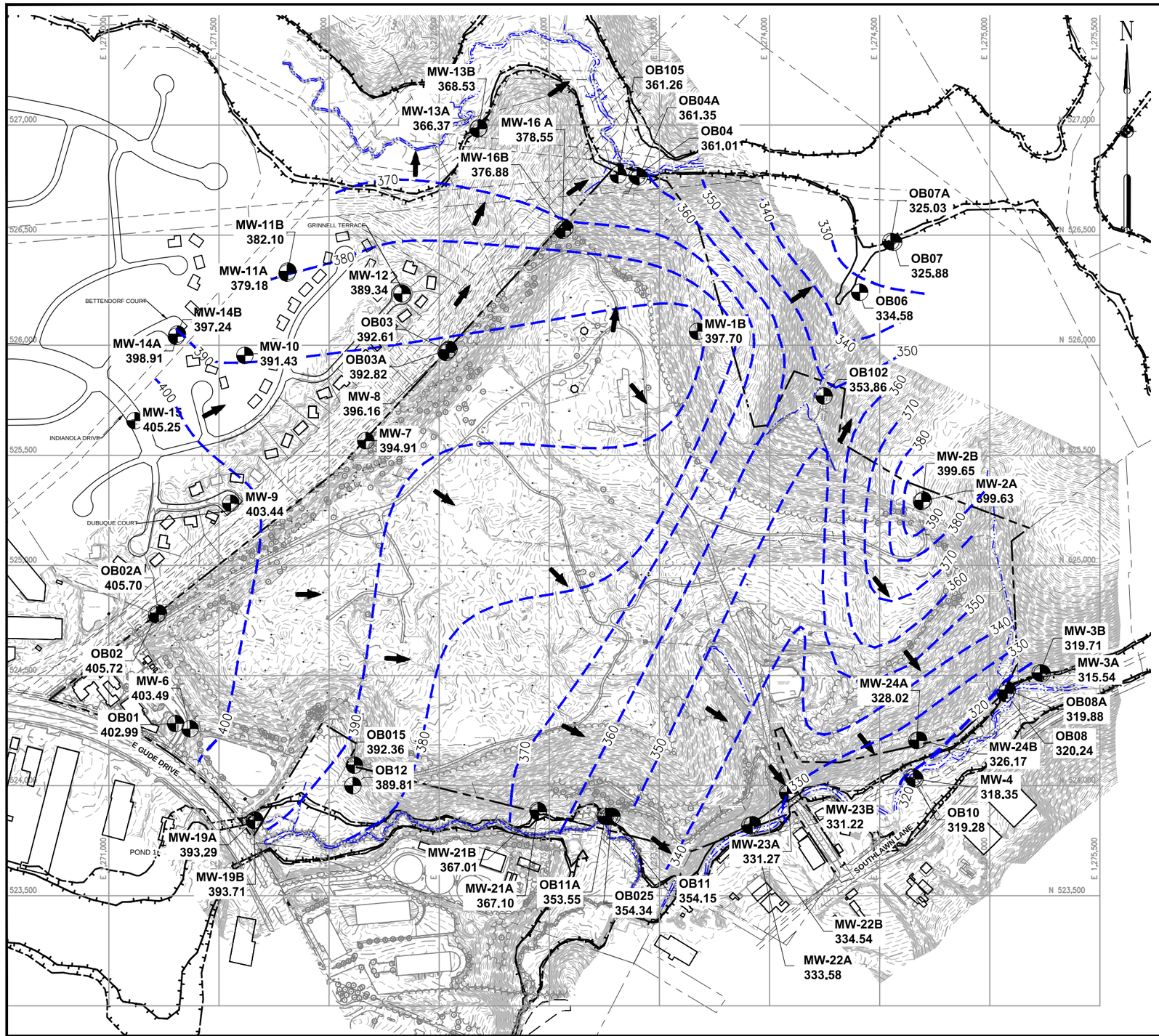

NOTES:

1. TOPOGRAPHY COMPILED BY WALLACE MONTGOMERY. USING PHOTOGRAMMETRIC METHODS WITH PHOTOGRAPHY DATED MAY 2018 AND SUPPLEMENTED WITH FIELD SURVEY PERFORMED BY WALLACE MONTGOMERY.
2. SURVEY OF STREAMS TAKEN FROM MAY 2018 PHOTOGRAMMETRY BY WALLACE MONTGOMERY.
3. HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983/91 (NAD-83/91). COORDINATE SYSTEM IS MARYLAND STATE PLANE, U.S. SURVEY FEET. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD-88) WITH ELEVATIONS SHOWN IN FEET.
4. FIELD SURVEY OF MW-14A, MW-14B, & MW-15, TEMPORARY GROUNDWATER MONITORING LOCATIONS, AND STREAM GAUGE LOCATIONS PERFORMED BY C.C. JOHNSON & MALHOTRA, P.C., AUGUST 2011.
5. THE PROPERTY BOUNDARY SHOWN REFLECTS A LAND EXCHANGE BETWEEN MONTGOMERY COUNTY AND M-NCPPC WHICH OCCURRED ON 21 OCTOBER 2014.

LEGEND

- 10-FT ELEVATION CONTOUR
- 2-FT ELEVATION CONTOUR
- PROPERTY BOUNDARY
- STREAM
- GROUNDWATER CONTOUR INTERVAL (10 FEET)
- MW-X — EXISTING GROUNDWATER MONITORING WELL
- 318 — GROUNDWATER ELEVATION (FT. MSL)
- INFERRED GROUNDWATER FLOW

0 250 500 1000

GRAPHIC SCALE IN FEET

FILE PATH: Q:\PROJECTS\1564601 - GUDE LF DESIGN\CAD\PRODUCTION\FIGURES\GROUNDWATER CONTOUR MAPS\FIG 2 - MAY 2019.DWG [4-1 (11X17)] 12/20/16

EA Engineering, Science, and Technology, Inc., PBC
Hunt Valley Center
225 Schilling Circle, Suite 400
Hunt Valley, Maryland 21031
(410) 584-7000

PROJECT NUMBER:	DESIGNED BY:	DRAWN BY:	FIGURE:
15646.01	PL/LJO	CAG	2
DATE:	CHECKED BY:	PROJECT MGR.:	SHEET NUMBER:
MAY 2019	PL/LJO	LJO	-

GUDE LANDFILL
SEMI-ANNUAL REPORT
GROUNDWATER AND SURFACE WATER
MONTGOMERY COUNTY, MARYLAND

FIGURE 2
GROUNDWATER CONTOUR MAP
APRIL 2019

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Tables

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Table 1
Groundwater Elevation Data (FT above MSL)

Monitoring Well	Well Top of Casing Elevation	Water Elevation										Spring 2019 Depth to Water
		F2014	S2015	F2015	S2016	F2016	S2017	F2017	S2018	F2018	S2019	
OB01	415.90	400.82	402.59	399.40	401.84	399.96	399.10	399.95	400.66	402.00	402.99	12.91
OB02	418.72	401.91	404.14	400.31	403.28	400.73	399.79	400.42	401.67	404.27	405.72	13.00
OB02A	418.70	401.95	404.52	400.22	403.45	400.65	399.76	400.32	401.51	404.29	405.70	13.00
OB03	409.86	386.24	389.42	384.25	386.18	383.14	380.56	379.99	381.86	388.65	392.61	17.25
OB03A	410.07	386.23	388.46	384.24	386.17	383.08	380.61	380.06	381.94	388.81	392.82	17.25
OB04	364.21	359.37	359.95	358.57	359.42	358.41	358.65	358.27	358.71	358.83	361.01	3.20
OB04A	365.37	359.94	360.63	359.19	360.06	359.06	359.21	358.73	359.19	359.46	361.35	4.02
OB06	339.78	330.94	332.99	328.63	330.59	328.40	328.81	324.06	329.21	329.60	334.58	5.20
OB07	329.38	322.70	324.22	319.60	322.50	319.66	320.50	318.44	320.97	321.23	325.88	3.50
OB07A	328.44	321.97	323.50	319.00	321.96	319.20	320.18	318.19	320.67	320.73	325.03	3.41
OB08	324.99	319.06	319.23	318.00	318.40	317.51	317.23	316.69	316.88	316.79	320.24	4.75
OB08A	325.28	318.73	318.91	317.65	318.04	317.19	316.89	316.46	316.65	316.55	319.88	5.40
OB10	325.77	318.68	319.18	318.27	318.85	318.29	318.50	318.38	318.45	319.06	319.28	6.49
OB11	362.56	352.51	352.86	350.96	351.45	353.29	352.34	352.11	352.74	352.89	354.15	8.41
OB11A	361.90	360.32	361.13	359.66	360.39	354.02	352.40	352.18	352.82	352.77	353.55	8.35
OB12	405.01	353.58	354.71	352.79	353.91	343.36	386.78	385.77	387.47	387.80	389.81	15.20
OB015	410.01	352.99	353.91	352.44	353.42	338.52	387.55	386.20	388.64	388.86	392.36	17.65
OB025	361.89	386.75	389.49	385.26	388.54	395.39	352.21	351.87	352.96	352.71	354.34	7.55
OB102	363.17	387.69	391.47	386.07	390.45	397.19	349.71	348.57	349.17	350.29	353.86	9.31
OB105	363.24	352.94	354.67	352.10	354.17	357.97	359.64	359.07	359.69	360.70	361.26	1.98
MW1B	434.00	391.76	387.14	387.58	383.79	383.44	381.07	378.78	376.73	380.47	397.70	36.30
MW2A	445.53	388.79	378.42	381.99	374.97	375.27	371.55	368.49	367.57	367.64	399.63	45.90
MW2B	444.45	388.74	378.42	382.01	374.59	375.40	371.18	367.40	364.37	365.32	399.65	44.80
MW3A	324.54	317.61	316.13	314.89	315.45	314.59	314.69	314.13	314.43	314.22	315.54	9.00
MW3B	324.73	316.15	318.24	315.28	317.07	316.30	315.56	314.33	315.11	314.95	319.71	5.02
MW04	324.75	318.17	318.59	317.93	318.35	317.77	318.00	317.93	317.98	318.52	318.35	6.40
MW06	417.29	401.58	403.40	400.31	402.76	400.77	399.84	400.67	401.42	402.73	403.49	13.80
MW07	433.81	389.88	391.09	387.91	388.37	386.13	383.42	382.90	383.93	388.15	394.91	38.90
MW08	412.66	389.40	394.17	387.40	389.92	386.31	383.59	382.99	385.29	394.40	396.16	16.50
MW09	417.69	399.12	400.95	397.09	400.05	397.19	396.30	395.78	397.55	399.28	403.44	14.25
MW10	394.03	379.96	390.48	383.56	387.30	383.45	383.15	380.53	384.52	387.34	391.43	2.60
MW11A	393.45	376.37	381.79	374.79	379.66	374.86	375.22	374.24	377.27	378.29	379.18	14.27
MW11B	393.40	376.06	378.93	374.22	377.68	374.43	375.26	374.20	376.03	377.44	382.10	11.30
MW12	397.55	390.12	384.58	380.85	383.77	380.33	379.40	378.51	380.79	384.05	389.34	8.21
MW13A	373.37	364.93	368.00	365.60	367.52	366.02	366.72	366.15	367.04	367.31	366.37	7.00
MW13B	373.35	367.77	368.72	366.49	368.24	366.87	367.41	366.85	367.66	368.11	368.53	4.82
MW-14A*	412.31	--	--	--	--	--	--	--	--	--	398.91	13.40
MW-14B*	412.34	--	--	--	--	--	--	--	--	--	397.24	15.10
MW-15*	414.45	--	--	--	--	--	--	--	--	--	405.25	9.20
MW-16A	420.11	--	--	--	--	--	--	371.14	370.79	373.44	378.55	41.56
MW-16B	418.68	--	--	--	--	--	--	370.54	370.29	372.79	376.88	41.80
MW-19A	397.54	--	--	--	--	--	--	392.50	393.33	394.22	393.29	4.25
MW-19B	397.33	--	--	--	--	--	--	392.51	393.32	394.25	393.71	3.62
MW-21A	372.45	--	--	--	--	--	--	362.89	364.67	365.61	367.10	5.35
MW-21B	371.61	--	--	--	--	--	--	363.24	364.73	365.57	367.01	4.60
MW-22A	338.79	--	--	--	--	--	--	332.91	332.61	332.84	333.58	5.21
MW-22B	339.58	--	--	--	--	--	--	334.38	334.75	335.16	334.54	5.04
MW-23A	354.89	--	--	--	--	--	--	329.35	329.68	329.81	331.27	23.62
MW-23B	354.47	--	--	--	--	--	--	330.66	328.73	329.61	331.22	23.25
MW-24A	355.02	--	--	--	--	--	--	323.78	323.67	323.99	328.02	27.00
MW-24B	354.17	--	--	--	--	--	--	323.41	323.18	323.54	326.17	28.00

* Monitoring wells MW-14A, MW-14B, and MW-15 were gauged during Spring 2019 event for the first time.

NOTES: F=Fall; S= Spring

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Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-1B 4/19/2019 Sampling Results	MW-2A 4/15/2019 Sampling Results	MW-2B 4/15/2019 Sampling Results	MW-3A 4/11/2019 Sampling Results	MW-3B 4/11/2019 Sampling Results	MW-4 4/8/2019 Sampling Results	MW-6 4/12/2019 Sampling Results	MW-7 4/16/2019 Sampling Results	MW-8 4/16/2019 Sampling Results	MW-9 4/16/2019 Sampling Results	MW-10 4/19/2019 Sampling Results	MW-11A 4/17/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	43.7	19.5	1 U	34.3	60.5	45.6	245	284	660	20.1	60.6	18.3
Ammonia Nitrogen	mg/L	--	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.05	1.99	0.1 U	0.1 U	0.1 U
Chemical Oxygen Demand	mg/L	--	3 U	5	3 U	3 U	6	12.4	12	48	38	9	5	11
Chloride	mg/L	--	2.7	2.9	30.2	3.2	3.1	156	618	118	112	22.9	2.8	6.2
Dissolved Oxygen, Field	mg/L	--	7.86	8.15	9.37	8.57	3.65	0.26	0.08	0.23	0.08	5.36	0.46	3.63
Hardness	mg/L	--	29.7	14.9	13.5	20.4 B	41.6 B	187 B	653 B	284	670	34.7	53.9	28.7
Nitrate	mg/L	10	0.2 U	0.2 U	0.2 U	0.2 U	0.2 J	0.8	0.2 U	0.2 U	0.2 U	1.4	0.2 U	1.2
ORP, Field	mV	--	210.4	182.2	243	175.9	84.7	160.3	86.8	-80.8	39.2	204.8	138.5	155.7
pH, Field	SU	--	6.13	5.37	5.22	5.96	6.87	5.76	5.86	5.96	6.88	5.26	5.87	6.27
pH, Lab	SU	--	5.48	5.65	5.5	6.27	6.93	5.95	6.03	6.31	7.05	5.65	6.07	5.91
Specific Conductivity, Field	µS/cm	--	109.6	65.5	55.5	72	197.5	718	2830	1109	1814	159.3	108.8	257.1
Specific Conductivity, Lab	µS/cm	--	89.3	54.5	227	77.7	145	604	2390	863	1480	123	147	78.5
Sulfate, total	mg/L	--	1 U	1.9	1.5	2	47.5	5.9	41.4	21.8	60.8	1 U	1 U	6.9
Temperature, field	°C	--	16.5	15.6	15.7	13.6	12.7	15	17.3	19.7	10.8	19.8	13.3	13.4
Total Dissolved Solids	mg/L	--	106	17	42	44	100	482	1860	572	917	84	114	68
Total Suspended Solids	mg/L	--	22.9	5.3	2.6 U	18.7	37.9	4.7 U	45.7	5.7	2.7	51.3	11.2	187
Turbidity, Lab	NTU	--	4.75	7.01	0.794	10.3	8.63	3.42	8.21	18.1	3.18	28.2	12.9	16.2
Turbidity, Field	NTU	--	6.8	9.8	2.9	9.4	12.8	5.4	5.5	9.8	3.1	8.3	5.8	5.9
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Barium, total	mg/L	2	0.0018	0.00974	0.00871	0.00423	0.0105	0.0334	0.463	0.225	0.132	0.0527	0.0373	0.0236
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	5.28	2.71	2.26	5.51 B	12.1 B	33	110	52	109	4.78	12.2	6.29
Chromium, total	mg/L	0.1	0.00116	0.00826	0.00359	0.00293	0.00527	0.00273	0.00591	0.00348	0.00206	0.0131	0.00109	0.00353
Cobalt, total	mg/L	--	0.001 U	0.00109	0.001 U	0.001 U	0.001 U	0.001 U	0.838	0.0443	0.0184	0.00297	0.0021	0.001 U
Copper, total	mg/L	--	0.00275	0.00315	0.00156	0.001 U	0.0014	0.00116	0.00719	0.00821	0.00535	0.00532	0.00342	0.00233
Iron, total	mg/L	--	0.419	0.167	0.1 U	0.281	0.614	0.566	4.75 B	19.5	1.09	4.16	0.917	0.841
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00307	0.001 U	0.001 U
Magnesium, total	mg/L	--	4.02	1.97	1.91	1.61	2.77	25.4	91.7	37.4	96.7	5.52	5.67	3.16
Manganese, total	mg/L	--	0.0119	0.071	0.0233	0.00947	0.0322	0.0227	75	20.1 J	1.34	0.115	0.221	0.0193
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000132	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.00109	0.0182	0.00394	0.00186	0.00361	0.00172	0.1	0.00819	0.00694	0.0105	0.00337	0.00324
Potassium, total	mg/L	--	1.08	1.29	1.15	1.04	1.26	2.86	4.89	3.99	12.9	1.95	1.43	0.635
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0118	0.001 U	0.001 U	0.00176	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	7.62	4.2 B	3.44 B	3.69	13.5	34.4	199	56 B	84.8 B	13.1 B	8.12	3.85
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.00112	0.001 U	0.001 U	0.001 U	0.00119	0.001 U	0.001 U	0.00125	0.00102	0.0058	0.00203	0.00219
Zinc, total	mg/L	--	0.00645	0.006	0.004 U	0.004 U	0.0104	0.00463	0.0574 B	0.00564	0.00611	0.041	0.165	0.0121
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-1B 4/19/2019 Sampling Results	MW-2A 4/15/2019 Sampling Results	MW-2B 4/15/2019 Sampling Results	MW-3A 4/11/2019 Sampling Results	MW-3B 4/11/2019 Sampling Results	MW-4 4/8/2019 Sampling Results	MW-6 4/12/2019 Sampling Results	MW-7 4/16/2019 Sampling Results	MW-8 4/16/2019 Sampling Results	MW-9 4/16/2019 Sampling Results	MW-10 4/19/2019 Sampling Results	MW-11A 4/17/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1 U	1 U	1 U	1 U	1 U	4.3	9.4	1 U	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	7.7 B	7.7 B	5.3 B	7.2 B	5 U	13.7	39	5.1	6.7	5 U	5 U
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	7.3	2.6	1.6	1 U	1 U	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	1 U	1 U	1 U	1 U	1 U	1 U	4.7	8.8	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isobutyl Alcohol	µg/L	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	8.4	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.9	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-11B 4/17/2019 Sampling Results	MW-12 4/16/2019 Sampling Results	MW-13A 4/9/2019 Sampling Results	MW-13B 4/9/2019 Sampling Results	MW-14A 4/18/2019 Sampling Results	MW-14B 4/18/2019 Sampling Results	MW-15 4/18/2019 Sampling Results	MW-16A 4/9/2019 Sampling Results	MW-16B 4/9/2019 Sampling Results	MW-19A 4/12/2019 Sampling Results	MW-19B 4/12/2019 Sampling Results	MW-21A 4/18/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	72.4	11.9	31.9	209	17.6	34.3	24	200	146	57.2	104	452
Ammonia Nitrogen	mg/L	--	0.1 U	0.1 U	0.13	0.1 U	0.1 U	0.1 U	0.1 U	0.19	0.1 U	0.1 U	0.1 U	11.9
Chemical Oxygen Demand	mg/L	--	12	11	5	7	10	11	12	21	30	5	5	37
Chloride	mg/L	--	13.1	272	70.3	115	160	20.7	25.3	37.2	210	267	173	106
Dissolved Oxygen, Field	mg/L	--	8.58	6.36	0.03	0.03	7.22	5.11	4.68	0.13	0.09	0.11	0.06	0.15
Hardness	mg/L	--	79.8	163	104 B	318 B	173	59.1	71.8	138 B	329 B	269 B	295 B	366
Nitrate	mg/L	10	3.9	4	0.2 U	0.2 U	3.3	5.4	5.2	0.5	0.2 U	2.1	1.6	0.2 U
ORP, Field	mV	--	224.7	170.2	138.4	127.1	228.1	147.8	233.5	-20.8	83.2	181.1	156.4	1.7
pH, Field	SU	--	5.63	5.2	5.17	5.96	5.35	5.81	5.52	6.16	5.94	5.71	5.95	6.29
pH, Lab	SU	--	6.5	5.86	5.49	6.23	5.54	5.99	5.78	6.43	6.23	5.86	6.09	6.41
Specific Conductivity, Field	µS/cm	--	89.4	1120	396	949	731	213.9	215.4	746	1174	1192	906	14.7
Specific Conductivity, Lab	µS/cm	--	211	898	314	799	590	174	175	604	961	1010	754	1120
Sulfate, total	mg/L	--	4.2	19.3	6.2	15.7	15.5	2.5	3.8	16.4	14.7	13.6	9.7	17
Temperature, field	°C	--	14.3	15.5	13.2	13.5	17.3	15	16.6	21.3	19.4	14.4	14	12.1
Total Dissolved Solids	mg/L	--	159	661	195	545	526	184	448	365	588	795	677	624
Total Suspended Solids	mg/L	--	18.4	20.8	26.8	4.9	125	95.2	1500	72.7	7.5	81	41.4	10.7
Turbidity, Lab	NTU	--	2.98	16.6	8.91	0.692	9.08	6.55	114	25.7	4.29	13.4	5.72	35.8
Turbidity, Field	NTU	--	38.5	9.8	23	2.3	8.2	6.2	203	36.4	3.7	9.1	8.1	8.7
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0021	0.001 U	0.001 U	0.001 U	0.00263
Barium, total	mg/L	2	0.019	0.313	0.102	0.0738	0.242	0.0172	0.0829	0.217	0.0271	0.118	0.0362	0.476
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	15.6	33	17.1	76.9	30	11.8	10.4	16.4	51.7	45.2	64.6	69.4
Chromium, total	mg/L	0.1	0.0112	0.00234	0.00147	0.00126	0.0106	0.00374	0.0134	0.0215	0.00441	0.00235	0.00756	0.00198
Cobalt, total	mg/L	--	0.001 U	0.00137	0.0182	0.001 U	0.00423	0.001 U	0.0053	0.00695	0.00784	0.0119	0.001 U	0.139
Copper, total	mg/L	--	0.001 U	0.00196	0.00193	0.00369	0.0107	0.00215	0.0598	0.00778	0.00154	0.00592	0.00177	0.00265
Iron, total	mg/L	--	0.256	0.675	2.36	0.157	2.39	0.351	11.4	6.87	0.655	1.75 B	0.471 B	18.8
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00251	0.00131	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	9.91	19.7	14.8	30.6	23.8	7.2	11.1	23.7	48.6	37.9	32.4	46.9
Manganese, total	mg/L	--	0.00765	0.0632	0.796	0.043	0.0389	0.0143	0.167	12.7	16.3	1.71	0.0475	16.1
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.0001 U	0.000372	0.0001 U	0.0001 J	0.0001 U	0.0001 U	0.0001 U	0.000839	0.000315	0.000635
Nickel, total	mg/L	--	0.0075	0.00521	0.0104	0.00278	0.0243	0.003	0.0152	0.0193	0.0172	0.0094	0.00472	0.0263
Potassium, total	mg/L	--	0.869	2.55	3.06	3.59	2.98	1.53	1.98	3.53	3.61	3.78	2.47	25.3
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00162	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	10.5	119 B	10.7	19.5	40.9	8.01	7.15	59.6	36	79.2	22.9	66.4
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00126
Vanadium, total	mg/L	--	0.00312	0.001 U	0.00172	0.00104	0.00611	0.001 U	0.00995	0.00173	0.001 U	0.00209	0.001 U	0.001 U
Zinc, total	mg/L	--	0.004 U	0.0324	0.0152 B	0.004 U	0.0407	0.00554	0.0488	0.0246 B	0.00673 B	0.0344 B	0.0142 B	0.0395
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	7.6	9.9	1 U	1 U	1 U	1 U	1 U	2.8	5.2	3.4

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-11B 4/17/2019 Sampling Results	MW-12 4/16/2019 Sampling Results	MW-13A 4/9/2019 Sampling Results	MW-13B 4/9/2019 Sampling Results	MW-14A 4/18/2019 Sampling Results	MW-14B 4/18/2019 Sampling Results	MW-15 4/18/2019 Sampling Results	MW-16A 4/9/2019 Sampling Results	MW-16B 4/9/2019 Sampling Results	MW-19A 4/12/2019 Sampling Results	MW-19B 4/12/2019 Sampling Results	MW-21A 4/18/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1.1	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	3.3	5.3	1 U	1 U	1 U	1 U	1 U	1 U	1 J	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1 U	2.6	6.1	1 U	1 U	1 U	1.3	3.9	1 U	1 J	1.1
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	6.2 B	8.6	5 U	5.5	8.9	6.9	5.6 B	6.3 B	9.5 B	7 B	6 B	6.1 B
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	1 U	1 U	1.3	1 U	1 U	1 U	2	10.3	1 U	1 U	1.4
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	5.1	1 U	1 U	1 U	1.3	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	2.1	1.2	46.5	58.4	1 U	1 U	1 U	1 U	1 U	7	15	9.8
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isobutyl Alcohol	µg/L	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1.9	3.7	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	4.9	1 U	7.1	9.7	1 U	1 U	1 U	1 U	1 U	1.8	2.3	3.5
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1.6	2.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1.7	1 U	11.7	12.3	1 U	1 U	1 U	1 U	1 U	2.6	4.9	5.6
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1 U	1 U	3.8	6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-21B 4/18/2019 Sampling Results	MW-22A 4/10/2019 Sampling Results	MW-22B 4/10/2019 Sampling Results	MW-23A 4/15/2019 Sampling Results	MW-23B 4/15/2019 Sampling Results	MW-24A 4/11/2019 Sampling Results	MW-24B 4/11/2019 Sampling Results	OB01 4/17/2019 Sampling Results	OB02 4/17/2019 Sampling Results	OB02A 4/17/2019 Sampling Results	OB03 4/16/2019 Sampling Results	OB03A 4/16/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	263	360	283	27.1	83.9	177	296	79.7	59.3	34.7	231	357
Ammonia Nitrogen	mg/L	--	0.57	0.1 U	0.1 U	0.1 U	0.1 U	0.59	0.1 U	0.1 U	0.1 U	0.1 U	2.45	3.47
Chemical Oxygen Demand	mg/L	--	27	14	8	4	4	39	43	19	12	13	27	31
Chloride	mg/L	--	174	131	120	83.4	89	324	293	591	195	196	203	166
Dissolved Oxygen, Field	mg/L	--	0.19	0.02	0.37	1.79	0.13	0.07	0.08	0.24	0.29	1.09	0.19	0.02
Hardness	mg/L	--	294	364 B	343 B	102	160	449 B	567 B	570	260	251	329	446
Nitrate	mg/L	10	0.2 U	0.2 U	0.2 U	4	0.3	0.3	0.6	0.2 U	0.2 J	1.9	0.2 U	0.2 U
ORP, Field	mV	--	-79.4	-20.9	-57.1	280.1	-25.5	-27.2	-108.4	202.1	167.6	167.6	12.8	-32.9
pH, Field	SU	--	6.49	6.46	6.9	5.27	6.66	5.92	6.52	5.68	5.99	5.5	6.01	6.34
pH, Lab	SU	--	6.5	6.39	6.75	5.42	6.78	6.08	6.52	5.83	6.69	5.78	6.23	6.5
Specific Conductivity, Field	µS/cm	--	1324	1291	1162	434.3	541	1575	1772	2357	889	87.2	1326	1574
Specific Conductivity, Lab	µS/cm	--	952	1070	953	359	446	1290	1370	1900	719	707	1050	1240
Sulfate, total	mg/L	--	13.4	39.6	75.1	3.2	7.6	1 U	1 U	42.1	15.8	24.5	50.5	121
Temperature, field	°C	--	14.2	13.5	15.4	16.1	14.7	18.3	16.5	16.7	13.9	14.4	13.7	16.5
Total Dissolved Solids	mg/L	--	621	645	599	260	285	1090	986	1700	642	659	656	794
Total Suspended Solids	mg/L	--	63.4	6.4	10.2	498	34.3	41.2	54.2	9.3	10.6	24.1	4.9	8.8
Turbidity, Lab	NTU	--	364	20.7	33.1	119	10	7.01	127	0.5 U	8.47	7.65	13.2	31.5
Turbidity, Field	NTU	--	25.1	6.5	6	140.7	9.9	4	24.4	3	6.4	9.9	4	8.1
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.002	0.001 U	0.00849	0.001 U	0.001 U	0.00486	0.0323	0.001 U	0.001 U	0.001 U	0.00245	0.00325
Barium, total	mg/L	2	0.123	0.0219	0.0355	0.152	0.00522	0.298	0.19	0.315	0.299	0.214	0.341	0.181
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	66.1	85.4 B	89.8 B	12.5	21.3	63.4 B	89.7 B	105	49.4	48.2	61.3	81.2
Chromium, total	mg/L	0.1	0.0112	0.001 U	0.00257	0.0154	0.00561	0.00312	0.00339	0.00114	0.00293	0.00855	0.00261	0.001 U
Cobalt, total	mg/L	--	0.0676	0.00111	0.00106	0.00595	0.00314	0.0625	0.0516	0.00456	0.00514	0.001 U	0.0364	0.0269
Copper, total	mg/L	--	0.00427	0.001 U	0.001 U	0.00173	0.0023	0.001 U	0.001 U	0.00452	0.0033	0.00201	0.00538	0.001 U
Iron, total	mg/L	--	63.1	4.25	3.55	5.6	2.45	25.8	47.8	0.1 U	0.657	0.757	17.2	18.1
Lead, total	mg/L	0.015	0.00115	0.001 U	0.001 U	0.00273	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	31.4	36.6	28.9	17.3	26	70.6	83.3	74.9	33.1	31.8	42.8	59.1
Manganese, total	mg/L	--	6.39	1.73	0.608	0.113	0.589	8.95	4.41	3.54	1.18	0.0437	16.8	8.65
Mercury, total	mg/L	0.002	0.000142	0.0001 U	0.0001 U	0.000827	0.0001 U	0.0001 U	0.0001 U	0.000181	0.0001 U	0.000595	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0336	0.00491	0.00469	0.0125	0.00516	0.0327	0.0169	0.0266	0.0137	0.0108	0.0124	0.00913
Potassium, total	mg/L	--	8.05	4.93	7.34	3.42	1.99	5.14	3.92	5.05	6.3	3.09	7.07	13.5
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.00224	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00268
Sodium, total	mg/L	--	60	83.2	57.1	27.2 B	21.8 B	53.6	34.8	141	25.9	28	62 B	76.8 B
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.00802	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00141	0.001 U	0.001 U
Zinc, total	mg/L	--	0.0105	0.00479	0.0111	0.0203	0.00668	0.004 U	0.004 U	0.0142	0.0209	0.00945	0.023	0.004 U
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	7.9	1 U	1 U	1 U	1 U	1.7	4.3	1 U	1 U	1 U	9.1	4.7

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	MW-21B 4/18/2019 Sampling Results	MW-22A 4/10/2019 Sampling Results	MW-22B 4/10/2019 Sampling Results	MW-23A 4/15/2019 Sampling Results	MW-23B 4/15/2019 Sampling Results	MW-24A 4/11/2019 Sampling Results	MW-24B 4/11/2019 Sampling Results	OB01 4/17/2019 Sampling Results	OB02 4/17/2019 Sampling Results	OB02A 4/17/2019 Sampling Results	OB03 4/16/2019 Sampling Results	OB03A 4/16/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U
1,2-Dichloropropane	µg/L	5	2.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.7	1.3
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1 U	1 U	1 U	1 U	13.5	13.1	1 U	1 U	1 U	5.1	2.9
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	25.2	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	5.5	6.5 B	5.2 B	7.3 B	8.9 B	44.3 B	5 U	7.4 B	5 U	5.9	7.8
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	4.6	5.4	1 U	1 U	1 U	1.2	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	1 U	1 U	1 U	1 U	10.5	3.4	1.4	1 U	1 U	1.5	1.5
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	17.9	4.7	4.1	4.7	3.6	1.2	2.4	1.2	1 U	1 U	30.6	15.9
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isobutyl Alcohol	µg/L	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	2.9	2.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	5.7	76.4	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	2	3.4	1 U	1 U	1 U	2.2	1.1
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	11.7	3.4	1.8	1.6	1.1	1 U	1 U	1 U	1 U	1 U	1.9	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	2.4	1 U	1 U	1 U	1 U	2.4	1.6	1 U	1 U	1 U	5.8	3.1

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	OB04 4/9/2019 Sampling Results	OB04A 4/9/2019 Sampling Results	OB06 4/8/2019 Sampling Results	OB07 4/8/2019 Sampling Results	OB07A 4/8/2019 Sampling Results	OB08 4/11/2019 Sampling Results	OB08A 4/11/2019 Sampling Results	OB10 4/8/2019 Sampling Results	OB11 4/10/2019 Sampling Results	OB11A 4/10/2019 Sampling Results	OB12 4/10/2019 Sampling Results	OB015 4/10/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	264	254	289	221	122	225	220	150	255	353	124	50.9
Ammonia Nitrogen	mg/L	--	0.8	0.94	0.1 U	0.1 U	0.1 U	0.1 U	0.31	0.1 U	0.1 U	0.58	0.1 U	0.18
Chemical Oxygen Demand	mg/L	--	47	50	51.9	21.1	25.2	4	9	18.3	34	34	10	3 J
Chloride	mg/L	--	530	546	358	230	239	41.5	32.6	228	458	404	75.6	7.1
Dissolved Oxygen, Field	mg/L	--	0.07	0.02	0.77	0.05	1.67	0.09	0.09	0.02	0.1	0.11	0.09	0.79
Hardness	mg/L	--	745 B	720 B	600 B	527 B	411 B	211 B	184 B	361 B	751 B	602 B	191 B	134 B
Nitrate	mg/L	10	1.3	1.4	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5	0.4	0.2 U	0.5
ORP, Field	mV	--	137.9	141.6	132.8	145	180.4	68.4	5.9	51.3	159.4	83.2	102.7	115.7
pH, Field	SU	--	5.89	5.8	6.01	6.62	5.69	6.46	6.29	5.95	5.63	5.86	5.59	5.43
pH, Lab	SU	--	6.21	6.12	6.14	6.73	5.98	6.53	6.44	6.08	5.5	5.53	5.78	5.61
Specific Conductivity, Field	µS/cm	--	2474	2541	2099	1420	542	662	609	1183	2199	2200	627	366.7
Specific Conductivity, Lab	µS/cm	--	2070	2120	1760	1190	1050	549	503	990	1830	1840	521	303
Sulfate, total	mg/L	--	25	18.8	99.6	41.4	40.7	6.1	2.3	1.7	12.6	9.8	24.7	91
Temperature, field	°C	--	15.3	15.8	14	13.1	12.8	13.7	13.7	14.7	15.8	15.6	16.3	17
Total Dissolved Solids	mg/L	--	1470	1450	1140	923	771	328	303	710	1440	1170	306	186
Total Suspended Solids	mg/L	--	2.6 U	6.3	22.3	2.6 U	2.6 U	2.6 U	57.4	2.6 U	2.6 U	2.6 U	2.6 U	2.7 U
Turbidity, Lab	NTU	--	0.5 U	0.812	9.11	1.42	1.09	0.5 U	5.08	0.788	0.5 U	1.83	0.912	4.53
Turbidity, Field	NTU	--	2	2	29.9	2.3	2.3	1.1	6.8	2.2	1.8	1.7	2.2	4.4
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.003	0.001 U	0.001 U	0.00113	0.001 U	0.001 U
Barium, total	mg/L	2	0.289	0.0666	0.171	0.0366	0.0438	0.151	0.11	0.12	0.0267	0.165	0.0177	0.0875
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00146	0.001 U	0.0141	0.00102	0.001 U	0.001 U
Calcium, total	mg/L	--	171	128	127	127	73.2	56.5 B	44.2 B	64.5	145 B	99.7 B	33 B	11.7 B
Chromium, total	mg/L	0.1	0.001 U	0.00227	0.00529	0.001 U	0.001 U	0.001 U	0.00571	0.001 U	0.00146	0.00125	0.001 U	0.00133
Cobalt, total	mg/L	--	0.001 U	0.00109	0.00476	0.001 U	0.001 U	0.00526	0.0122	0.0218	0.00176	0.0383	0.00101	0.00517
Copper, total	mg/L	--	0.04	0.0305	0.00665	0.0023	0.0026	0.001 U	0.00425	0.001 U	0.00516	0.00193	0.001 U	0.001 U
Iron, total	mg/L	--	0.1 U	0.143	0.836	0.1 U	0.1 U	0.1 U	4	1.61	0.1 U	1.89	0.1 U	0.713
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00225	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	91.3	98.5	68.6	50.8	55.5	17	18	48.5	94.2	85.8	26.4	25.4
Manganese, total	mg/L	--	3.8	2.42	0.608	0.154	0.0717	7.65	7.75	14.4	1.53	13.2	0.11	1.92
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.000252	0.0001 U	0.000886	0.0001 U	0.0001 U	0.0001 U	0.004	0.000244	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0148	0.0237	0.0125	0.00123	0.00311	0.00673	0.0106	0.0225	0.0352	0.0342	0.00738	0.0343
Potassium, total	mg/L	--	6.86	6.32	4.5	4.77	2.32	2.72	2.92	3.68	5.17	5.67	5	1.98
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00101	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	77.1	108	155	26.5	28.5	25.4	27.2	27.5	115	123	30	8.44
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.00105	0.001 U	0.001 U	0.001 U	0.00195	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.00796 B	0.0205 B	0.0205	0.004 U	0.004 U	0.004 U	0.025	0.00543	0.0469	0.0189	0.00755	0.0613
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.2	12.8	5.8	18.5	1 U

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	OB04 4/9/2019 Sampling Results	OB04A 4/9/2019 Sampling Results	OB06 4/8/2019 Sampling Results	OB07 4/8/2019 Sampling Results	OB07A 4/8/2019 Sampling Results	OB08 4/11/2019 Sampling Results	OB08A 4/11/2019 Sampling Results	OB10 4/8/2019 Sampling Results	OB11 4/10/2019 Sampling Results	OB11A 4/10/2019 Sampling Results	OB12 4/10/2019 Sampling Results	OB015 4/10/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.8	1.1	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.4	1 U	1.1	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1.3	1.1	3.3	4.4	2.1	8.1	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	5.4	6.2	1 J	1 U	1 U	2.7	3.2	9.5	17	8.3	7.4	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	8.1	5 U	7.6	5.4	5 U	5 U	5 J	8.6	5 U	9	15.1
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1.6	1.6	1 U	1 U	1 U	1 U	1 U	2.4	2.7	1 U	3.4	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1.6	1.6	1.3	1 U	1 U	4.5	7.8	4.4	22.3	9.1	2.7	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	11.8	14.1	1 U	1.7	1.5	13.7	8	36.9	89.5	27.6	27.8	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isobutyl Alcohol	µg/L	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	2.1	3	1 U	1 U	1 U	1 U	1 U	1 U	5.6	1 U	4.1	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1.3	1.1	1 U	1 U	1 U	1 U	1 U	1 U	10.1	1.4	13	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.2	3	1.3	3.2	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 J	1.4	1 U	1 U	1 U	1 U	1 U	5.8	11.3	4.3	12.3	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1.3	1.8	1 U	1 U	1 U	1.2	1.6	20.9	13.9	6.9	7.1	1.2

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	OB025 4/10/2019 Sampling Results	OB102 4/15/2019 Sampling Results	OB105 4/9/2019 Sampling Results	ST015 4/8/2019 Sampling Results	ST065 4/8/2019 Sampling Results	ST70 4/8/2019 Sampling Results	ST80 4/8/2019 Sampling Results	ST120 4/8/2019 Sampling Results
General Parameters										
Alkalinity	mg/L	--	315	957	1270	78.7	89.1	106	104	69.4
Ammonia Nitrogen	mg/L	--	0.33	18.3	43.8	0.1 U	0.15	0.43	0.1 U	0.1 U
Chemical Oxygen Demand	mg/L	--	25	131	131	17.3	18.9	20.2	21	10.9
Chloride	mg/L	--	191	410	224	142	171	157	152	182
Dissolved Oxygen, Field	mg/L	--	1.63	0.02	-0.02	10.08	10.43	12.99	13.79	10.05
Hardness	mg/L	--	388 B	492	821 B	159 B	173 B	188 B	188 B	173 B
Nitrate	mg/L	10	0.2 U	0.9	0.7	1.4	2	1.6	1.6	1.8
ORP, Field	mV	--	138.7	102.9	-106.1	145.3	135.9	105.4	136.4	98.5
pH, Field	SU	--	6.36	6.68	6.9	7.25	7.72	7.9	9.18	7.04
pH, Lab	SU	--	6.26	6.8	6.97	7.3	7.77	7.95	9.02	7.33
Specific Conductivity, Field	µS/cm	--	1449	3530	3590	752	712	901	860	684
Specific Conductivity, Lab	µS/cm	--	1210	2930	2950	627	752	754	723	729
Sulfate, total	mg/L	--	45.8	83.3	150	15.7	18	25.8	27.5	15.5
Temperature, field	°C	--	15.9	14	13.3	19.9	14.3	18.1	18.7	13.8
Total Dissolved Solids	mg/L	--	751	1760	1730	380	430	458	445	435
Total Suspended Solids	mg/L	--	19.3	2.7	50.3	4.8	2.6 U	3.7	4.4	3.1
Turbidity, Lab	NTU	--	12.8	0.96	204	4.74	1.65	4.65	4.62	2.17
Turbidity, Field	NTU	--	15.9	9.7	19.5	130	6.9	3.3	5.9	2
Inorganics										
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.00271	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Barium, total	mg/L	2	0.0912	0.258	0.566	0.0692	0.0509	0.0786	0.0644	0.0551
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	62.1 B	69.1	115	30	30.5	37.7	38.6	31.4
Chromium, total	mg/L	0.1	0.00293	0.00161	0.00207	0.001 U	0.001 U	0.00925	0.00986	0.001 U
Cobalt, total	mg/L	--	0.031	0.0605	0.0066	0.0013	0.001 U	0.00137	0.00103	0.001 U
Copper, total	mg/L	--	0.001 U	0.0228	0.00202	0.00224	0.00143	0.00276	0.003	0.00167
Iron, total	mg/L	--	1.3	0.108	21.4	0.356	0.185	0.572	0.564	0.345
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	56.5	77.7	138	20.4	23.4	22.9	22.2	22.9
Manganese, total	mg/L	--	24.7	12.6	1.9	0.254	0.0847	0.261	0.194	0.116
Mercury, total	mg/L	0.002	0.000117	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0184	0.0727	0.0108	0.00746	0.0068	0.0069	0.00462	0.00916
Potassium, total	mg/L	--	14.4	46.2	85.7	2.34	3.93	6.01	6.73	2.28
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	82.4	493 B	253	55.7	71.3	64.8	63.7	71.4
Thallium, total	mg/L	0.002	0.001 U	0.001 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.0013	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.0127	0.00897	0.0261 B	0.0107	0.004 U	0.00945	0.00476	0.0089
VOCs										
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 2
Spring 2019 Results

Parameters	Units	MCL	OB025 4/10/2019 Sampling Results	OB102 4/15/2019 Sampling Results	OB105 4/9/2019 Sampling Results	ST015 4/8/2019 Sampling Results	ST065 4/8/2019 Sampling Results	ST70 4/8/2019 Sampling Results	ST80 4/8/2019 Sampling Results	ST120 4/8/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1.1	1 J	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	14.5	7.2 B	9.4 B	5.2	5 U	9.7	10.4	5.1
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	2	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	3.6	1 U	1.9	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isobutyl Alcohol	µg/L	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 U	1 U	1 U	1 J	1 U	1 U	1 U	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 3
Relative Percent Difference for Volatile Organic Compounds - Duplicate Analysis

Parameter	OB30[1]	MW-13B	RPD	OB40[1]	MW-24B	RPD	OB50[1]	OB11	RPD
1,1-Dichloroethane	9.6	9.9	3.1%	4.4	4.3	2.3%	12.8	12.8	0.0%
1,2-Dichlorobenzene	1 U	1 U	NA	1 U	1 U	NA	3.0	2.8	6.9%
1,2-Dichloroethane	1.7	1.7	0.0%	1 U	1 U	NA	2.5	2.4	4.1%
1,2-Dichloropropane	4.9	5.3	7.8%	1 U	1 U	NA	4.8	4.4	8.7%
1,4-Dichlorobenzene	6.1	6.1	0.0%	1 U	1 U	NA	18.6	17.0	9.0%
2-Butanone (MEK)	5 U	5 U	NA	25.1	25.2	0.4%	5 U	5 U	NA
Acetone	5 U	5.5	NA	43.8	44.3	1.1%	10	8.6	15.1%
Benzene	1.7	1.6	6.1%	5.6	5.4	3.6%	2.7	2.7	0.0%
Chlorobenzene	1.3	1.3	0.0%	3.6	3.4	5.7%	23.2	22.3	4.0%
Cis-1,2-Dichloroethene	57.6	58.4	1.4%	2.7	2.4	11.8%	90.9	89.5	1.6%
Methyl tert-butyl ether (MTBE)	1 U	1 U	NA	1 U	1 U	NA	2.0	2.1	4.9%
Methylene chloride	3.3	3.7	11.4%	1 U	1 U	NA	5.4	5.6	3.6%
o-Xylene	1 U	1 U	NA	1.3	1.1	16.7%	1 U	1 U	NA
Tetrachloroethene	10.2	9.7	5.0%	1 U	1 U	NA	10.4	10.1	2.9%
Toluene	1 U	1 U	NA	76.1	76.4	0.4%	1 U	1 U	NA
Trans-1,2-Dichloroethene	2.4	2.3	4.3%	3.0	3.4	12.5%	3.2	3.0	6.5%
Trichloroethene	12.4	12.3	0.8%	1 U	1 U	NA	11.5	11.3	1.8%
Vinyl chloride	6.1	6	1.7%	1.8	1.6	11.8%	14.4	13.9	3.5%

(1) Duplicate sample

Table 4

Relative Percent Difference for Inorganics and General Water Quality Parameters - Duplicate Analysis

Parameter	OB30[1]	MW-13B	RPD	OB40[1]	MW-24B	RPD	OB50[1]	OB11	RPD
Alkalinity	207	209	0.96%	294	296	0.7%	257	255	0.8%
Arsenic	0.001 U	0.001 U	NA	0.03310	0.03230	2.4%	0.001 U	0.001 U	NA
Barium, total	0.0712	0.0738	3.6%	0.191	0.190	0.5%	0.0262	0.0267	1.9%
Cadmium, total	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA	0.0139	0.0141	1.4%
Calcium, total	75.1	76.9	2.4%	90.1	89.7	0.4%	138	145	4.9%
Chemical Oxygen Demand	8	7	13.3%	42.0	43.0	2.4%	35.0	34.0	2.9%
Chloride	115	115	0.0%	294	293	0.3%	447	458	2.4%
Chromium, total	0.001 U	0.00126	NA	0.00409	0.00339	18.7%	0.001 U	0.00146	NA
Cobalt, total	0.001 U	0.001 U	NA	0.0522	0.0516	1.2%	0.00174	0.00176	1.1%
Iron, total	0.1 U	0.157	NA	48.1	47.8	0.6%	0.1 U	0.1 U	NA
Lead, total	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA
Magnesium, total	29.9	30.6	2.3%	83.6	83.3	0.4%	90	94	4.6%
Manganese, total	0.0411	0.0430	4.5%	4.35	4.41	1.4%	1,460	1,530	4.7%
Mercury, total	0.000286	0.000372	26.1%	0.0001 U	0.0001 U	NA	4.01	4	0.2%
Nickel, total	0.00242	0.00278	13.8%	0.0173	0.0169	2.3%	34.2	35.2	2.9%
Nitrate	0.3	0.2 U	NA	0.3	0.6	66.7%	0.4	0.5	22.2%
Potassium, total	3.50	3.50	0.0%	3.98	3.92	1.5%	5,100	5,170	1.4%
Selenium, total	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA
Sodium, total	19000	19500	2.6%	3.49	3.48	0.3%	109,000	115,000	5.4%
Sulfate	15.70	15.70	0.0%	1.0 U	1.0 U	NA	12.7	12.6	0.8%
Thallium, total	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA
Total Dissolved Solids	537	545	1.5%	987	986	0.1%	1,420	1,440	1.4%
Total Hardness	311,000	318,000	2.2%	570,000	567,000	0.5%	714,000	751,000	5.1%
Vanadium, total	0.001 U	0.00104	NA	0.001 U	0.001 U	NA	0.001 U	0.001 U	NA
Zinc, total	0.004 U	0.004 U	NA	0.00485	0.004 U	NA	0.049	0.0469	4.4%

(1) Duplicate sample

(2) RPDs>20% are shaded

Table 5
MCL Exceedances - Volatile Organic Compounds

Monitoring Well	Parameter	Units	MCL	Result
Northwest				
MW-13A	Tetrachloroethene	µg/L	5	7.1
	Trichloroethene	µg/L	5	11.7
	Vinyl Chloride	µg/L	2	3.8
MW-13B	1,2-Dichloropropane	µg/L	5	5.3
	Tetrachloroethene	µg/L	5	9.7
	Trichloroethene	µg/L	5	12.3
	Vinyl Chloride	µg/L	2	6
OB03	Vinyl Chloride	µg/L	2	5.8
OB03A	Vinyl Chloride	µg/L	2	3.1
West				
MW-9	Tetrachloroethene	µg/L	5	8.4
Southwest				
OB12	1,2-Dichloropropane	µg/L	5	8.1
	Tetrachloroethene	µg/L	5	13
	Trichloroethene	µg/L	5	12.3
	Vinyl Chloride	µg/L	2	7.1
MW-21A	Trichloroethene	µg/L	5	5.6
MW-21B	Trichloroethene	µg/L	5	11.7
	Vinyl Chloride	µg/L	2	2.4
South				
OB11	cis-1,2-Dichloroethene	µg/L	70	89.5
	Methylene Chloride	µg/L	5	5.6
	Tetrachloroethene	µg/L	5	10.1
	Trichloroethene	µg/L	5	11.3
	Vinyl Chloride	µg/L	2	13.9
OB11A	Vinyl Chloride	µg/L	2	6.9
Southeast				
MW-24A	Vinyl Chloride	µg/L	2	2.4
MW-24B	Benzene	µg/L	5	5.4
OB10	Trichloroethene	µg/L	5	5.8
	Vinyl Chloride	µg/L	2	20.9

Table 6
MCL Exceedances - Inorganics

Monitoring Well	Parameter	Units	MCL	Result
South				
OB11	Cadmium, total	mg/L	0.005	0.0141
	Mercury, total	mg/L	0.002	0.004
Southeast				
MW-24B	Arsenic, total	mg/L	0.01	0.0323

Table 7
Historical Methane Concentrations (% by volume)

Well	9/20/2005	4/4/2006	9/26/2006	4/17/2007	10/2/2007	3/27/2008	9/23/2008	3/5/2009	9/21/2009	3/24/2010	9/14/2010	4/19/2011	9/6/2011	3/7/2012	9/10/2012	3/18/2013	9/11/2013	3/6/2014	9/2/2014	3/19/2015	8/31/2015
OB01	0.0	16.8	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.9	1.3	3.7
OB02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB02A	2.9	0.0	4.5	24.2	0.0	0.0	1.6	1.3	2.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB03A	48.3	47.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB04A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB0105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
OB08A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
OB0102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB07A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
OB011A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0
OB025	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB015	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0
OB012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-1B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0
MW-2A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-2B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-3A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
MW-3B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
MW-04	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-06	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-07	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-08	--	--	--	--	--	--	--	--	--	--	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-09	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
MW-10	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-11A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0
MW-11B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0
MW-12	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
MW-13A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-13B	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
MW-14A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-14B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-16A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-16B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-19A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-19B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-21A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-21B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-22A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-22B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-23A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-23B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-24A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-24B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Unable to sample - well within construction site

Table 7
Historical Methane Concentrations (% by volume)

Well	Well	3/18/2016	9/2/2016	3/6/2017	9/19/2017	4/5/2018	9/7/2018	4/8/2019
OB01	OB01	7.2	2.7	0.2	8.1	9.3	20.2	0.0
OB02	OB02	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB02A	OB02A	0.0	0.0	0.0	0.0	0.0	1.4	0.0
OB03	OB03	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB03A	OB03A	0.0	0.0	0.0	0.0	0.0	0.0	0.1
OB04	OB04	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB04A	OB04A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB0105	OB0105	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB08	OB08	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB08A	OB08A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB0102	OB0102	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB06	OB06	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB07	OB07	0.0	0.0	0.0	0.0	0.0	0.1	0.0
OB07A	OB07A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB011	OB011	0.0	0.0	0.0	0.0	0.0	0.1	0.0
OB011A	OB011A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB025	OB025	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB015	OB015	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB012	OB012	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB10	OB10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-1B	MW-1B	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-2A	MW-2A	0.0	0.0	0.0	0.0	0.0	0.1	13.3
MW-2B	MW-2B	0.0	0.0	0.0	0.0	0.0	0.1	1.6
MW-3A	MW-3A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-3B	MW-3B	0.0	0.0	0.0	0.1	0.0	0.0	0.0
MW-04	MW-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-06	MW-06	0.1	0.1	6.0	0.0	0.0	0.0	0.0
MW-07	MW-07	0.0	0.0	0.0	0.0	0.0	57.8	0.02
MW-08	MW-08	0.0	0.0	0.0	0.0	0.0	6.8	0.0
MW-09	MW-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-10	MW-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-11A	MW-11A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-11B	MW-11B	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-12	MW-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-13A	MW-13A	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-13B	MW-13B	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-14A	MW-13B	--	--	--	--	--	--	0.0
MW-14B	MW-13B	--	--	--	--	--	--	0.0
MW-15	MW-13B	--	--	--	--	--	--	0.0
MW-16A	MW-16A	--	--	--	0.0	0.0	0.0	0.0
MW-16B	MW-16B	--	--	--	0.0	0.0	0.0	0.0
MW-19A	MW-19A	--	--	--	0.0	0.0	0.0	0.0
MW-19B	MW-19B	--	--	--	0.0	0.0	0.0	0.0
MW-21A	MW-21A	--	--	--	0.7	0.0	0.0	0.0
MW-21B	MW-21B	--	--	--	0.0	0.0	0.0	0.0
MW-22A	MW-22A	--	--	--	0.0	0.0	0.0	0.0
MW-22B	MW-22B	--	--	--	0.0	0.0	0.0	0.0
MW-23A	MW-23A	--	--	--	0.0	0.0	0.0	0.0
MW-23B	MW-23B	--	--	--	0.1	0.1	0.0	0.0
MW-24A	MW-24A	--	--	--	13.5	2.3	0.0	0.0
MW-24B	MW-24B	--	--	--	2.9	0.0	0.0	0.0

* Unable to * Unable to sample - well within construction site

Table 8
Gude Landfill Groundwater Monitoring Data
Chemical Constituents with Statistically Significant Increasing Trends
(2001 through April 2019)

GROUNDWATER MONITORING WELL LOCATIONS																											
	Northwest								West					Southwest	South			Southeast				Northeast					
Parameter	OB03	OB03A	OB04	OB04A	OB105	MW-11B	MW-12	MW-13B	OB01	OB02A	MW-6	MW-7	MW-9	OB12	OB11	OB11A	OB025	OB08	OB08A	OB10	MW-4	OB06	OB07	OB07A	OB102	MW-2A	MW-2B
1,1-Dichloroethane														X													
1,2-Dichlorobenzene	X														X	X											
1,2-Dichloroethane														X													
1,2-Dichloropropane														X				X									
1,4-Dichlorobenzene	X	X	X	X	X							X		X	X	X		X	X	X							
Benzene			X	X										X													
Chlorobenzene			X	X								X		X				X	X	X		X			X		
cis-1,2-Dichloroethene					X	X						X		X			X	X		X			X				
Methylene Chloride			X																								
Tetrachloroethene						X																					
trans-1,2-Dichloroethene														X													
Trichloroethene						X																					
Vinyl Chloride				X																X							
Arsenic, total				X																							
Barium, total			X	X	X				X	X		X						X		X					X		
Cadmium, total															X												
Calcium, total	X	X	X	X					X		X	X		X	X	X				X			X				
Cobalt, total									X		X	X							X	X							
Copper, total			X	X																							
Iron, total										X		X															
Magnesium, total	X	X		X		X			X		X	X			X	X				X			X				
Manganese, total			X	X	X				X	X		X			X	X	X		X	X		X	X				
Mercury, total															X												
Nickel, total			X	X					X	X	X				X					X					X		
Potassium, total					X				X											X					X		
Selenium, total			X	X											X	X						X	X	X			
Sodium, total					X				X	X	X	X			X	X				X		X					
Alkalinity				X	X							X		X	X	X						X	X				
Ammonia Nitrogen					X														X						X		
Chemical Oxygen Demand	X		X	X								X										X	X				
Chloride	X		X	X		X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X			X
Dissolved Oxygen, Field													X													X	
Hardness			X	X		X		X	X	X				X	X					X			X			X	
Nitrate						X		X	X	X											X						
Nitrate+Nitrite						X		X	X	X											X						
Phosphate																			X				X	X			
Specific Conductivity, Field	X	X	X	X	X				X		X				X	X	X			X		X					
Sulfate, total							X	X				X		X	X			X			X		X				

Notes:
1. Monitoring wells MW-1B, MW-3A, MW-3B, MW-8, MW-11A, OB02, and OB015 had no parameters with increasing trends.
2. Existing monitoring wells MW-1B, MW-2A, MW- 2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A and MW-13B were first sampled in 2010.
3. MW-14A, MW-14B, and MW-15 were sampled during April 2019 event for the second time and therefore do not have sufficient data for statistical analysis.
4. MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, and MW-23B were installed between January and March 2017 and therefore do not have sufficient data for statistical analysis.

Table 9
Gude Landfill Groundwater Monitoring Data
Chemical Constituents with Statistically Significant Decreasing Trends
(2001 through April 2019)

GROUNDWATER MONITORING WELL LOCATIONS																																			
	Northwest											West							Southwest		South			Southeast						Northeast					
Parameter	OB03	OB03A	OB04	OB04A	OB105	MW-8	MW-11A	MW-11B	MW-12	MW-13A	MW-13B	OB01	OB02	OB02A	MW-6	MW-7	MW-9	MW-10	OB015	OB12	OB11	OB11A	OB025	OB08	OB08A	OB10	MW-3A	MW-3B	MW-4	OB06	OB07A	OB102	MW-1B	MW-2A	MW-2B
1,1-Dichloroethane	X	X								X	X	X			X							X													
1,2-Dichloropropane		X									X																								
1,4-Dichlorobenzene											X																								
Benzene	X	X								X	X											X													
Chlorobenzene	X	X																				X													
Chloroethane	X	X																																	
cis-1,2-Dichloroethene										X	X	X	X	X	X							X								X	X				
Dichlorodifluoromethane	X	X		X						X	X										X	X				X									
Methylene Chloride										X	X											X													
Tetrachloroethene	X									X	X										X	X									X			X	X
trans-1,2-Dichloroethene										X	X																								
Trichloroethene	X	X		X						X	X	X		X								X			X	X									
Trichlorofluoromethane																						X													
Vinyl Chloride	X									X	X	X							X																
Barium, total	X	X				X	X		X	X							X	X		X						X	X	X					X		
Cadmium, total																						X													
Calcium, total					X		X		X								X	X								X	X					X			
Chromium, total							X											X	X							X	X								
Cobalt, total	X	X					X												X							X	X					X			
Copper, total	X	X				X	X		X	X		X	X	X	X			X	X	X	X	X		X	X	X	X				X		X		
Iron, total	X				X		X		X	X								X	X				X			X		X				X	X		
Lead, total							X		X						X				X							X	X								
Magnesium, total							X		X	X								X								X	X					X			
Manganese, total							X		X								X		X							X		X					X		X
Nickel, total		X							X										X									X							
Potassium, total	X						X		X								X	X				X				X	X	X		X					
Selenium, total															X																				
Sodium, total						X				X																X	X					X			X
Vanadium, total							X			X								X								X	X								
Zinc, total		X					X					X			X					X		X	X			X	X	X		X		X			
Alkalinity							X			X	X	X					X	X						X	X			X	X						
Ammonia Nitrogen	X	X																				X													
Chemical Oxygen Demand																																X			
Chloride						X			X									X																	
Dissolved Oxygen, Field																												X							
Hardness					X				X																X							X			
Nitrate										X						X				X										X					
Nitrate+Nitrite										X						X				X										X					
Nitrite																														X					
ORP, Field	X	X	X		X		X	X	X		X					X	X	X	X	X		X	X		X	X						X	X		
pH, Field			X																				X					X	X						
Specific Conductivity, Field																		X																	
Sulfate, total					X																	X						X				X			
Total Dissolved Solids			X	X					X	X								X	X								X	X			X	X			
Turbidity																			X																
Turbidity, Field					X		X		X	X					X		X	X											X			X			

Notes:
1. Monitoring well OB07 had no parameters with decreasing trends.
2. Existing monitoring wells MW-1B, MW-2A, MW- 2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A and MW-13B were first sampled in 2010.
3. MW-14A, MW-14B, and MW-15 were sampled during April 2019 event for the second time and therefore do not have sufficient data for statistical analysis.
4. MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, and MW-23B were installed between January and March 2017 and therefore do not have sufficient data for statistical analysis.

Appendix A

Field Forms

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Appendix B

Chain-of-Custody Documents

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Appendix C

Laboratory Reports

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Appendix D

Maximum Contaminant Level Exceedance Graphs

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Appendix E

Historical Data Tables

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