# 2017 ANNUAL ENVIRONMENTAL MONITORING REPORT

## Hansville Landfill, Kitsap County, Washington

Prepared for: Kitsap County Public Works - Solid Waste

Project No. 160423-05 • February 28, 2018 Final

Aspect CONSULTING

earth + water

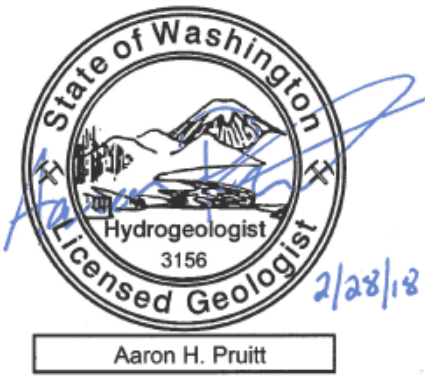
# 2017 ANNUAL ENVIRONMENTAL MONITORING REPORT

## Hansville Landfill, Kitsap County, Washington

Prepared for: Kitsap County Public Works - Solid Waste

Project No. 160423-05 • February 28, 2018 Final

Aspect Consulting, LLC




**Aaron H. Pruitt, LHG**
Project Hydrogeologist
apruitt@aspectconsulting.com

**Peter S. Bannister, PE**
Associate Engineer
pbannister@aspectconsulting.com

V:\160423 Kitsap County Hansville Landfill\Deliverables\2017 Reports\2017 Annual Report\Final\Hansville LF 2017 Annual Report_Final_20180228.docx

# Contents

## List of Tables



## List of Appendices

# Acronyms

| | |
|---|---|
| Aspect | Aspect Consulting, LLC |
| BETX | benzene, ethylbenzene, toluene and xylenes |
| CAP | Cleanup Action Plan |
| CMP | Compliance Monitoring Plan |
| COCs | contaminants of concern |
| CUL | Cleanup level |
| Ecology | Washington Department of Ecology |
| gpm | gallons per minute |
| KCSL | Kitsap County Sanitary Landfill |
| mg/kg | milligrams/kilograms |
| mg/L | milligrams per liter |
| µg/L | micrograms per liter |
| MSW | municipal solid waste |
| MTCA | Model Toxics Control Act |
| NFA | No Further Action |
| PCE | perchloroethylene |
| RASR | Remedial Action Status Report |
| RI/FS | Remedial Investigation/Feasibility Study |
| SAP | Sampling Analysis Plan |
| SHA | Site Hazard Assessment |
| SVE | soil vapor extraction |
| UCL / LCL | upper confidence limit / lower confidence limit |
| TEF | toxic equivalency factor |
| VOC | volatile organic compound |
| WAC | Washington Administrative Code |
| WDNR | Washington Department of Natural Resources |
| WMN | Waste Management of Washington |

# 1 Introduction

This combined fourth quarter 2017 and 2017 annual monitoring report documents site activities and environmental monitoring results conducted at the Hansville Landfill Site (Site), and was prepared by Aspect Consulting, LLC (Aspect) on behalf of Kitsap County Public Works Solid Waste Division and Waste Management of Washington (WMW). Cleanup activities at the Site have been conducted under the Model Toxics Control Act (MTCA). Ongoing environmental monitoring at the Site supports the remedy of natural attenuation of groundwater with enhanced monitoring and institutional controls that was established with the final Cleanup Action Plan (CAP) provided with the Amended Consent Decree No. 95-2-03005-1 (August 5, 2011). The data sets presented in this letter report were collected in accordance with the Ecology-approved Compliance Monitoring Plan (CMP) (SCS Engineers, 2011; SCS Engineers, 2012), except where otherwise noted.

During 2017, conditions monitored at the Site were consistent with historical trends showing improvements in protection of human health and the environment. In January 2017, Kitsap County and WMW contracted with Aspect to implement the CAP, and the transition from the previous consultant, SCS Engineers, was smooth.

This report is organized similar to previous 2017 quarterly reports, and includes topics listed in the CMP (SCS Engineers, 2011).

- Section 2 summarizes Site background, including general Site information, regulatory framework, surrounding land use, hydrogeologic conditions, the environmental monitoring network, and cleanup criteria.
- Section 3 describes Site activities during the fourth quarter 2017, and provides a summary of previous Site activities in 2017.
- Section 4 describes landfill gas collection activities and monitoring results during the fourth quarter 2017. The landfill gas collection system was safely operated to improve groundwater protection.
- Section 5 describes groundwater and surface water conditions observed during the fourth quarter 2017, including statistical analysis of trends in groundwater concentrations, and an assessment of natural attenuation processes.
- Section 6 summarizes landfill inspection reports prepared by the Kitsap Public Health District.

# 2 Site Background

Details on Site background were provided in the Remedial Investigation (RI) report (Parametrix, 2007), and the Feasibility Study (FS) report (Parametrix, 2009). This section summarizes Site background to provide context for ongoing Site activities and compliance monitoring.

## 2.1 Site Location and Description

The closed Hansville Landfill is located on an approximately 73-acre parcel within the northeast quarter of Section 9, Township 27 North, Range 2 East of the Willamette Meridian, in Kitsap County, Washington. The Landfill is approximately five miles south of the unincorporated community of Hansville on the northernmost reach of the Kitsap Peninsula, and is situated on the upper portions of several sloping drainages with perennial creeks that ultimately discharge into Port Gamble Bay. The topography ranges between approximately 310 and 390 feet NAVD88. A Site location map is provided in Figure B-1, showing property boundaries and other Site features.

The Site includes the Landfill, the Landfill property (Property), and a portion of land owned by the Port Gamble S'Klallam Tribe. The Landfill was active between 1962 and 1989, and consists of three separate disposal areas, or cells. These include the following:

- 13-acre municipal solid waste disposal cell (main MSW cell) situated within the central portion of the Property;
- 4-acre demolition disposal cell situated on the northeast corner of the property, which accepted construction, demolition, and land clearing wastes; and,
- 1/3-acre septage lagoon located immediately southwest of the demolition disposal area, which accepted residential septic tank waste until 1982. A second septage disposal area was reportedly located near the northeast corner of the demolition disposal area.

### *2.1.1 Engineering Controls*

The engineering controls at the Landfill include engineered cover systems and an active landfill gas collection system. The engineered cover systems incorporate a geomembrane, vegetated surface, and integrated surface water control to prevent erosion. The layout of the landfill gas collection system is shown on Figure A-1, and includes:

- 13 vertical collection wells installed within the main MSW cell;
- 10 perimeter collection wells installed outside the western edge of the main MSW cell;
- approximately 3,200 feet of horizontal collector trench installed below the engineered cover system at the main MSW cell and the demolition disposal cell with 8 monitoring and control points; and,
- laterals and a perimeter header leading to the blower and flare compound.

### 2.1.2 Current Property Uses

The County owns the Property, and has operated a transfer station east of the Landfill for solid waste transfer and/or recycling operations since 1989. The remaining portions of the Property are largely comprised of a former soil borrow area and wooded land. Prior to development of the landfill, the Property was undeveloped forested land.

## 2.2 Regulatory Framework

The Hansville Landfill is a former municipal solid waste landfill that stopped accepting waste and closed in 1989. The closure met requirements of Chapter 173-304 of the Washington Administrative Code (WAC), and included the following engineering controls (for example):

- Installation of horizontal gas collector trenches in the main MSW cells and the demolition disposal cell to prevent landfill gas migration, and
- Installation of an engineered cover system over all three distinct disposal areas to reduce or eliminate precipitation infiltration through refuse.

In 1991, the Bremerton-Kitsap County Health Department required corrective actions to better control landfill gas migration and prevent groundwater impacts. Kitsap County Sanitary Landfill[1] (KCSL) converted the landfill gas collection system from passive to active. KCSL also conducted additional investigations, continued environmental monitoring, and implemented additional improvements at the Site as part of a corrective action program. The active landfill gas collection and flare system has been in operation since 1991.

Also, in 1991, the Washington Department of Ecology (Ecology) performed a Site Hazard Assessment (SHA) under the Model Toxics Control Act (MTCA) Regulations, which resulted in an initial ranking of 3. In 1992, this ranking was subsequently changed to a 1 (the highest rank on a scale of 1 to 5) based on changes in the state ranking model.

In October 1995, Ecology signed a consent decree with the County and KCSL to conduct a RI/FS for the Site. The RI/FS reports (Parametrix, 2007; Parametrix, 2009) identified contaminants of concern (COCs) related to the landfill in groundwater and in seepage to surface water. Based on these findings, Site-specific cleanup levels were developed for arsenic, vinyl chloride, and manganese in groundwater, and arsenic and vinyl chloride in surface water. The highest concentrations of these COCs were observed adjacent to the waste disposal areas, with decreasing concentrations at increasing distances to the landfill.

In preparing the 2011 Amended Consent Decree and CAP, Ecology selected the remedy involving natural attenuation of groundwater with enhanced monitoring and institutional controls (including a restrictive covenant for the Landfill Property). A CMP (SCS Engineers, 2011; SCS Engineers, 2012) provides monitoring program details, including the Sampling and Analysis Plan and the Quality Assurance Plan. Compliance monitoring under the CAP has been conducted since the fourth quarter of 2011.

[1] By 1998, WMW assumed control of KCSL through a series of sales, mergers, and acquisitions.

During the summer of 2016, Ecology initiated the first five-year review of the Hansville Landfill MTCA remedy as defined under the 2011 Amended Consent Decree. Consistent with Section XXVI of the Amended Consent Decree, a Remedial Action Status Report (RASR; SCS Engineers, May 2016) was prepared and submitted to Ecology. In August 2016, Ecology prepared a draft memorandum that included an evaluation of the previous five years of groundwater data and comments to the RASR. Based on Ecology's review, the current monitoring program will continue to be implemented through the next five-year MTCA review cycle.

## 2.3 Surrounding Land Use

The Property is bordered to the south and west by lands owned by the Port Gamble S'Klallam Tribe. Tribal lands in the immediate vicinity of the Landfill Property consists of woodland and recreational land. The Point Casino and Hotel is located approximately 1,000 feet from the Landfill. The nearest Tribal residential land use is approximately 2,000 feet from the landfill.

Surrounding areas to the north and east of the Landfill Property are zoned by Kitsap County as light industrial use, low-density residential, and rural woodland. The nearest off-property structures include a shop and office approximately 200 feet from the demolition disposal cell.

## 2.4 Hydrogeology

The regional near-surface geology in the vicinity of the Hansville Landfill is dominated by glacio-fluvial and glacio-lacustrine deposits associated with the Vashon glaciation. The RI (Parametrix, 2007) identifies the following main stratigraphic units at the Site (from ground surface downward):

- Sand – This unit was reported in all the investigative borings from the ground surface to depths ranging from 62 to 142 feet below ground surface (bgs). The sand deposit consists primarily of poorly graded, fine- and medium-grained sand with trace amounts of silt and gravel. The material is dark yellowish brown to dark gray in color, dense to very dense, and dry to saturated. The RI references the sand unit as the upper aquifer. This unit has been interpreted as outwash associated with the Vashon Drift.
- Transition Zone – This zone was reported at three boring locations (MW-8, MW-9, and MW-14), and is approximately 15 feet thick. It consists of interbedded layers of sand, silty sand, and silt, and does not appear to be really extensive.
- Silt – This unit was reported in all borings advanced through the upper aquifer. It occurred at depths ranging from approximately 66 feet bgs (at MW-9) to 163 feet bgs (at MW-14). The silt is dark gray, silty to moderately plastic, very dense, and dry. This unit has been interpreted to be the Kitsap Formation.

Groundwater in the upper aquifer near the Landfill is approximately 50 feet below the bottom extent of refuse. Groundwater flows towards the west-southwest, and discharges into the headwaters of perennial creeks, including Creek A, Creek B, and Middle Creek

(see Figure B-1). The dense silts reported for the Kitsap Formation underlying the upper aquifer restrict downward groundwater flow.

## 2.5 Environmental Monitoring Network

This section summarizes historical development of the Site performance and compliance monitoring network. The following are the conditional points of compliance for the Hansville Site described in the CAP:

- The Upper Aquifer at the Landfill Property boundary;
- The Upper Aquifer downgradient of the Landfill Property boundary and upgradient of the creek headwaters on tribal property; and
- Groundwater discharge to surface water at the headwaters of Creek A, Creek B, and Middle Creek on tribal property.

### *2.5.1 Subsurface Gas*

The landfill gas collection system and gas probes have been monitored since 1990 to assess potential landfill gas migration from the Landfill, and landfill gas concentrations within the waste.

All subsurface gas probes were installed outside the waste in native soils to measure for potential landfill gas migration. Six subsurface gas probes (GP-1, GP-2S, GP-2I, GP-2D, GP-3, and GP-4) were installed at four on-Property locations in 1990. In 1994, gas probe GP-5 was installed on-Property. In 1996, gas probe GP-6 was installed on-Property, and gas probe GP-7 was installed off-Property, adjacent to groundwater monitoring well MW-9.

Per the CAP, landfill gas performance monitoring includes quarterly field measurements at the 9 subsurface gas probes at 7 locations, and the landfill gas collection system (21 vertical well and horizontal trench monitoring locations, the blower inlet and outlet ports). Subsurface gas compliance monitoring locations are shown on Figures A-1 and B-1.

### *2.5.2 Groundwater*

Groundwater monitoring was initiated at the site in 1982 with the installation of three monitoring wells (MW-1 through MW-3). Three additional monitoring wells (MW-4 through MW-6) were added to the monitoring program in 1988. Beginning in 1996, 10 monitoring wells were installed as part of a phased RI:

- Phase I included wells MW-7 through MW-12; and
- Phase II included wells MW-8D, MW-12I, MW-13S, MW-13D, and MW-14.

Based on the groundwater monitoring results, the CAP includes the following six points of compliance: MW-5, MW-6, MW-7, MW-12I, MW-13D, and MW-14. See Figure B-1 for the groundwater compliance monitoring locations.

### 2.5.3 Surface Water

Surface water monitoring commenced in 1991 at two locations on Middle Creek (SW-1 and SW-2). Two additional locations (SW-SB and SW-3) were added in 1992 and 1994, respectively. Seven new surface water sampling locations (SW-4, SW-5, SW-6, SW-7, SW-8, SW-9, SW-10) were established in 1996 during the RI. Based on the surface water monitoring results, the CAP includes the following four points of compliance: SW-1, SW-4, SW-6, and SW-7. See Figure 2 for the surface water compliance monitoring locations.

### 2.5.4 Cleanup Criteria

The CAP established the final Site-specific cleanup levels for groundwater and surface water, summarized in the table below.

**Table 1. Hansville Landfill Site Cleanup Levels**

| Chemical | Media | Site Cleanup Level (µg/L) | Origin of Cleanup Level |
|---|---|---|---|
| Vinyl Chloride | Groundwater | 0.025 | EPA Human Health, 2004 |
| Arsenic | | 5 | Background |
| Manganese | | 2,240 | Method B Formula Value |
| Vinyl Chloride | Surface Water | 0.025 | EPA Human Health, 2004 |
| Arsenic | | 5 | Background |

The performance standard[2] for on-Property probes is to operate the landfill gas collection system to maintain methane concentrations below five percent by volume.

# 3 Site Activities

Site activities included environmental monitoring of landfill gas, groundwater, and surface water. A chronology of on-Site activities performed during the fourth quarter of 2017 is provided below.

- On October 10, 2017, Aspect conducted monthly system tuning of the landfill gas system, and flow rates were maintained. Details of landfill gas monitoring are provided in Section 4. Also on this date, groundwater and surface water sampling was completed by Aspect representatives. Groundwater and surface water samples were collected in accordance with the CMP (SCS Engineers, 2011). Details of groundwater and surface water sampling are provided in Section 5.
- On November 7, 2017, Aspect conducted monthly system tuning of the landfill gas system, and flow rates were maintained. Details of landfill gas monitoring are provided in Section 4. Aspect also replaced the flexible hose connecting the four

[2] See WAC 173-304-460, from the Minimum Functional Standards for Solid Waste Handling, and one of the regulations listed in the CAP.

major laterals to the perimeter header around the main MSW cell, in order to prevent atmospheric leaks and increase the landfill gas collection performance.

- On December 7, 2017, Aspect conducted landfill gas monitoring in accordance with the CMP (SCS Engineers, 2011), and flow rates were maintained. Details of landfill gas monitoring are provided in Section 4.
- On December 19, Aspect modified the monitoring assembly at TD-1 to prevent liquid accumulation above the orifice plate, and improve landfill gas collection performance.

Previously during 2017, Site activities included the following:

- Project transition tour with SCS Engineers;
- Monthly landfill gas system tuning;
- Quarterly landfill gas compliance monitoring;
- Quarterly groundwater and surface water performance and compliance monitoring;
- Condensate collection sump inspection and assessment; and
- Landfill gas collection system wellhead replacements.

## 3.1 Deviations from the Compliance Monitoring Plan

There were deviations from the CMP (SCS, 2011) during first quarter sampling, but these deviations do not affect project schedule for Site cleanup. The causes of the deviations are identified below, as are solutions for avoiding these issues during future monitoring events.

During first quarter 2017 sampling, samples were not field filtered due to low pressures produced by dedicated pumps in the groundwater monitoring wells (Aspect, 2017a). During subsequent sampling events, a peristaltic pump was used as a booster pump, with disposable tubing inserted into the outlet of the dedicated Grundfos pumps, and water pumped through a 0.45-micrometer (µm) filter. At surface water monitoring locations, a peristaltic pump was used with disposable tubing to draw water from the creek to fill sample bottles. This setup allows for samples to be field filtered as specified in the CMP (SCS, 2011).

# 4 Landfill Gas Conditions

The following sections provide a discussion of landfill gas monitoring, landfill gas collection system performance, and explosive gas control. The layout of the landfill gas collection system is shown on Figure A-1.

The landfill gas collection system has been downsized from the system installed in 1991 due to decreasing methane collection rates, and the associated difficulty in sustaining

flare operation. Landfill gas collection rates decreased steadily until approximately January 2013. Between 2013 and the end of 2017, the landfill gas collection rate was increased from less than 10 standard cubic feet per minute (scfm) to approximately 75 scfm to improve groundwater protection. The maximum design flow rate for the existing landfill gas collection system is approximately 100 scfm.

Since active landfill gas collection started in 1991, the system has historically been operated to protect groundwater, based on available performance monitoring data. In 1995, the maximum methane concentration was 38 percent, and the balance gas was 44 percent, indicating that approximately half of the gas collected was from the atmosphere. Since 2013, the average methane concentration has been less than 5 percent, and the average balance gas has been approximately 78 percent, indicating that nearly all of the gas collected was from the atmosphere.

## 4.1 Landfill Gas Monitoring

During the fourth quarter of 2017, compliance monitoring of the landfill gas collection system and compliance probes occurred on December 7 and the landfill gas collection system was tuned on October 10 and November 7.

Measurements were made with a GEM-5000 multigas meter. Landfill gas monitoring parameters collected for the compliance monitoring event are summarized in Tables A-1 through A-4, and listed below:

- Landfill gas composition measurements included methane (CH4), carbon dioxide (CO2), oxygen (O2), and balance gas (Balance) concentrations.
- Collection system pressure measurements included the static pressure measured before and after any valve adjustments, reported as “initial” and “adjusted,” respectively.
- Collection system flow-rate measurements were obtained at selected locations. At locations with orifice plates, the differential pressure and gas temperature were measured to calculate flow. These locations include the blower inlet, vertical collection wells R-1 through R-8, R-10, R-11, and R-12, and horizontal trench collectors TD-1, TR-1, TR-2, TR-4, and TR-7. Tables A-1 through A-4 present flow rates measured after valve adjustments, reported as “adjusted.”

The perimeter collection wells were operated only temporarily for monitoring, and were otherwise not active during the reporting period.

## 4.2 Landfill Gas System Performance

During the fourth quarter of 2017, the flow at the blower inlet was approximately 76 scfm. Methane and carbon dioxide concentrations at the blower inlet were 4.2 and 14.8 percent by volume, respectively. The oxygen concentration was 1.3 percent by volume. The explosive range for methane in air is approximately 5 to 15 percent by volume, whereas the minimum methane concentration to sustain a flame is approximately 20 percent. Landfill gas measured at the blower inlet has contained less than 20 percent methane since 2012.

During the fourth quarter of 2017, methane concentrations measured at individual collection locations ranged between 0.8 and 9.4 percent by volume, similar to methane concentrations observed during the third quarter 2017. The landfill gas concentrations remained relatively stable during the second half of 2017, following the wellfield optimization efforts during the first half of 2017. Wellfield optimization will continue to focus on maximizing methane and carbon dioxide collection rates.

## 4.3 Explosive Gas Control

Methane was not detected at any of the landfill gas compliance monitoring locations during the fourth quarter of 2017. Carbon dioxide concentrations in the compliance monitoring locations ranged from 0.1 to 4.3 percent by volume, and oxygen concentrations ranged from 15.6 to 21.5 percent by volume. The 2017 landfill gas monitoring results continue to show that the site remains in compliance with subsurface methane threshold of 5 percent by volume at the property boundary.

# 5 Groundwater and Surface Water Conditions

The following sections describe groundwater and surface water monitoring, address observed groundwater elevations and flow, water quality results, and an evaluation of statistical trends to ensure progress toward Site-specific cleanup levels.

## 5.1 Groundwater and Surface Water Monitoring

During the fourth quarter of 2017, groundwater and surface water was monitored and sampled by Aspect on October 10, 2017.

Measurements of field parameters were made with a calibrated YSI multiparameter probe, and a calibrated Hach turbidimeter. Samples for laboratory analysis were collected in supplied bottles and delivered using standard chain-of-custody methods. Field parameters and laboratory results for all sampling events in 2017 are organized in Tables B-2 and B-3, and listed below:

- Field parameters included dissolved oxygen, pH, oxidation reduction potential, specific conductivity, temperature, and turbidity.
- Conventional parameters included alkalinity, ammonia (as N), bicarbonate, carbonate, chloride, nitrate (as N), nitrite (as N), orthophosphate (as P), sulfate, and total organic carbon.
- Dissolved metals included arsenic and manganese.
- Detected volatile organic compounds included total 1,2-dichloroethene, cis-1,2-dichloroethene, diethyl ether, and vinyl chloride.

Sampling procedures detailed in the CMP (SCS Engineers, 2011) were followed, with the exceptions detailed below.

- During the January sampling event, samples were not able to be filtered in the field due to dedicated submersible Grundfos pumps providing insufficient pressure to force water through a 0.45 µm filter. Based on guidance provided by the laboratory (Test America-Denver), unfiltered samples were collected in the laboratory-supplied bottles after they were triple-rinsed to remove acid preservatives. The laboratory was instructed to filter the samples prior to analysis. Surface water samples were similarly collected without field filtering, and submitted to the laboratory to be filtered prior to analysis. Because these samples should have been field filtered and were not, they were subsequently determined to not be representative. Results for dissolved fraction of arsenic, dissolved manganese, and orthophosphate (as P) were classified as unusable per the data validation process in the CMP. Because the laboratory-reported concentrations were not representative of groundwater or surface water, these values are not included in tables or figures, but instead flagged as "R" (Aspect, 2017a). Starting with the second quarter sampling event, Aspect used a peristaltic pump as an in-line "booster" pump to ensure sufficient pressure was available to pass water through a 0.45-µm filter. The peristaltic pump was used at groundwater monitoring wells for field-filtered samples only and at surface water monitoring locations for all samples. (Aspect, 2017b).

Some groundwater and surface water samples collected during the first and second quarters of 2017 were not analyzed within the 48-hour hold time prescribed by the laboratory for ammonia, nitrate, nitrite, and orthophosphate. Affected results were classified as useable per the data validation process in the CMP (SCS Engineers, 2011). These data are reported and flagged as "J" (Aspect, 2017a; Aspect, 2017b). Starting with the third quarter sampling event, samples with short hold times were delivered to Analytical Resources, Inc in Tukwila, WA, to reduce the hold time due to shipment. As a subcontractor to Test America-Denver, this laboratory had already been receiving samples for dissolved arsenic. This change in laboratory reduced the reporting limits for nitrate, nitrite, and orthophosphate.

For the fourth quarter of 2017, no qualifiers were assigned by Aspect or the laboratories, and data quality objectives were met, based on the Quality Assurance Plan provided in the CMP (SCS Engineers, 2011).

## 5.2 Groundwater Elevations and Flow

Depth to groundwater measurements and calculated water table elevations for the fourth quarter of 2017 are presented in Table B-1, and a potentiometric surface map is provided in Figure B-1. Groundwater elevations ranged from 238.7 feet North American Vertical Datum of 1988 (NAVD88) in MW-12I to 268.7 feet NAVD88 in MW-5. Groundwater at the Site flowed generally towards the west-southwest. Groundwater gradients ranged from 0.006 feet/feet in the upgradient areas, to 0.03 feet/feet further downgradient, with the gradient steepening as it approaches the groundwater discharge area (Figure B-1). Groundwater elevation and gradient conditions were consistent with those presented in previous monitoring events.

## 5.3 Water Quality Results

Groundwater quality results from the fourth quarter 2017 are presented in Table B-2, including field parameters, conventional parameters, dissolved metals, and volatile organic compounds. During the fourth quarter 2017 monitoring event, field parameters were within the range of observed values during previous monitoring events, except at MW-14. It showed an increase in dissolved oxygen during the second half of 2017. Dissolved arsenic, dissolved manganese, and vinyl chloride concentrations decreased at groundwater monitoring wells where those compounds had been previously detected.

- The dissolved arsenic concentration at monitoring well MW-14 was 0.0137 mg/L, and exceeded the 0.005 mg/L cleanup level. Dissolved arsenic was detected at concentrations below the cleanup level at the other groundwater points of compliance.
- Dissolved manganese concentrations were less than the 2.24 mg/L cleanup level at all groundwater points of compliance.
- The vinyl chloride concentrations at monitoring wells MW-6, MW-14, and MW-12I were 0.056 ug/L, 0.063 ug/L, and 0.046 ug/L, respectively, and exceeded the 0.025 ug/L cleanup level. Vinyl chloride was not detected at a reporting limit of 0.020 ug/L at other groundwater points of compliance.

Surface water quality results from the fourth quarter 2017 are presented in Table B-3, including field parameters, conventional parameters, dissolved metals, and volatile organic compounds. During the fourth quarter 2017 monitoring event, stream flows appeared seasonally low at the end of the dry season. Field parameters and analyte concentrations observed during the fourth quarter 2017 monitoring event were within the range of observed values during other monitoring events in 2017.

- The dissolved arsenic concentration at surface water monitoring location, SW-6, had a concentration of 0.00811 µg/L, exceeding the Site-specific cleanup level for arsenic of 0.005 µg/L. Historically, SW-6 has had arsenic exceedances during seasonally low stream flows, including the third quarter 2017 (Aspect, 2017c), the third quarter 2016 (SCS, 2016), and the third quarter of 2011 (Parametrix, 2012). During the fourth quarter of 2017, dissolved arsenic was detected at concentrations below the cleanup level at the other surface water points of compliance.
- During the fourth quarter of 2017, vinyl chloride was not detected at a reporting limit of 0.020 ug/L at any surface water compliance monitoring location. Vinyl chloride has not been detected in surface water samples since the third quarter of 2013, and reporting limits have been less than the Site-specific cleanup level of 0.025 µg/L.

## 5.4 Statistical Evaluation

The groundwater quality data were evaluated following the description provided in the CAP (Appendix D). Time-series graphs show arsenic and vinyl chloride concentrations

since 2007. Trend analysis and projected average concentrations are based on data collected since 2007, following Ecology guidance from the first five-year review[3].

### 5.4.1 Time-Series Graphs

Groundwater concentrations over time are shown on Figure C-1 for dissolved arsenic, and on Figure C-2 for vinyl chloride. These figures include graphs for all groundwater points of compliance, and show the Site-specific cleanup levels for reference.

Dissolved arsenic has been detected at all points of compliance and upgradient well MW-5, and concentrations have been below the cleanup level of 5 ug/L for at least 7 years, except at monitoring well MW-14.

Vinyl chloride has been detected at points of compliance downgradient of the main MSW cell, including monitoring wells MW-6, MW-12I, and MW-14. Vinyl chloride concentrations observed at these locations during the fourth quarter of 2017 were at historically low levels.

### 5.4.2 Statistical Trend Analysis

Based on the results of statistical analysis, the dissolved arsenic concentrations in groundwater at MW-14, and vinyl chloride concentrations in groundwater at MW-6, MW-12I, and MW-14, have statistically significant downward trends. These results show continued progress toward achieving Site-specific cleanup levels.

Statistical analysis of groundwater data was performed in accordance with the CMP (SCS Engineers, 2011). The program Sanitas WQStat (ver. 9.0.34) was used to evaluate the Mann-Kendall Test and Sen's Slope. Mann-Kendall testing was performed to assess whether there were statistically significant trends in groundwater concentrations using the two-tailed test (alpha = 0.05). Mann-Kendall results are reported as an approximated normal distribution Test Value "Z" (where the number of data points was greater than 40). Sen's slope analysis was performed to identify the trend direction for statistically significant trends, and reflects the median of the slopes of all pairs of historical data.

Table C-1 provides results of statistical trend analysis, including the Mann-Kendall Test and Sen's Slope analysis. In all cases, the trends are statistically significant because the magnitude of the Mann-Kendall Test Value (Z) was greater than the Critical Value (which is based on the number of data points and alpha). In all cases, the trends are decreasing because the Sen's Slope is negative.

### 5.4.3 Trend Projections

To qualitatively evaluate the convergence of groundwater exceedances with Site-specific cleanup levels, exponential attenuation curves are shown on Figure C-3. These curves are projected 10 years, through the end of 2027. Based on these long-term projections, the findings include the following:

[3] Ecology identified data inconsistencies between Ecology's Environmental Information Management database and the SCS Engineer's reported data set. Arsenic results for second quarter 2014 were not previously submitted to EIM. Two arsenic results (MW-6 on 4/19/2012, MW-7 on 7/5/12) had errors when originally loaded into EIM. These inconsistencies were rectified by Aspect in 2017.

- The Site-specific cleanup levels will be met within the next 10 years for vinyl chloride in MW-12I and MW-14.
- The Site-specific cleanup levels will be met in more than 10 years for vinyl chloride in MW-6 and dissolved arsenic in MW-14.

Optimizing the landfill gas collection system may reduce the time to meet cleanup levels. This is consistent with elements of the contaminant fate and transport model presented in the RI/FS (Parametrix, 2007; Parametrix, 2009). Increasing landfill gas collection reduces the potential for landfill gas (containing carbon dioxide, methane, and volatile organic compounds) to come in contact with groundwater, which results in low dissolved oxygen.

- For vinyl chloride, this means reducing the mass transfer from vapor-phase to groundwater, and increasing the natural attenuation rates.
- For dissolved metals, this means maintaining a higher pH in groundwater, and preventing mobilization of naturally occurring arsenic and manganese.

### 5.4.4 Calculation of Statistical Limits

Where Site-specific groundwater cleanup levels were exceeded, statistical limit concentrations were evaluated to assess the approach toward cleanup levels (CAP, Appendix D). Table C-2 shows the calculated annual statistics—including the mean[4], 95% upper confidence limit (UCL), and 95% lower confidence limit (LCL)—for sampling results from 2007 through 2017.

The statistical limits for vinyl chloride concentrations at MW-6, MW-12I, and MW-14 are all approaching the cleanup level. At MW-14, the statistical mean and UCL arsenic concentrations were decreasing at less than 0.001 ug/L in 2017, as shown in Figure C-3.

# 6 Annual Inspections

During 2017, the Kitsap Public Health District inspected the Hansville Landfill Site. Inspection forms are provided in Appendix E.

[4] The mean statistic was based on the least-squares regression method, as shown by the trend lines in Figure C-3.

# 7 References

Aspect Consulting, LLC (Aspect), 2017c, Third Quarter 2017 Environmental Monitoring Report, Hansville Landfill, Kitsap County, WA, November 29, 2017.

Aspect Consulting, LLC (Aspect), 2017b, Second Quarter 2017 Environmental Monitoring Report, Hansville Landfill, Kitsap County, WA, August 31, 2017.

Aspect Consulting, LLC (Aspect), 2017a, First Quarter 2017 Environmental Monitoring Report, Hansville Landfill, Kitsap County, WA, April 28, 2017.

Parametrix, 2012, 2011 Annual Monitoring Report, Remedial Action at the Hansville Landfill, Kitsap County, WA, February 2012.

Parametrix, 2009, Hansville Landfill Remedial Investigation/Feasibility Study, Final Feasibility Study Report, June 2009.

Parametrix, 2007, Hansville Landfill Remedial Investigation/Feasibility Study, Remedial Investigation Report, July 2007.

SCS Engineers (SCS), 2016, Remedial Action Status Report (RASR), May 2016

SCS Engineers (SCS), 2016, Third Quarter 2016 Environmental Monitoring Report, Hansville Landfill, Kitsap County, WA, October 2016.

SCS Engineers (SCS), 2012, Addendum to the Hansville Landfill Compliance Monitoring Plan, January 27, 2012.

SCS Engineers (SCS), 2011, Compliance Monitoring Plan with Sampling & Analysis Plan and Quality Assurance Plan – Remedial Action at the Hansville Landfill, September 15, 2011.

# 8 Limitations

Work for this project was performed for the Kitsap County Public Works (Client), and this report was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This report does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

# APPENDIX A

# Landfill Gas Data

## Table A-1. Landfill Gas Data, First Quarter, 2017

Project No. 160423, Hansville Landfill, Hansville, WA

| Location | Device ID | Date/Time | Methane, CH4 (% by vol) | Carbon Dioxide, CO2 (% by vol) | Oxygen, O2 (% by vol) | Balance, Bal (% by vol) | Static Pressure inches H2O | | | Gas Temperature degrees F | | | Flow Rate SCFM | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Initial | Adjusted | Maximum | Initial | Adjusted | Maximum | Initial | Adjusted |
| **Blower Inlet** | HANSBLIN | 1/27/2017 7:46 | 3.3 | 11.9 | 6.3 | 78.5 | -3.27 | -3.28 | -3.27 | 39.9 | 39.7 | 39.9 | 76.9 | 76.8 |
| **Blower Outlet** | HANSBLOT | 1/27/2017 12:33 | 3.3 | 12 | 6 | 78.7 | N/A | N/A | 0 | N/A | N/A | N/A | N/A | N/A |
| **Extraction Well 001** | HANSR001 | 1/27/2017 9:13 | 10.3 | 11.5 | 0 | 78.2 | -1.02 | -1.03 | -1.02 | 42.9 | 42.9 | 42.9 | 0.9 * | 0.9 * |
| **Extraction Well 002** | HANSR002 | 1/27/2017 10:49 | 2.8 | 13.8 | 4.1 | 79.3 | -1.83 | -1.82 | -1.82 | 56.2 | 56.2 | 56.2 | 2.2 * | 2.2 * |
| **Extraction Well 003** | HANSR003 | 1/27/2017 10:43 | 12 | 13.1 | 0 | 74.9 | -1.2 | -1.16 | -1.16 | 55.4 | 55.6 | 55.6 | 1.3 | 2.2 |
| **Extraction Well 004** | HANSR004 | 1/27/2017 10:32 | 4.1 | 15 | 2.6 | 78.3 | -2.17 | -2.18 | -2.17 | 56.6 | 56.7 | 56.7 | 0.6 | 0.6 |
| **Extraction Well 005** | HANSR005 | 1/27/2017 10:21 | 5.3 | 15 | 3.3 | 76.4 | -2.19 | -2.2 | -2.19 | 62.9 | 62.9 | 62.9 | 0.5 * | 0.4 * |
| **Extraction Well 006** | HANSR006 | 1/27/2017 10:01 | 2.8 | 16.7 | 1.5 | 79 | -1.42 | -1.42 | -1.42 | 49.2 | 48.6 | 49.2 | 2.4 * | 2.2 * |
| **Extraction Well 007** | HANSR007 | 1/27/2017 9:54 | 3.6 | 14.5 | 1.1 | 80.8 | -1.49 | -1.49 | -1.49 | 56 | 56 | 56 | 1.6 * | 1.6 * |
| **Extraction Well 008** | HANSR008 | 1/27/2017 8:27 | 7.5 | 15.8 | 2.3 | 74.4 | -0.8 | -0.81 | -0.8 | 47.3 | 46.9 | 47.3 | 0.7 * | 0.7 * |
| **Extraction Well 009** | HANSR009 | 1/27/2017 9:01 | 1.3 | 12.4 | 5.6 | 80.7 | -1.09 | -1.09 | -1.09 | 46.7 | 46.8 | 46.8 | 0 * | 0 * |
| **Extraction Well 010** | HANSR010 | 1/27/2017 9:08 | 9.7 | 10.1 | 2.3 | 77.9 | -1.12 | -1.13 | -1.12 | 43.8 | 43.8 | 43.8 | 0.4 * | 0.4 * |
| **Extraction Well 011** | HANSR011 | 1/27/2017 9:26 | 5.6 | 4.1 | 0.1 | 90.2 | -1.04 | -1.05 | -1.04 | 44.3 | 44.3 | 44.3 | 0.2 | 0.2 |
| **Extraction Well 012** | HANSR012 | 1/27/2017 9:32 | 3.8 | 10.8 | 0.9 | 84.5 | -1.13 | -1.14 | -1.13 | 48.2 | 48.2 | 48.2 | 0.1 | 0.1 |
| **Extraction Well 013** | HANSR013 | 1/27/2017 9:49 | 6 | 8.8 | 5.5 | 79.7 | -1.54 | -1.55 | -1.54 | 50.8 | 50.8 | 50.8 | 2 * | 2 * |
| **Trench Well TD-1** | HANSTD01 | 1/27/2017 7:57 | 1.2 | 19.8 | 0 | 79 | -0.45 | -0.44 | -0.44 | 44.5 | 44.5 | 44.5 | 1.9 * | 1.9 * |
| **Trench Well TR-1** | HANSTR01 | 1/27/2017 10:07 | 3 | 14.7 | 2.4 | 79.9 | -1.18 | -1.18 | -1.18 | 52.5 | 52.6 | 52.6 | 2.7 * | 2.7 * |
| **Trench Well TR-2** | HANSTR02 | 1/27/2017 8:36 | 2.5 | 11.6 | 7.2 | 78.7 | -1.01 | -1 | -1 | 41.2 | 41 | 41.2 | 0.1 * | 0.1 * |
| **Trench Well TR-3** | HANSTR03 | 1/27/2017 9:19 | 5.3 | 6.4 | 9.2 | 79.1 | -1.19 | -1.18 | -1.18 | 41.5 | 41.5 | 41.5 | 0.1 * | 0 * |
| **Trench Well TR-4** | HANSTR04 | 1/27/2017 10:27 | 6.4 | 13.7 | 1.3 | 78.6 | -1.38 | -1.4 | -1.38 | 54.4 | 54.4 | 54.4 | 2.9 * | 2.9 * |
| **Trench Well TR-5** | HANSTR05 | 1/27/2017 9:42 | 0 | 0.1 | 22 | 77.9 | -1.23 | -1.22 | -1.22 | 49.5 | 49.4 | 49.5 | 0 * | 0 * |
| **Trench Well TR-6** | HANSTR06 | 1/27/2017 9:37 | 1.6 | 9.3 | 9.9 | 79.2 | -1.21 | -1.21 | -1.21 | 43.5 | 43.6 | 43.6 | 0 * | 0 * |
| **Trench Well TR-7** | HANSTR07 | 1/27/2017 10:38 | 10.1 | 12.9 | 3.4 | 73.6 | 0.2 | 0.21 | 0.21 | 54.6 | 54.4 | 54.6 | 2.9 | 2.8 |
| **Native Extraction Well 1 Shallow** | HANSN01S | 1/27/2017 11:02 | 0 | 2.1 | 19.4 | 78.5 | -0.52 | -0.52 | -0.52 | 50.4 | 50.3 | 50.4 | 2.2 * | 2.2 * |
| **Native Extraction Well 1 Deep** | HANSN01D | 1/27/2017 10:56 | 0 | 2.3 | 19.3 | 78.4 | -0.98 | -0.99 | -0.98 | 52.8 | 52.5 | 52.8 | 0.6 * | 0.6 * |
| **Native Extraction Well 2 Shallow** | HANSN02S | 1/27/2017 11:08 | 0 | 1.5 | 20.8 | 77.7 | -0.26 | -0.25 | -0.25 | 56.8 | 56.9 | 56.9 | 0 * | 0 * |
| **Native Extraction Well 2 Deep** | HANSN02D | 1/27/2017 11:12 | 0 | 1.5 | 20.8 | 77.7 | -0.23 | -0.22 | -0.22 | 54.1 | 54.1 | 54.1 | 0.2 * | 0.2 * |
| **Native Extraction Well 3 Shallow** | HANSN03S | 1/27/2017 11:24 | 0 | 3.6 | 18.1 | 78.3 | -0.96 | -0.98 | -0.96 | 54.4 | 54.4 | 54.4 | 3.4 * | 3.3 * |
| **Native Extraction Well 3 Deep** | HANSN03D | 1/27/2017 11:19 | 0 | 3.3 | 18.4 | 78.3 | -1.35 | -1.36 | -1.35 | 54.5 | 54.5 | 54.5 | 3 * | 3 * |
| **Native Extraction Well 4 Shallow** | HANSN04S | 1/27/2017 11:37 | 0 | 1.9 | 20.3 | 77.8 | -0.49 | -0.49 | -0.49 | 52.8 | 52.8 | 52.8 | 4.1 * | 4.1 * |
| **Native Extraction Well 4 Deep** | HANSN04D | 1/27/2017 11:31 | 0 | 1.6 | 20.5 | 77.9 | -1.36 | -1.36 | -1.36 | 54.5 | 54.4 | 54.5 | 2.7 * | 2.6 * |
| **Native Extraction Well 5 Shallow** | HANSN05S | 1/27/2017 8:19 | 0 | 2.4 | 19.7 | 77.9 | -1.85 | -1.85 | -1.85 | 48.1 | 48.2 | 48.2 | 2.4 * | 2.4 * |
| **Native Extraction Well 5 Deep** | HANSN05D | 1/27/2017 8:14 | 0 | 0.8 | 21.6 | 77.6 | -0.41 | -0.41 | -0.41 | 40.2 | 40.2 | 40.2 | 4.6 * | 4.6 * |
| **Gas Probe 1** | HANSGP01 | 1/27/2017 11:45 | 0 | 0.1 | 21.9 | 78 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Shallow** | HANSGP2S | 1/27/2017 11:54 | 0 | 0.1 | 22 | 77.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Middle** | HANSGP2M | 1/27/2017 11:57 | 0 | 0.1 | 22 | 77.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Deep** | HANSGP2D | 1/27/2017 11:59 | 0 | 0.1 | 22 | 77.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 3** | HANSGP03 | 1/27/2017 12:05 | 0 | 0.3 | 22.1 | 77.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 4** | HANSGP04 | 1/27/2017 12:12 | 0 | 1.1 | 21.5 | 77.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 5** | HANSGP05 | 1/27/2017 8:08 | 0 | 0.1 | 22.3 | 77.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 6** | HANSGP06 | 1/27/2017 12:47 | 0 | 2.7 | 19 | 78.3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 7** | HANSGP07 | 1/27/2017 12:20 | 0 | 0.8 | 21.3 | 77.9 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

**Notes**

GEM™5000; G5 V1_12_40; LSGAM:6_0_20160627; {384895391051}

* Flow estimated assuming valve restriction is equivalent to an orifice plate with a 0.5-inch opening.

## Table A-2. Landfill Gas Data, Second Quarter, 2017

Project No. 160423, Hansville Landfill, Hansville, WA

| Location | Device ID | Date/Time | Methane, CH4 (% by vol) | Carbon Dioxide, CO2 (% by vol) | Oxygen, O2 (% by vol) | Balance, Bal (% by vol) | Static Pressure (inches H2O) | | | Gas Temperature (degrees F) | | | Flow Rate (SCFM) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Initial | Adjusted | Maximum | Initial | Adjusted | Maximum | Initial | Adjusted |
| **Blower Inlet** | HANSBLIN | 6/13/2017 14:14 | 3.4 | 14.4 | 1.4 | 80.8 | -3.33 | -3.3 | -3.3 | 65.7 | 65.7 | 65.7 | 72.2 * | 71.4 * |
| **Blower Outlet** | HANSBLOT | 6/13/2017 14:17 | 3.3 | 14.4 | 1.4 | 80.9 | 0.05 | 0.05 | 0.05 | 60 | 60.2 | 60.2 | N/A | N/A |
| **Extraction Well 001** | HANSR001 | 6/13/2017 9:12 | 6.9 | 11.6 | 0 | 81.5 | -0.86 | -0.85 | -0.85 | 57 | 57 | 57 | N/A | N/A |
| **Extraction Well 002** | HANSR002 | 6/13/2017 10:51 | 1.9 | 14.1 | 2.6 | 81.4 | -1.73 | -1.72 | -1.72 | 64.5 | 64.5 | 64.5 | N/A | N/A |
| **Extraction Well 003** | HANSR003 | 6/13/2017 10:45 | 7.6 | 13.3 | 0 | 79.1 | -0.76 | -0.81 | -0.76 | 59.7 | 59.6 | 59.7 | 2 * | 1.8 * |
| **Extraction Well 004** | HANSR004 | 6/13/2017 10:29 | 2.9 | 14.8 | 1.3 | 81 | -1.9 | -1.9 | -1.9 | 61.1 | 61.1 | 61.1 | 0.7 * | 0.7 * |
| **Extraction Well 005** | HANSR005 | 6/13/2017 10:18 | 3.8 | 15.5 | 1.9 | 78.8 | -2.13 | -2.12 | -2.12 | 66 | 66.2 | 66.2 | N/A | N/A |
| **Extraction Well 006** | HANSR006 | 6/13/2017 10:03 | 2.4 | 15.4 | 2.7 | 79.5 | -1.16 | -1.17 | -1.16 | 61.8 | 61.8 | 61.8 | N/A | N/A |
| **Extraction Well 007** | HANSR007 | 6/13/2017 9:56 | 1.6 | 13.9 | 0.4 | 84.1 | -1.09 | -1.1 | -1.09 | 63.5 | 63.5 | 63.5 | N/A | N/A |
| **Extraction Well 008** | HANSR008 | 6/13/2017 8:48 | 5.1 | 15.4 | 1.6 | 77.9 | -0.89 | -0.9 | -0.89 | 59.4 | 59.4 | 59.4 | N/A | N/A |
| **Extraction Well 009** | HANSR009 | 6/13/2017 9:01 | 1.2 | 13.9 | 3 | 81.9 | -0.87 | -0.88 | -0.87 | 57.2 | 57.2 | 57.2 | N/A | N/A |
| **Extraction Well 010** | HANSR010 | 6/13/2017 9:07 | 6.1 | 9.4 | 3.8 | 80.7 | -0.86 | -0.85 | -0.85 | 55.2 | 55.2 | 55.2 | N/A | N/A |
| **Extraction Well 011** | HANSR011 | 6/13/2017 9:22 | 4 | 4.3 | 0 | 91.7 | -0.67 | -0.67 | -0.67 | 54 | 54 | 54 | 0.2 * | 0.3 * |
| **Extraction Well 012** | HANSR012 | 6/13/2017 9:28 | 13.5 | 2.8 | 0.2 | 83.5 | -0.78 | -0.8 | -0.78 | 53 | 52.9 | 53 | 0 * | 0.1 * |
| **Extraction Well 013** | HANSR013 | 6/13/2017 9:46 | 4.9 | 10.9 | 1.1 | 83.1 | -1.3 | -1.32 | -1.3 | 56.3 | 56.3 | 56.3 | N/A | N/A |
| **Trench Collector TD-1** | HANSTD01 | 6/13/2017 8:27 | 0.8 | 18.9 | 0.1 | 80.2 | -0.38 | -0.38 | -0.38 | 55.6 | 55.6 | 55.6 | N/A | N/A |
| **Trench Collector TR-1** | HANSTR01 | 6/13/2017 10:10 | 3.1 | 14.1 | 2.6 | 80.2 | -1.01 | -0.99 | -0.99 | 63.9 | 63.9 | 63.9 | N/A | 13.7 ** |
| **Trench Collector TR-2** | HANSTR02 | 6/13/2017 8:54 | 2.1 | 13.8 | 3.4 | 80.7 | -0.97 | -0.96 | -0.96 | 58.2 | 58.2 | 58.2 | N/A | 2.7 ** |
| **Trench Collector TR-3** | HANSTR03 | 6/13/2017 9:17 | 5 | 8.3 | 5.2 | 81.5 | -0.92 | -0.9 | -0.9 | 56.8 | 56.8 | 56.8 | N/A | 8.7 ** |
| **Trench Collector TR-4** | HANSTR04 | 6/13/2017 10:25 | 5.5 | 14.4 | 1.1 | 79 | -1.44 | -1.44 | -1.44 | 59.6 | 59.6 | 59.6 | N/A | 43.1 ** |
| **Trench Collector TR-5** | HANSTR05 | 6/13/2017 9:39 | 9.1 | 3.5 | 6.3 | 81.1 | -0.01 | -0.01 | -0.01 | 53.8 | 53.8 | 53.8 | N/A | 1.31 ** |
| **Trench Collector TR-6** | HANSTR06 | 6/13/2017 9:31 | 3 | 12.9 | 3.2 | 80.9 | -0.86 | -0.87 | -0.86 | 56.4 | 56.4 | 56.4 | N/A | 6 ** |
| **Trench Collector TR-7** | HANSTR07 | 6/13/2017 10:39 | 11.1 | 13 | 1.1 | 74.8 | -0.86 | -0.86 | -0.86 | 58.4 | 58.3 | 58.4 | 2.4 * | 4.2 ** |
| **Native Soil Extraction Well 1 Shallow** | HANSN01S | 6/13/2017 11:36 | 0 | 0.5 | 20.2 | 79.3 | -0.79 | -0.79 | -0.79 | 70.2 | 70.3 | 70.3 | N/A | N/A |
| **Native Soil Extraction Well 1 Deep** | HANSN01D | 6/13/2017 11:29 | 0 | 0.4 | 20.5 | 79.1 | -0.82 | -0.83 | -0.82 | 68.9 | 69 | 69 | N/A | N/A |
| **Native Soil Extraction Well 2 Shallow** | HANSN02S | 6/13/2017 11:45 | 0 | 0.2 | 20.6 | 79.2 | -0.05 | -0.06 | -0.05 | 66.9 | 66.9 | 66.9 | N/A | N/A |
| **Native Soil Extraction Well 2 Deep** | HANSN02D | 6/13/2017 11:41 | 0 | 0.1 | 20.6 | 79.3 | -0.08 | -0.09 | -0.08 | 67.4 | 67.5 | 67.5 | N/A | N/A |
| **Native Soil Extraction Well 3 Shallow** | HANSN03S | 6/13/2017 11:55 | 0 | 0.1 | 20.6 | 79.3 | -0.05 | -0.05 | -0.05 | 70.2 | 70.3 | 70.3 | N/A | N/A |
| **Native Soil Extraction Well 3 Deep** | HANSN03D | 6/13/2017 11:50 | 0 | 1.4 | 18.9 | 79.7 | -0.04 | -0.06 | -0.04 | 67.1 | 67.2 | 67.2 | N/A | N/A |
| **Native Soil Extraction Well 4 Shallow** | HANSN04S | 6/13/2017 12:05 | 0 | 0.1 | 20.7 | 79.2 | -0.09 | -0.09 | -0.09 | 67.7 | 67.7 | 67.7 | N/A | N/A |
| **Native Soil Extraction Well 4 Deep** | HANSN04D | 6/13/2017 12:01 | 0 | 0.1 | 20.6 | 79.3 | -0.08 | -0.08 | -0.08 | 66.9 | 67 | 67 | N/A | N/A |
| **Native Soil Extraction Well 5 Shallow** | HANSN05S | 6/13/2017 12:15 | 0 | 1.2 | 19.4 | 79.4 | 0.04 | -0.02 | 0.04 | 70.5 | 70.5 | 70.5 | N/A | N/A |
| **Native Soil Extraction Well 5 Deep** | HANSN05D | 6/13/2017 12:11 | 0 | 0.1 | 20.6 | 79.3 | -2.63 | -2.64 | -2.63 | 69.3 | 69.4 | 69.4 | N/A | N/A |
| **Gas Probe 1** | HANSGP01 | 6/13/2017 12:28 | 0 | 0.8 | 20 | 79.2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Shallow** | HANSGP2S | 6/13/2017 12:50 | 0 | 0.1 | 21.3 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Middle** | HANSGP2M | 6/13/2017 13:01 | 0 | 0.9 | 19.8 | 79.3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 2 Deep** | HANSGP2D | 6/13/2017 13:13 | 0 | 0.2 | 21.3 | 78.5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 3** | HANSGP03 | 6/13/2017 13:25 | 0 | 0.9 | 21 | 78.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 4** | HANSGP04 | 6/13/2017 13:41 | 0 | 1.7 | 19.9 | 78.4 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 5** | HANSGP05 | 6/13/2017 14:08 | 0 | 1.3 | 20.1 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 6** | HANSGP06 | 6/13/2017 8:36 | 0 | 3.1 | 18.3 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| **Gas Probe 7** | HANSGP07 | 6/13/2017 13:51 | 0 | 3.7 | 17.7 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

**Notes**

* Flow rate measured using orifice plate.
** Flow rate measured with a hot-wire anemometer on 5/2/1
"N/A" indicates parameter not measured.
"inches H2O" - inches water column
"degrees F" - degrees Fahrenheit
"SCFM" - standard cubic feet per minute

## Table A-3. Landfill Gas Data, Third Quarter, 2017

Project No. 160423, Hansville Landfill, Hansville, WA

| Location | Device ID | Date/Time | Methane, CH4 (% by vol) | Carbon Dioxide, CO2 (% by vol) | Oxygen, O2 (% by vol) | Balance, Bal (% by vol) | Static Pressure (inches H2O) | | | Gas Temperature (degrees F) | | | Flow Rate (SCFM) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Initial | Adjusted | Maximum | Initial | Adjusted | Maximum | Initial | | Adjusted | |
| **Blower Inlet** | HANSBLIN | 9/14/2017 8:58 | 4.50 | 15.10 | 1.70 | 78.70 | -3.57 | -3.56 | -3.56 | 64.30 | 64.30 | 64.3 | 72.60 | * | 71.50 | * |
| **Blower Outlet** | HANSBLOT | 9/14/2017 9:01 | 4.40 | 15.20 | 1.70 | 78.70 | -0.04 | -0.04 | -0.04 | 59.30 | 59.30 | 59.3 | N/A | | N/A | |
| **Extraction Well 001** | HANSR001 | 9/14/2017 10:07 | 5.60 | 12.60 | 0.20 | 81.60 | -1.04 | -1.07 | -1.04 | 71.60 | 71.30 | 71.6 | 1.40 | * | 1.60 | * |
| **Extraction Well 002** | HANSR002 | 9/14/2017 11:43 | 1.40 | 13.80 | 3.00 | 81.80 | -1.98 | -1.98 | -1.98 | 74.50 | 74.50 | 74.5 | 2.60 | * | 2.70 | * |
| **Extraction Well 003** | HANSR003 | 9/14/2017 11:38 | 6.70 | 12.30 | 0.00 | 81.00 | -1.21 | -1.23 | -1.21 | 77.60 | 78.90 | 78.9 | 2.50 | * | 2.80 | * |
| **Extraction Well 004** | HANSR004 | 9/14/2017 11:26 | 2.30 | 15.90 | 0.00 | 81.80 | -1.59 | -1.60 | -1.59 | 73.30 | 73.30 | 73.3 | 2.20 | * | 2.20 | * |
| **Extraction Well 005** | HANSR005 | 9/14/2017 11:18 | 1.50 | 16.90 | 0.30 | 81.30 | -1.10 | -1.13 | -1.1 | 75.60 | 75.60 | 75.6 | 2.40 | * | 2.40 | * |
| **Extraction Well 006** | HANSR006 | 9/14/2017 11:03 | 2.00 | 15.90 | 2.50 | 79.60 | -1.44 | -1.46 | -1.44 | 79.20 | 79.20 | 79.2 | 1.60 | * | 1.60 | * |
| **Extraction Well 007** | HANSR007 | 9/14/2017 10:58 | 0.60 | 13.40 | 0.10 | 85.90 | -0.88 | -0.88 | -0.88 | 72.80 | 72.80 | 72.8 | 2.80 | * | 2.80 | * |
| **Extraction Well 008** | HANSR008 | 9/14/2017 9:38 | 4.00 | 16.80 | 0.10 | 79.10 | -1.24 | -1.25 | -1.24 | 65.80 | 65.80 | 65.8 | 2.20 | * | 2.20 | * |
| **Extraction Well 009** | HANSR009 | 9/14/2017 9:55 | 1.00 | 14.80 | 2.10 | 82.10 | -2.43 | -2.39 | -2.39 | 77.50 | 77.50 | 77.5 | 0.30 | | 0.40 | |
| **Extraction Well 010** | HANSR010 | 9/14/2017 10:00 | 4.60 | 9.00 | 4.20 | 82.20 | -1.15 | -1.16 | -1.15 | 73.40 | 73.50 | 73.5 | 1.30 | * | 1.30 | * |
| **Extraction Well 011** | HANSR011 | 9/14/2017 10:22 | 2.60 | 5.20 | 0.00 | 92.20 | -1.04 | -1.06 | -1.04 | 74.00 | 74.10 | 74.1 | 0.70 | * | 0.70 | * |
| **Extraction Well 012** | HANSR012 | 9/14/2017 10:28 | 10.00 | 2.00 | 0.00 | 88.00 | -1.26 | -1.40 | -1.26 | 72.00 | 72.40 | 72.4 | 1.00 | * | 1.50 | * |
| **Extraction Well 013** | HANSR013 | 9/14/2017 10:52 | 1.00 | 9.20 | 5.60 | 84.20 | -1.70 | -1.71 | -1.7 | 73.40 | 73.50 | 73.5 | 3.10 | | 3.10 | |
| **Trench Collector TD-1** | HANSTD01 | 9/14/2017 9:15 | 4.60 | 20.90 | 0.00 | 74.50 | -0.09 | -0.07 | -0.07 | 70.20 | 68.20 | 70.2 | 1.30 | * | 3.20 | * |
| **Trench Collector TR-1** | HANSTR01 | 9/14/2017 11:08 | 0.10 | 13.60 | 4.60 | 81.70 | -1.05 | -1.06 | -1.05 | 79.50 | 79.70 | 79.7 | 2.40 | * | 2.40 | * |
| **Trench Collector TR-2** | HANSTR02 | 9/14/2017 9:50 | 6.50 | 16.40 | 0.60 | 76.50 | -1.83 | -1.55 | -1.55 | 67.10 | 67.70 | 67.7 | 0.60 | | 2.70 | |
| **Trench Collector TR-3** | HANSTR03 | 9/14/2017 10:17 | 6.60 | 16.50 | 0.70 | 76.20 | -1.43 | -1.41 | -1.41 | 71.60 | 71.30 | 71.6 | 0.40 | | 1.00 | |
| **Trench Collector TR-4** | HANSTR04 | 9/14/2017 11:22 | 2.60 | 18.20 | 0.00 | 79.20 | -1.06 | -1.06 | -1.06 | 78.80 | 78.80 | 78.8 | 2.20 | * | 2.20 | * |
| **Trench Collector TR-5** | HANSTR05 | 9/14/2017 10:43 | 0.00 | 0.10 | 20.50 | 79.40 | -1.15 | -1.16 | -1.15 | 70.70 | 77.00 | 77 | 3.60 | | 3.60 | |
| **Trench Collector TR-6** | HANSTR06 | 9/14/2017 10:35 | 7.50 | 15.50 | 0.60 | 76.40 | -2.02 | -1.29 | -1.29 | 67.60 | 68.10 | 68.1 | 0.80 | | 2.20 | |
| **Trench Collector TR-7** | HANSTR07 | 9/14/2017 11:32 | 8.90 | 15.10 | 0.40 | 75.60 | -1.13 | -1.13 | -1.13 | 71.90 | 71.90 | 71.9 | 2.80 | * | 2.80 | * |
| **Native Soil Extraction Well 1 Shallow** | HANSN01S | 9/14/2017 11:57 | 0.00 | 1.50 | 18.70 | 79.80 | -0.73 | -0.97 | -0.73 | 66.80 | 67.50 | 67.5 | 1.20 | | 0.30 | |
| **Native Soil Extraction Well 1 Deep** | HANSN01D | 9/14/2017 11:51 | 0.00 | 1.60 | 18.60 | 79.80 | -1.08 | -1.13 | -1.08 | 65.40 | 64.60 | 65.4 | 1.00 | | 0.30 | |
| **Native Soil Extraction Well 2 Shallow** | HANSN02S | 9/14/2017 12:11 | 0.00 | 0.10 | 19.90 | 80.00 | -0.14 | -0.15 | -0.14 | 85.80 | 85.90 | 85.9 | 0.30 | | 0.00 | |
| **Native Soil Extraction Well 2 Deep** | HANSN02D | 9/14/2017 12:06 | 0.00 | 0.20 | 20.00 | 79.80 | -0.09 | -0.09 | -0.09 | 80.60 | 80.70 | 80.7 | 0.00 | | 0.00 | |
| **Native Soil Extraction Well 3 Shallow** | HANSN03S | 9/14/2017 12:21 | 0.00 | 1.80 | 18.10 | 80.10 | -1.00 | -0.53 | -0.53 | 68.30 | 69.40 | 69.4 | 3.90 | | 4.60 | |
| **Native Soil Extraction Well 3 Deep** | HANSN03D | 9/14/2017 12:16 | 0.00 | 1.60 | 18.30 | 80.10 | -0.59 | -0.31 | -0.31 | 76.20 | 79.40 | 79.4 | 4.20 | | 4.70 | |
| **Native Soil Extraction Well 4 Shallow** | HANSN04S | 9/20/2017 16:15 | 0.00 | 1.40 | 20.10 | 78.50 | -0.26 | -0.25 | -0.25 | 64.00 | 64.00 | 64 | 0.00 | | 0.00 | |
| **Native Soil Extraction Well 4 Deep** | HANSN04D | 9/20/2017 16:11 | 0.00 | 1.40 | 19.90 | 78.70 | -0.17 | -0.16 | -0.16 | 64.00 | 64.00 | 64 | 0.00 | | 0.00 | |
| **Native Soil Extraction Well 5 Shallow** | HANSN05S | 9/20/2017 16:04 | 0.00 | 1.40 | 20.00 | 78.60 | -0.62 | -0.54 | -0.54 | 64.00 | 64.00 | 64 | 0.00 | | 0.00 | |
| **Native Soil Extraction Well 5 Deep** | HANSN05D | 9/20/2017 16:01 | 0.00 | 1.10 | 20.40 | 78.50 | -0.34 | -0.33 | -0.33 | 64.00 | 64.00 | 64 | 0.00 | | 0.00 | |
| **Gas Probe 1** | HANSGP01 | 9/20/2017 14:07 | 0.00 | 1.00 | 20.80 | 78.20 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Shallow** | HANSGP2S | 9/20/2017 14:21 | 0.00 | 0.10 | 21.60 | 78.30 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Middle** | HANSGP2M | 9/20/2017 14:32 | 0.00 | 1.20 | 19.00 | 79.80 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Deep** | HANSGP2D | 9/20/2017 14:49 | 0.00 | 1.30 | 18.50 | 80.20 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 3** | HANSGP03 | 9/20/2017 14:58 | 0.00 | 1.00 | 21.30 | 77.70 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 4** | HANSGP04 | 9/20/2017 15:09 | 0.00 | 1.20 | 20.90 | 77.90 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 5** | HANSGP05 | 9/20/2017 15:42 | 0.00 | 1.10 | 20.80 | 78.10 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 6** | HANSGP06 | 9/20/2017 15:52 | 0.00 | 2.40 | 19.00 | 78.60 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 7** | HANSGP07 | 9/20/2017 15:28 | 0.00 | 3.20 | 19.10 | 77.70 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |

**Notes**

* Flow rate measured using orifice plate.

** Flow rate measured with a hot-wire anemometer on 5/2/17

"N/A" indicates parameter not measured.

"inches H2O" - inches water column

"degrees F" - degrees Fahrenheit

"SCFM" - standard cubic feet per minute

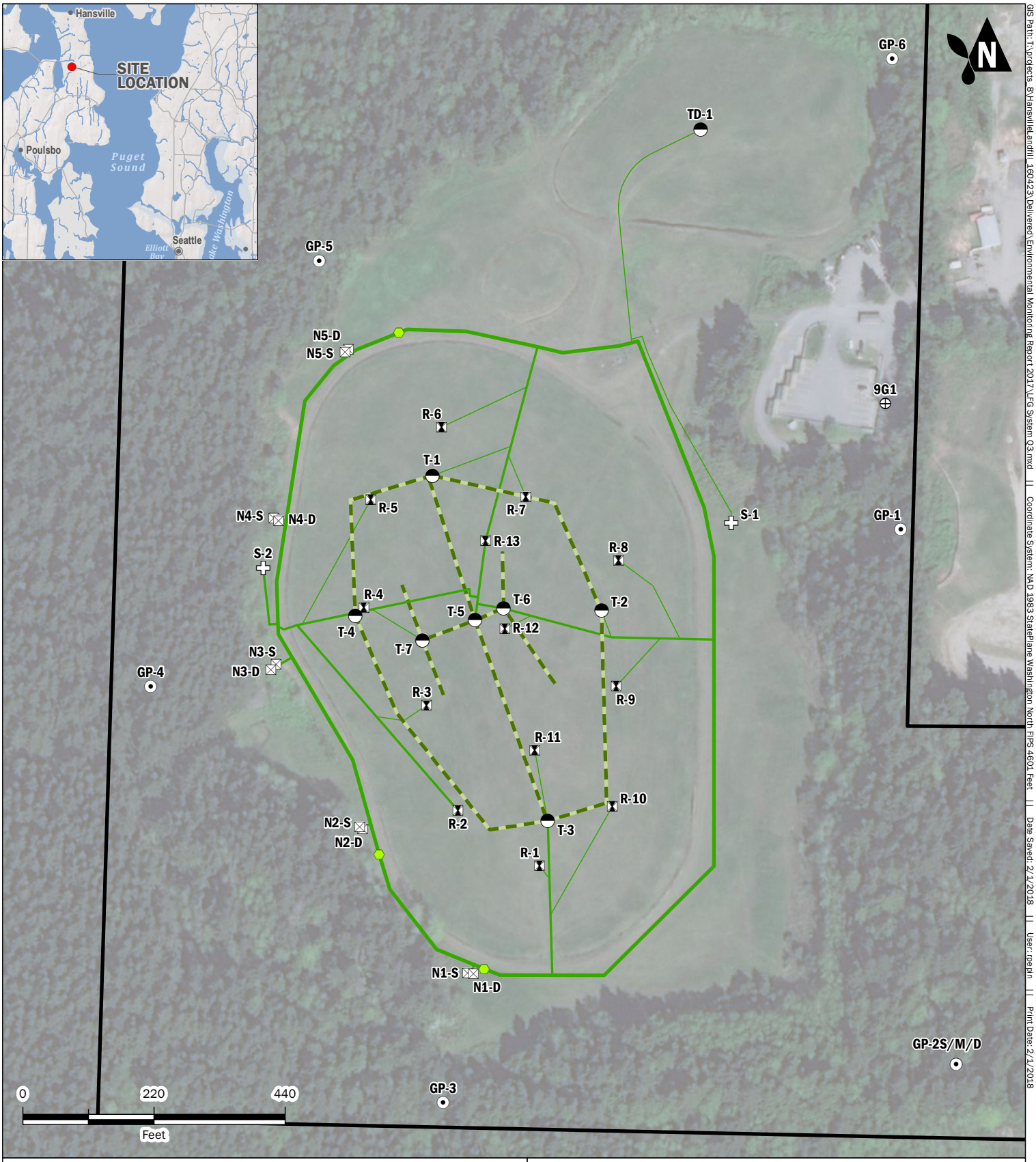
## Table A-4. Landfill Gas Data, Fourth Quarter, 2017

Project 160423, Hansville Landfill, Hansville, WA

| Location | Device ID | Date/Time | Methane, CH4 (% by vol) | Carbon Dioxide, CO2 (% by vol) | Oxygen, O2 (% by vol) | Balance, Bal (% by vol) | Static Pressure (inches H2O) | | | Gas Temperature (Degrees F) | | | Flow Rate (SCFM) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Initial | Adjusted | Maximum | Initial | Adjusted | Maximum | Initial | | Adjusted | |
| **Blower Inlet** | HANSBLIN | 12/7/2017 8:59 | 4.2 | 14.8 | 1.3 | 79.7 | -4.36 | -4.3 | -4.3 | 43.7 | 43.7 | 43.7 | 75.7 | * | 76 | * |
| **Blower Outlet** | HANSBLOT | 12/7/2017 9:02 | 3.9 | 14.8 | 1.2 | 80.1 | 0.73 | 0.02 | 0.73 | 36 | 35.8 | 36 | N/A | | N/A | |
| **Extraction Well 001** | HANSR001 | 12/7/2017 9:51 | 5 | 13.1 | 0.1 | 81.8 | -0.39 | -0.41 | -0.39 | 46.8 | 46.8 | 46.8 | 2 | * | 2.1 | * |
| **Extraction Well 002** | HANSR002 | 12/7/2017 10:59 | 1.5 | 14.6 | 2.4 | 81.5 | -2.29 | -2.27 | -2.27 | 68.7 | 68.7 | 68.7 | 3.8 | * | 5 | * |
| **Extraction Well 003** | HANSR003 | 12/7/2017 10:55 | 6.9 | 13 | 0 | 80.1 | -0.85 | -0.81 | -0.81 | 64.5 | 64.8 | 64.8 | 2.8 | * | 3.2 | * |
| **Extraction Well 004** | HANSR004 | 12/7/2017 10:46 | 2.3 | 16.2 | 0 | 81.5 | -1.61 | -1.6 | -1.6 | 62.1 | 62.1 | 62.1 | 2.4 | * | 3.5 | * |
| **Extraction Well 005** | HANSR005 | 12/7/2017 10:37 | 2.2 | 17.3 | 0.2 | 80.3 | -0.91 | -0.93 | -0.91 | 67.5 | 67.6 | 67.6 | 2.9 | * | 2.7 | * |
| **Extraction Well 006** | HANSR006 | 12/7/2017 10:28 | 2.1 | 16 | 2.1 | 79.8 | -1.33 | -1.32 | -1.32 | 63.5 | 63.6 | 63.6 | 2.7 | * | 2.6 | * |
| **Extraction Well 007** | HANSR007 | 12/7/2017 10:24 | 0.9 | 13.7 | 0.2 | 85.2 | -0.43 | -0.44 | -0.43 | 64.1 | 64.2 | 64.2 | 3.7 | * | 3.9 | * |
| **Extraction Well 008** | HANSR008 | 12/7/2017 9:29 | 4.3 | 16.7 | 0.1 | 78.9 | -0.81 | -0.85 | -0.81 | 52.1 | 52.2 | 52.2 | 3 | * | 2.5 | * |
| **Extraction Well 009** | HANSR009 | 12/7/2017 9:40 | 1.1 | 15.1 | 2.1 | 81.7 | -1.72 | -1.69 | -1.69 | 75.8 | 75.8 | 75.8 | 0.4 | | 0.8 | |
| **Extraction Well 010** | HANSR010 | 12/7/2017 9:45 | 4.3 | 9.4 | 4.8 | 81.5 | -0.67 | -0.69 | -0.67 | 54.5 | 54.6 | 54.6 | 1.2 | * | 1.2 | * |
| **Extraction Well 011** | HANSR011 | 12/7/2017 10:00 | 2.6 | 6.3 | 0 | 91.1 | -0.65 | -0.64 | -0.64 | 47.3 | 47.3 | 47.3 | 0.9 | * | 0.8 | * |
| **Extraction Well 012** | HANSR012 | 12/7/2017 10:04 | 8 | 2.7 | 0 | 89.3 | -0.94 | -0.95 | -0.94 | 54.4 | 54.4 | 54.4 | 0.9 | * | 1.2 | * |
| **Extraction Well 013** | HANSR013 | 12/7/2017 10:18 | 2.3 | 12.4 | 2.1 | 83.2 | -1.89 | -1.89 | -1.89 | 60 | 60 | 60 | 4.5 | | 4.5 | |
| **Trench Collector TD-1** | HANSTD01 | 12/7/2017 9:09 | 4.3 | 19.7 | 0 | 76 | -0.02 | -0.04 | -0.02 | 47.9 | 47.9 | 47.9 | 3.1 | * | 3.7 | * |
| **Trench Collector TR-1** | HANSTR01 | 12/7/2017 10:33 | 0.9 | 14 | 3.6 | 81.5 | -0.78 | -0.79 | -0.78 | 64.8 | 64.9 | 64.9 | 3.5 | * | 3.5 | * |
| **Trench Collector TR-2** | HANSTR02 | 12/7/2017 9:35 | 6 | 15.5 | 0.3 | 78.2 | -1.07 | -1.06 | -1.06 | 51.7 | 51.7 | 51.7 | 2.2 | | 3.6 | |
| **Trench Collector TR-3** | HANSTR03 | 12/7/2017 9:55 | 8.8 | 15 | 0 | 76.2 | -1.05 | -1.04 | -1.04 | 56.9 | 56.9 | 56.9 | 0.7 | | 0.8 | |
| **Trench Collector TR-4** | HANSTR04 | 12/7/2017 10:42 | 2 | 16.9 | 0 | 81.1 | -0.73 | -0.73 | -0.73 | 59 | 59 | 59 | 3 | * | 3.3 | * |
| **Trench Collector TR-5** | HANSTR05 | 12/7/2017 10:11 | 0.8 | 1.7 | 18.5 | 79 | -0.82 | -0.82 | -0.82 | 53.5 | 53.6 | 53.6 | 2.8 | | 2.8 | |
| **Trench Collector TR-6** | HANSTR06 | 12/7/2017 10:07 | 9.4 | 12.9 | 0.1 | 77.6 | -1.26 | -1.26 | -1.26 | 53.4 | 53.5 | 53.5 | 1.5 | | 1.6 | |
| **Trench Collector TR-7** | HANSTR07 | 12/7/2017 10:51 | 7.9 | 14.9 | 0.1 | 77.1 | -0.72 | -0.72 | -0.72 | 58.2 | 58.3 | 58.3 | 4.2 | * | 4.1 | * |
| **Native Soil Extraction Well 1 Deep** | HANSN01D | 12/7/2017 11:07 | 0 | 0.2 | 20.9 | 78.9 | 0.04 | 0.06 | 0.06 | 44.1 | 44.3 | 44.3 | 3.2 | | 3.7 | |
| **Native Soil Extraction Well 1 Shallow** | HANSN01S | 12/7/2017 11:11 | 0 | 1.1 | 20 | 78.9 | 0.04 | 0.03 | 0.04 | 42.5 | 42.4 | 42.5 | 3.9 | | 3.2 | |
| **Native Soil Extraction Well 2 Deep** | HANSN02D | 12/7/2017 11:15 | 0 | 0.5 | 21 | 78.5 | 0.07 | 0.06 | 0.07 | 42.3 | 42.2 | 42.3 | 0 | | 0 | |
| **Native Soil Extraction Well 2 Shallow** | HANSN02S | 12/7/2017 11:19 | 0 | 0.7 | 20.8 | 78.5 | 0.04 | 0.03 | 0.04 | 41.4 | 41.4 | 41.4 | 0.5 | | 0.4 | |
| **Native Soil Extraction Well 3 Deep** | HANSN03D | 12/7/2017 11:23 | 0 | 0.2 | 21.5 | 78.3 | 0.03 | 0.03 | 0.03 | 57.5 | 57.7 | 57.7 | 7.2 | | 5.6 | |
| **Native Soil Extraction Well 3 Shallow** | HANSN03S | 12/7/2017 11:28 | 0 | 0.6 | 21 | 78.4 | 0.03 | 0.03 | 0.03 | 65.3 | 65.4 | 65.4 | 7 | | 6.9 | |
| **Native Soil Extraction Well 4 Deep** | HANSN04D | 12/7/2017 11:33 | 0 | 0.4 | 21.1 | 78.5 | 0.02 | 0 | 0.02 | 64.4 | 64.4 | 64.4 | 5.5 | | 5.8 | |
| **Native Soil Extraction Well 4 Shallow** | HANSN04S | 12/7/2017 11:37 | 0 | 0.1 | 21.4 | 78.5 | 0.03 | 0.02 | 0.03 | 66.5 | 66.6 | 66.6 | 5.6 | | 6.4 | |
| **Native Soil Extraction Well 5 Deep** | HANSN05D | 12/7/2017 11:42 | 0 | 0.1 | 21.2 | 78.7 | 0.03 | 0.03 | 0.03 | 64.6 | 64.6 | 64.6 | 6.6 | | 5.7 | |
| **Native Soil Extraction Well 5 Shallow** | HANSN05S | 12/7/2017 11:45 | 0 | 0.5 | 20.7 | 78.8 | 0.02 | 0.02 | 0.02 | 65.7 | 65.7 | 65.7 | 6.7 | | 5.9 | |
| **Gas Probe 1** | HANSGP01 | 12/7/2017 12:00 | 0 | 1.1 | 19.8 | 79.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Shallow** | HANSGP2S | 12/7/2017 12:12 | 0 | 1 | 20.4 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Middle** | HANSGP2M | 12/7/2017 12:20 | 0 | 1.1 | 19.6 | 79.3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 2 Deep** | HANSGP2D | 12/7/2017 12:27 | 0 | 0.3 | 21.1 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 3** | HANSGP03 | 12/7/2017 12:38 | 0 | 1.3 | 20.9 | 77.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 4** | HANSGP04 | 12/7/2017 12:51 | 0 | 1.7 | 20.5 | 77.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 5** | HANSGP05 | 12/7/2017 13:15 | 0 | 1.2 | 20.7 | 78.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 6** | HANSGP06 | 12/7/2017 9:21 | 0 | 4.3 | 15.6 | 80.1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |
| **Gas Probe 7** | HANSGP07 | 12/7/2017 13:00 | 0 | 2.7 | 19.5 | 77.8 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | | N/A | |

**Notes**

* Flow rate measured using orifice plate.
"N/A" indicates parameter not measured.
"Inches H2O" - inches of water column
"degrees F" - degrees Farenheit
"SCFM" - standard cubic feet per minute




GIS Path: T:\projects_8\HansvilleLandfill_160423\Delivered\Environmental Monitoring Report 2017\LFG System Q3.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 2/1/2018 || User: mpjin || Print Date: 2/1/2018

**Exploration**

- Condensate Sump
- Gas Detection Probe
- Gas Extraction Well (Native Soil Completion)
- Gas Extraction Well (in Refuse Completion)
- Trench Completion
- Well Geologic Control

**Landfill Gas System**

- LFG Pipe - 2"
- LFG Pipe - 4"
- LFG Pipe - 6"
- Trench
- LFG Valve
- Landfill Boundary

# Landfill Gas System

Third Quarter 2017 Environmental Monitoring Report
Hansville Landfill
Kitsap County, Washington

| Aspect CONSULTING | FEB-2018 | BY: AHP / RAP / KES | FIGURE NO. A-1 |
|---|---|---|---|
| | PROJECT NO. 160423 | REVISED BY: PSB / RAP | |

# APPENDIX B

# Water Quality Results

# Table B-1. Water Level Elevations 2017

Project No. 160423, Hansville Landfill, Hansville, WA

| Well | Ground Elevation (ft NAVD88) | Top of Casing Elevation (ft NAVD88) | Screen Elevation (ft NAVD88) | | Depth to Water, Q1 2017 (ft) | Water Level Elevation, Q1 2017 (ft NAVD88) | Depth to Water, Q2 2017 (ft) | Water Level Elevation, Q2 2017 (ft NAVD88) |
|---|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | | | | |
| MW-5 | 363.7 | 366.9 | 244 | 234 | 99.9 | 267.0 | 99.2 | 267.7 |
| MW-6 | 332 | 332.7 | 260 | 245 | 73.9 | 258.9 | 73.2 | 259.5 |
| MW-7 | 344.3 | 346.0 | 259 | 244 | 84.6 | 261.4 | 84.1 | 261.9 |
| MW-12I | 245.6 | 248.1 | 217 | 207 | 9.8 | 238.3 | 9.3 | 238.8 |
| MW-13D | 258.1 | 260.4 | 205 | 195 | 10.9 | 249.6 | 9.8 | 250.6 |
| MW-14 | 338.6 | 341.1 | 262 | 247 | 81.3 | 259.8 | 80.5 | 260.6 |

| Well | Ground Elevation (ft NAVD88) | Top of Casing Elevation (ft NAVD88) | Screen Elevation (ft NAVD88) | | Depth to Water, Q3 2017 (ft) | Water Level Elevation, Q3 2017 (ft NAVD88) | Depth to Water, Q4 2017 (ft) | Water Level Elevation, Q4 2017 (ft NAVD88) |
|---|---|---|---|---|---|---|---|---|
| | | | Top | Bottom | | | | |
| MW-5 | 363.7 | 366.9 | 244 | 234 | 98.6 | 268.3 | 98.2 | 268.7 |
| MW-6 | 332 | 332.7 | 260 | 245 | 72.9 | 259.9 | 72.7 | 260.0 |
| MW-7 | 344.3 | 346.0 | 259 | 244 | 83.3 | 262.7 | 83.0 | 263.0 |
| MW-12I | 245.6 | 248.1 | 217 | 207 | 9.6 | 238.5 | 9.4 | 238.7 |
| MW-13D | 258.1 | 260.4 | 205 | 195 | 10.4 | 250.0 | 10.7 | 249.7 |
| MW-14 | 338.6 | 341.1 | 262 | 247 | 80.7 | 260.4 | 80.7 | 260.4 |

**Notes**

Depths to water collected January 25-26 (Q1), April 11 (Q2), July 11 (Q3), and October 11 (Q4), 2017

Elevations relative to North American Vertical Datum of 1988 (NAVD88).

# Table B-2. Groundwater Quality Results

Project No. 160423, Hansville Landfill, Hansville, WA

| | | | MW-5 | MW-5 | MW-5 | MW-5 | MW-6 | MW-6 | MW-6 | MW-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 01/25/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 | 01/25/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 |
| Parameter | Units | Site Cleanup Level | | | | | | | | |
| Field Parameters | | | | | | | | | | |
| Dissolved Oxygen | mg/L | | **8.39** | **9.17** | **8.37** | **9.02** | **0.44** | **0.46** | **0.42** | **0.47** |
| pH | pH units | | **7.45** | **7.2** | **7.47** | **7.35** | **6.97** | **7.09** | **7.2** | **7.14** |
| Oxidation Reduction Potential | mV | | **18.9** | **41.7** | **113.2** | **95.3** | **13.3** | **15.7** | **117.3** | **74.6** |
| Specific Conductivity | uS/cm | | **143.1** | **147.6** | **150.8** | **264.5** | **389.2** | **399.7** | **331.6** | **840** |
| Temperature | deg C | | **12.5** | **11.5** | **13.9** | **13.2** | **16.1** | **15.9** | **16.6** | **15.7** |
| Turbidity | NTU | | **0.51** | **0.28** | **0.08** | **0.59** | **5.44** | **0.86** | **0.16** | **1.91** |
| Conventional Parameters | | | | | | | | | | |
| Alkalinity | mg/L | | **59** | **60** | **60** | **62** | **150** | **170** | **130** | **170** |
| Ammonia (as N) | mg/L | | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U | 0.030 U | **0.096 J** | 0.030 U | 0.030 U |
| Bicarbonate | mg/L | | **59** | -- | **60** | **62** | **150** | -- | **130** | **170** |
| Carbonate | mg/L | | 5.0 U | -- | 5.0 U | 5.0 U | 5.0 U | -- | 5.0 U | 5.0 U |
| Chloride | mg/L | | **2.6** | **2.8** | **2.8** | **2.8** | **15** | **9.3** | **9.9** | **23** |
| Nitrate (as N) | mg/L | | **0.92 J** | **1.2 J** | **1.01** | **0.896** | **1.8 J** | **1.4** | **1.37** | **4.2** |
| Nitrite (as N) | mg/L | | 0.50 UJ | 0.50 UJ | 0.10 U | 0.10 U | 0.50 UJ | 0.50 U | **0.355** | **0.243** |
| Orthophosphate (as P) | mg/L | | -- | 0.50 UJ | 0.10 U | 0.10 U | -- | 0.50 U | 0.10 U | 0.10 U |
| Sulfate | mg/L | | **7.7** | **8.8** | **8.8** | **8.6** | **23** | **28** | **23** | **32** |
| Total Organic Carbon | mg/L | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | **1.5** | **1.4** | 1.0 U | **1.5** |
| Dissolved Metals (mg/L) | | | | | | | | | | |
| Arsenic | mg/L | 0.005 | -- | **0.00184** | **0.00199** | **0.00195** | -- | **0.00184** | **0.00216** | **0.00143** |
| Manganese | mg/L | 2.24 | -- | 0.0010 U | **0.0013** | 0.0010 U | -- | **0.48** | **0.47** | **0.46** |
| Volatile Organic Compounds (detected only) | | | | | | | | | | |
| 1,2-Dichloroethene (total) | ug/L | | 2.0 U | -- | -- | -- | 2.0 U | -- | -- | -- |
| cis-1,2-Dichloroethene | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Diethyl Ether | ug/L | | 1.0 U | -- | -- | -- | **1.2** | -- | -- | -- |
| Vinyl Chloride (8260 SIM) | ug/L | 0.025 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | **0.16** | **0.096** | **0.15** | **0.056** |

**Notes**

Bold - detected
Shaded - Exceeded Site Cleanup Level
U - Not detected at or above reporting limit
J or UJ - Estimated "usable"
R - Rejected data, not representative of site conditions

mg/L - milligrams per liter
mV - millivolts
uS - microSiemens
degrees C - degrees Celsius
NTU - Nephthalometric Turbidity Units

ug/L - micrograms per liter

# Table B-2. Groundwater Quality Results

Project No. 160423, Hansville Landfill, Hansville, WA

| | | | MW-7 | MW-7 | MW-7 | MW-7 | MW-12I | MW-12I | MW-12I | MW-12I |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 01/25/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 | 01/25/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 |
| Parameter | Units | Site Cleanup Level | | | | | | | | |
| Field Parameters | | | | | | | | | | |
| Dissolved Oxygen | mg/L | | **1.78** | **1.86** | **1.78** | **1.75** | **0.23** | **0.97** | **0.14** | **0.21** |
| pH | pH units | | **7.05** | **6.75** | **6.92** | **6.84** | **7.07** | **7.15** | **7.38** | **7.31** |
| Oxidation Reduction Potential | mV | | **11.6** | **48.9** | **114.6** | **109.6** | **26.6** | **49.8** | **138.6** | **52.1** |
| Specific Conductivity | uS/cm | | **279.4** | **298.3** | **299.6** | **522** | **156** | **167** | **183.6** | **304.9** |
| Temperature | deg C | | **9.5** | **12.5** | **12.3** | **12.8** | **10** | **10.3** | **11** | **11** |
| Turbidity | NTU | | **1.8** | **0.85** | **0.2** | **0.74** | **0.34** | **0.68** | **0.13** | **0.16** |
| Conventional Parameters | | | | | | | | | | |
| Alkalinity | mg/L | | **160** | **160** | **150** | **150** | **77** | **83** | **87** | **87** |
| Ammonia (as N) | mg/L | | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U |
| Bicarbonate | mg/L | | **160** | -- | **150** | **150** | **77** | -- | **87** | **87** |
| Carbonate | mg/L | | 5.0 U | -- | 5.0 U | 5.0 U | 5.0 U | -- | 5.0 U | 5.0 U |
| Chloride | mg/L | | **2** | **1.8** | **1.6** | **1.7** | **2.7** | **3.3** | **3.2** | **2.4** |
| Nitrate (as N) | mg/L | | **0.56 J** | **0.60 J** | **0.555** | **0.639** | 0.50 UJ | 0.5 | **2.18** | 0.10 U |
| Nitrite (as N) | mg/L | | 0.50 UJ | 0.50 UJ | 0.10 U | 0.10 U | 0.50 UJ | 0.5 | 0.10 U | 0.10 U |
| Orthophosphate (as P) | mg/L | | -- | 0.50 UJ | 0.10 U | 0.10 U | -- | 0.5 | 0.10 U | 0.10 U |
| Sulfate | mg/L | | **4.3** | **5** | **4.4** | **4.2** | **3.9** | **5.8** | **6.3** | **4.8** |
| Total Organic Carbon | mg/L | | **1.5** | **1.4** | **1.2** | **1.3** | **2.9** | **2.4** | **1.9** | **2.2** |
| Dissolved Metals (mg/L) | | | | | | | | | | |
| Arsenic | mg/L | 0.005 | -- | **0.000967** | **0.0011** | **0.0011** | -- | **0.00211** | **0.00228** | **0.00224** |
| Manganese | mg/L | 2.24 | -- | 0.0010 U | 0.0010 U | 0.0010 U | -- | **0.054** | **0.054** | **0.046** |
| Volatile Organic Compounds (detected only) | | | | | | | | | | |
| 1,2-Dichloroethene (total) | ug/L | | 2.0 U | -- | -- | -- | 2.0 U | -- | -- | -- |
| cis-1,2-Dichloroethene | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Diethyl Ether | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Vinyl Chloride (8260 SIM) | ug/L | 0.025 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | **0.06** | **0.077** | **0.099** | **0.063** |

**Notes**

Bold - detected
Shaded - Exceeded Site Cleanup Level
U - Not detected at or above reporting limit
J or UJ - Estimated "usable"
R - Rejected data, not representative of site conditions

mg/L - milligrams per liter
mV - millivolts
uS - microSiemens
degrees C - degrees Celsius
NTU - Nephthalometric Turbidity Units

ug/L - micrograms per liter

# Table B-2. Groundwater Quality Results

Project No. 160423, Hansville Landfill, Hansville, WA

| | | | MW-13D | MW-13D | MW-13D | MW-13D | MW-14 | MW-14 | MW-14 | MW-14 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 01/26/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 | 01/25/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 |
| Parameter | Units | Site Cleanup Level | | | | | | | | |
| Field Parameters | | | | | | | | | | |
| Dissolved Oxygen | mg/L | | **0.18** | **0.19** | **0.13** | **0.21** | **0.44** | **0.43** | **2.48** | **2.49** |
| pH | pH units | | **7.47** | **7.5** | **7.76** | **7.71** | **6.97** | **6.94** | **7.05** | **7.07** |
| Oxidation Reduction Potential | mV | | **96.8** | **57.5** | **191** | **-14.1** | **8.4** | **14.7** | **100.1** | **62.3** |
| Specific Conductivity | uS/cm | | **193.5** | **198.3** | **201.8** | **349.1** | **276.5** | **302.5** | **251.3** | **475.2** |
| Temperature | deg C | | **10.6** | **10.7** | **11.3** | **11.1** | **14.7** | **14.9** | **15.7** | **15.4** |
| Turbidity | NTU | | **0.29** | **0.2** | **0.3** | **0** | **0.47** | **0.97** | **0.42** | **0.41** |
| Conventional Parameters | | | | | | | | | | |
| Alkalinity | mg/L | | **76** | **77** | **76** | **77** | **120** | **140** | **110** | **110** |
| Ammonia (as N) | mg/L | | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U | 0.030 UJ | 0.030 UJ | 0.030 U | 0.030 U |
| Bicarbonate | mg/L | | **76** | -- | **76** | **77** | **120** | -- | **110** | **110** |
| Carbonate | mg/L | | 5.0 U | -- | 5.0 U | 5.0 U | 5.0 U | -- | 5.0 U | 5.0 U |
| Chloride | mg/L | | **6.1** | **6.2** | **6** | **5.8** | **5.3** | **8.7** | **4.7** | **8.9** |
| Nitrate (as N) | mg/L | | 0.50 UJ | 0.5 | 0.10 U | 0.10 U | 0.50 UJ | 0.5 | **0.224** | **0.467** |
| Nitrite (as N) | mg/L | | 0.50 UJ | 0.5 | 0.10 U | 0.10 U | 0.50 UJ | 0.5 | 0.10 U | 0.10 U |
| Orthophosphate (as P) | mg/L | | -- | 0.5 | **0.1** | **0.1** | -- | 0.5 | **0.12** | **0.11** |
| Sulfate | mg/L | | **18** | **18** | **18** | **17** | **15** | **20** | **13** | **13** |
| Total Organic Carbon | mg/L | | 1.0 U | 1 | 1.0 U | 1.0 U | 1.0 U | 1 | 1.0 U | **1.1** |
| Dissolved Metals (mg/L) | | | | | | | | | | |
| Arsenic | mg/L | 0.005 | -- | **0.00423** | **0.00437** | **0.00463** | -- | **0.0169** | **0.015** | **0.0137** |
| Manganese | mg/L | 2.24 | -- | **0.026** | **0.025** | **0.023** | -- | **2.6** | **0.87** | **0.65** |
| Volatile Organic Compounds (detected only) | | | | | | | | | | |
| 1,2-Dichloroethene (total) | ug/L | | 2.0 U | -- | -- | -- | **3.3** | -- | -- | -- |
| cis-1,2-Dichloroethene | ug/L | | 1.0 U | -- | -- | -- | **3.3** | -- | -- | -- |
| Diethyl Ether | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Vinyl Chloride (8260 SIM) | ug/L | 0.025 | 0.020 U | 0.02 | 0.020 U | 0.020 U | **0.14** | **0.1** | **0.14** | **0.046** |

**Notes**

Bold - detected

Shaded - Exceeded Site Cleanup Level

U - Not detected at or above reporting limit

J or UJ - Estimated "usable"

R - Rejected data, not representative of site conditions

mg/L - milligrams per liter

mV - millivolts

uS - microSiemens

degrees C - degrees Celsius

NTU - Nephthalometric Turbidity Units

ug/L - micrograms per liter

# Table B-3. Surface Water Quality Results

Project No. 160423, Hansville Landfill, Hansville, WA

| | | | SW-1 | SW-1 | SW-1 | SW-1 | SW-4 | SW-4 | SW-4 | SW-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 01/26/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 | 01/26/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 |
| Parameter | Units | Site Cleanup Level | | | | | | | | |
| Field Parameters | | | | | | | | | | |
| Dissolved Oxygen | mg/L | | **10.26** | **10.55** | **8.35** | **10.36** | **10.89** | **11.02** | **8.35** | **10.65** |
| pH | pH units | | **7** | **7.41** | **7.82** | **7.55** | **7.46** | **7.4** | **8.06** | **7.81** |
| Oxidation Reduction Potential | mV | | **136.7** | **45.5** | **166.6** | **106.3** | **118.6** | **75.3** | **166.6** | **136.6** |
| Specific Conductivity | uS/cm | | **183.7** | **156.7** | **195.3** | **339.9** | **304.4** | **289.9** | **195.3** | **675.5** |
| Temperature | deg C | | **8.4** | **8.2** | **11.7** | **10.4** | **6.8** | **8.6** | **11.7** | **10.7** |
| Turbidity | NTU | | **1.17** | **1.6** | **2.32** | **2.17** | **1.5** | **3.5** | **8.91** | **4.26** |
| Conventional Parameters | | | | | | | | | | |
| Alkalinity | mg/L | | **76** | **73** | **80** | **76** | **130** | **120** | **160** | **160** |
| Ammonia (as N) | mg/L | | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U |
| Bicarbonate | mg/L | | **76** | -- | **80** | **76** | **130** | -- | **160** | **160** |
| Carbonate | mg/L | | 5.0 U | -- | 5.0 U | 5.0 U | 5.0 U | -- | 5.0 U | 5.0 U |
| Chloride | mg/L | | **4.6** | **4.5** | **4.8** | **4.6** | **12** | **11** | **15** | **14** |
| Nitrate (as N) | mg/L | | **1.6 J** | **1.6** | **1.55** | **1.47** | **1.2 J** | **1** | **0.931** | **0.796** |
| Nitrite (as N) | mg/L | | 0.50 UJ | 0.50 U | 0.10 U | 0.10 U | 0.50 UJ | 0.50 U | 0.10 U | 0.10 U |
| Orthophosphate (as P) | mg/L | | -- | 0.50 U | 0.10 U | 0.10 U | -- | 0.50 U | 0.10 U | 0.10 U |
| Sulfate | mg/L | | **11** | **11** | **11** | **10** | **18** | **16** | **23** | **20** |
| Total Organic Carbon | mg/L | | **2.8** | **2.9** | **1.6** | **2** | **10** | **11** | **4.4** | **6** |
| Dissolved Metals (mg/L) | | | | | | | | | | |
| Arsenic | mg/L | 0.005 | -- | **0.00145** | **0.00156** | **0.00164** | -- | **0.00185** | **0.00197** | **0.00209** |
| Manganese | mg/L | 2.24 | -- | **0.0019** | 0.0010 U | 0.0010 U | -- | **0.038** | **0.073** | **0.03** |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,2-Dichloroethene (total) | ug/L | | 2.0 U | -- | -- | -- | 2.0 U | -- | -- | -- |
| cis-1,2-Dichloroethene | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Diethyl Ether | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Vinyl Chloride (8260 SIM) | ug/L | 0.025 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |

**Notes**

Bold - detected

Shaded - Exceeded Site Cleanup Level

U - Not detected at or above reporting limit

J or UJ - Estimated "usable"

R - Rejected data, not representative of site conditions

mg/L - milligrams per liter

mV - millivolts

uS - microSiemens

degrees C - degrees Celsius

NTU - Nephthalometric Turbidity Units

ug/L - micrograms per liter

# Table B-3. Surface Water Quality Results

Project No. 160423, Hansville Landfill, Hansville, WA

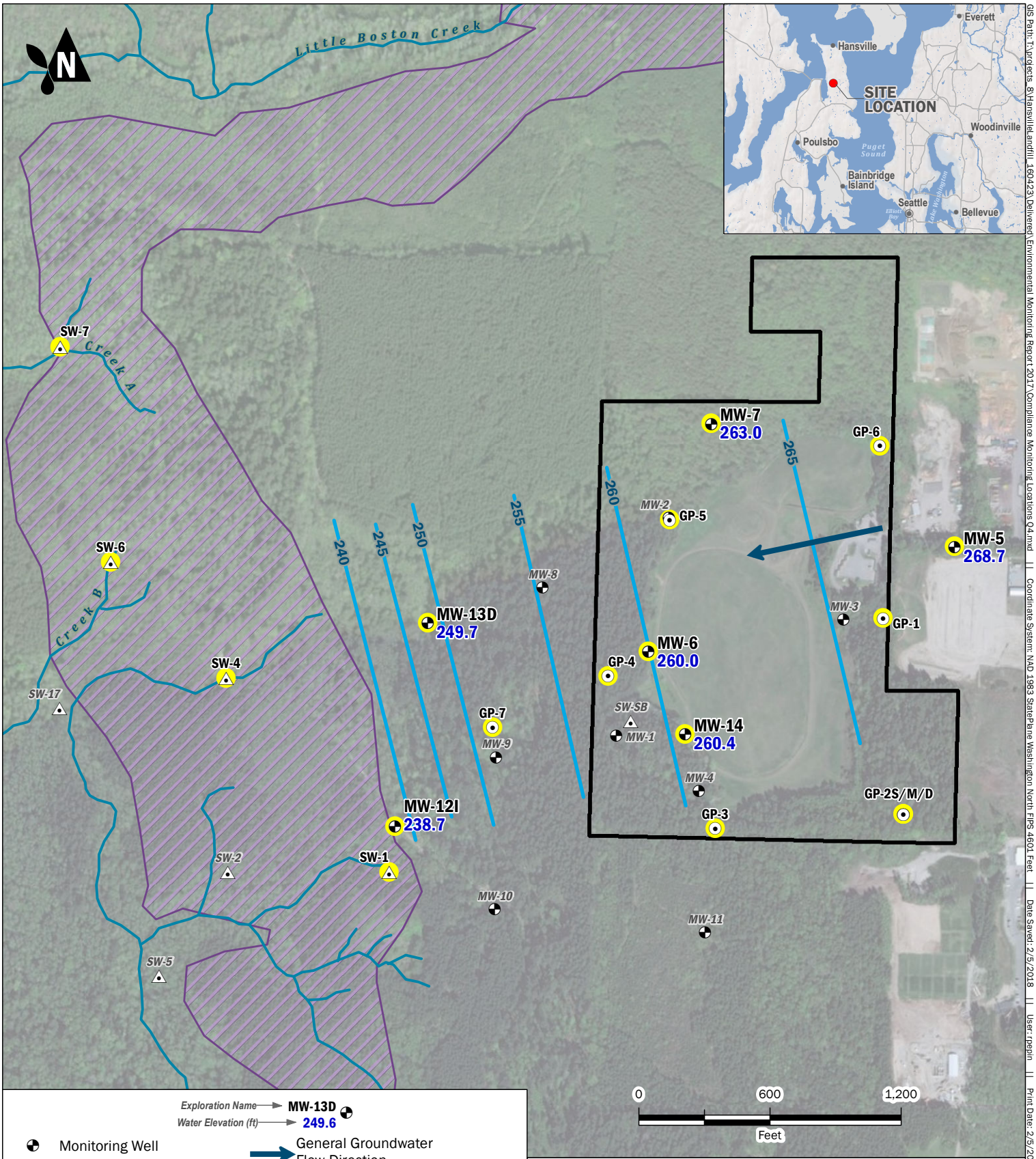
| | | | SW-6 | SW-6 | SW-6 | SW-6 | SW-7 | SW-7 | SW-7 | SW-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | 01/26/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 | 01/26/2017 | 04/11/2017 | 07/11/2017 | 10/10/2017 |
| Parameter | Units | Site Cleanup Level | | | | | | | | |
| Field Parameters | | | | | | | | | | |
| Dissolved Oxygen | mg/L | | **10.09** | **10.91** | **10.23** | **10.18** | **12.06** | **12.17** | **10.47** | **10.84** |
| pH | pH units | | **6.92** | **7.24** | **7.56** | **7.45** | **7.23** | **7.48** | **7.94** | **7.91** |
| Oxidation Reduction Potential | mV | | **127.3** | **57.7** | **343.1** | **1.6** | **118.4** | **48.5** | **114.7** | **104.2** |
| Specific Conductivity | uS/cm | | **87.6** | **88.2** | **168.6** | **123.9** | **113.1** | **102.3** | **143.7** | **218.7** |
| Temperature | deg C | | **5.2** | **8.6** | **14.5** | **10.7** | **6.3** | **8.6** | **12.7** | **10.8** |
| Turbidity | NTU | | **2.32** | **3.55** | **18.8** | **17.6** | **1.82** | **3.07** | **3.17** | -- |
| Conventional Parameters | | | | | | | | | | |
| Alkalinity | mg/L | | **30** | **34** | **69** | **70** | **37** | **35** | **58** | **63** |
| Ammonia (as N) | mg/L | | 0.030 U | 0.030 UJ | **0.066** | **0.078 J** | 0.030 U | 0.030 UJ | 0.030 U | 0.030 U |
| Bicarbonate | mg/L | | **30** | -- | **69** | **70** | **37** | -- | **58** | **63** |
| Carbonate | mg/L | | 5.0 U | -- | 5.0 U | 5.0 U | 5.0 U | -- | 5.0 U | 5.0 U |
| Chloride | mg/L | | **3.9** | **3.1** | **4** | **4.1** | **3.8** | **3.1** | **3.6** | **3.9** |
| Nitrate (as N) | mg/L | | **0.79 J** | 0.50 U | **0.218** | **0.11** | **2.3 J** | **1.6** | **0.763** | **0.764** |
| Nitrite (as N) | mg/L | | 0.50 UJ | 0.50 U | 0.10 U | 0.10 U | 0.50 UJ | 0.50 U | 0.10 U | 0.10 U |
| Orthophosphate (as P) | mg/L | | -- | 0.50 U | 0.10 U | 0.10 U | -- | 0.50 U | 0.10 U | 0.10 U |
| Sulfate | mg/L | | **6.2** | **5.2** | **2.2** | **3** | **7.2** | **6.5** | **6.9** | **6.5** |
| Total Organic Carbon | mg/L | | **19** | **19** | **16** | **11** | **8.8** | **10** | **6.6** | **6.5** |
| Dissolved Metals (mg/L) | | | | | | | | | | |
| Arsenic | mg/L | 0.005 | -- | **0.00233** | **0.00811** | **0.00631** | -- | **0.000937** | **0.00158** | **0.00151** |
| Manganese | mg/L | 2.24 | -- | **0.026** | **0.33** | **0.22** | -- | **0.0037** | **0.0056** | **0.0064** |
| Volatile Organic Compounds | | | | | | | | | | |
| 1,2-Dichloroethene (total) | ug/L | | 2.0 U | -- | -- | -- | 2.0 U | -- | -- | -- |
| cis-1,2-Dichloroethene | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Diethyl Ether | ug/L | | 1.0 U | -- | -- | -- | 1.0 U | -- | -- | -- |
| Vinyl Chloride (8260 SIM) | ug/L | 0.025 | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U | 0.020 U |

**Notes**

Bold - detected
Shaded - Exceeded Site Cleanup Level
U - Not detected at or above reporting limit
J or UJ - Estimated "usable"
R - Rejected data, not representative of site conditions

mg/L - milligrams per liter
mV - millivolts
uS - microSiemens
degrees C - degrees Celsius
NTU - Nephthalometric Turbidity Units

ug/L - micrograms per liter




Exploration Name → MW-13D
Water Elevation (ft) → 249.6

- Monitoring Well
- Gas Detection Probe
- Surface Water Station
- Compliance Monitoring Location
- Inferred Water Elevation Contour (ft) *Measured October 11 2017*
- General Groundwater Flow Direction
- Approximate Area of Groundwater Discharge from Upper Aquifer
- Stream
- Landfill Boundary
- Tax Parcel

*Note: Vertical datum is NAVD88. Approximate area of groundwater discharge from upper aquifer delineation from Remedial Investigation Report (Parametrix, 2006).*

# Compliance Monitoring Locations

Fourth Quarter 2017 Environmental Monitoring Report
Hansville Landfill
Kitsap County, Washington

| Aspect Consulting | FEB-2018 | BY: AHP / RAP / KES | FIGURE NO. B-1 |
|---|---|---|---|
| | PROJECT NO. 160423 | REVISED BY: --- | |



GIS Path: T:\projects_8\Hansville\Landfill_160423\Delivered\Environmental Monitoring Report 2017\Compliance Monitoring Locations Q4.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Saved: 2/5/2018 || User: rpepin || Print Date: 2/5/2018

# APPENDIX C

# Groundwater Statistics and Time-Series Plots

# Table C-1. Statistical Analysis

Project 160423, Hansville Landfill, Hansville, WA

**Dissolved Arsenic Statistical Results**

| Well | Statistical Trend[1] | Mann-Kendall Test[2] | | | | Sen's Slope | |
|---|---|---|---|---|---|---|---|
| | | Test Value, Z | Critical Value | Number of data points, n | Statistical Significance | (ug/L per day) | (ug/L per year) |
| MW-5 | --[3] | -- | -- | -- | -- | -- | -- |
| MW-6 | -- | -- | -- | -- | -- | -- | -- |
| MW-7 | -- | -- | -- | -- | -- | | -- |
| MW-12I | -- | -- | -- | -- | -- | -- | -- |
| MW-13D | -- | -- | -- | -- | -- | | -- |
| MW-14 | Decreasing | -5.9 | -1.96 | 43 | Yes | -3.6E-06 | -0.0013 |

**Vinyl Chloride Statistical Results**

| Well | Statistical Trend[1] | Mann-Kendall Test[2] | | | | Sen's Slope | |
|---|---|---|---|---|---|---|---|
| | | Test Value, Z | Critical Value | Number of data points, n | Statistical Significance | (ug/L per day) | (ug/L per year) |
| MW-5 | --[3] | -- | -- | -- | -- | | -- |
| MW-6 | Decreasing | -5.1 | -1.96 | 44 | Yes | -6.7E-05 | -0.025 |
| MW-7 | -- | -- | -- | -- | -- | | -- |
| MW-12I | Decreasing | -6.1 | -1.96 | 44 | Yes | -1.2E-04 | -0.042 |
| MW-13D | -- | -- | -- | -- | -- | | -- |
| MW-14 | Decreasing | -7.3 | -1.96 | 44 | Yes | -1.1E-04 | -0.039 |

**Notes**

1 - The Statistical Trend indicates:

"Non-significant" if the magnitude of the Test Value is less than the Critical Value,

"Increasing" if the magnitude of the Test Value is greater than the Critical Value and the Sen's Slope is positive, or

"Decreasing" if the magnitude of the Test Value is greater than the Critical Value and the Sen's Slope is negative.

2 - Mann-Kendall tests were performed with alpha = 0.05 (95% confidence level).

For N>40, Mann-Kendall uses an approximation of a normal distribution, represented by Test Value Z.

For N<=40, Mann-Kendall scores are reported as Test Value S.

3 - "--" Indicates most recent groundwater concentrations were below the Site-specific cleanup level.

"ug/L" - micrograms per liter

# Table C-2. Statistical Limit Analysis

Project 160423, Hansville Landfill, Hansville, WA

## Dissolved Arsenic Statistical Concentrations (mg/L) since 2011

| Well | Statistic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Site-specific Cleanup Level |
|---|---|---|---|---|---|---|---|---|---|
| MW-14 | LCL | 0.018 | 0.017 | 0.016 | 0.015 | 0.014 | 0.013 | 0.012 | 0.005 |
| | Trend | 0.020 | 0.019 | 0.018 | 0.017 | 0.016 | 0.015 | 0.015 | |
| | UCL | 0.023 | 0.021 | 0.020 | 0.019 | 0.019 | 0.018 | 0.018 | |

## Vinyl Chloride Statistical Concentrations (ug/L) since 2011

| Well | Statistic | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Site-specific Cleanup Level |
|---|---|---|---|---|---|---|---|---|---|
| MW-6 | LCL | 0.235 | 0.212 | 0.190 | 0.167 | 0.147 | 0.128 | 0.112 | 0.025 |
| | Trend | 0.265 | 0.237 | 0.214 | 0.191 | 0.172 | 0.154 | 0.138 | |
| | UCL | 0.298 | 0.266 | 0.241 | 0.219 | 0.201 | 0.185 | 0.171 | |
| MW-12I | LCL | 0.235 | 0.197 | 0.164 | 0.134 | 0.109 | 0.088 | 0.071 | |
| | Trend | 0.269 | 0.224 | 0.188 | 0.155 | 0.130 | 0.108 | 0.090 | |
| | UCL | 0.308 | 0.255 | 0.214 | 0.181 | 0.155 | 0.133 | 0.114 | |
| MW-14 | LCL | 0.277 | 0.235 | 0.199 | 0.165 | 0.137 | 0.113 | 0.093 | |
| | Trend | 0.306 | 0.258 | 0.219 | 0.184 | 0.156 | 0.132 | 0.111 | |
| | UCL | 0.338 | 0.284 | 0.242 | 0.206 | 0.178 | 0.154 | 0.133 | |

**Notes**

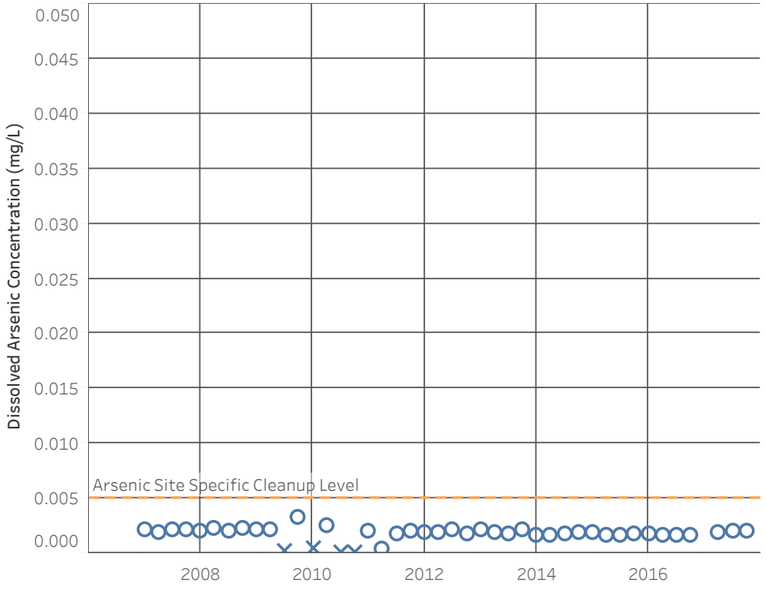
LCL is the 95% Lower Confidence Limit calculated using log-normal transformed concentrations.

Trend is the average concentration calculated using least-squares fit a line for log-normal transformed concentrations.

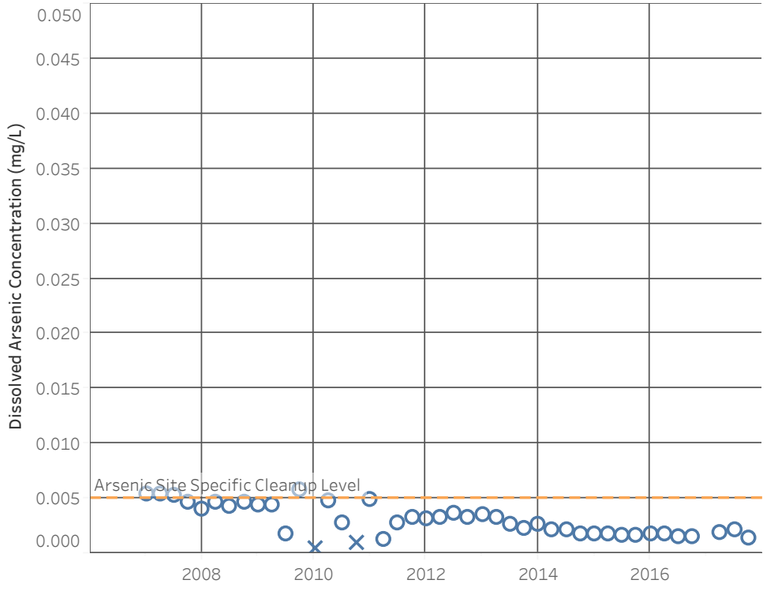
UCL is the 95% Upper Confidence Limit calculated using log-normal transformed concentrations.

UCL, LCL calculated based on method described in CMP (SCS Engineers, 2011), except using data collected since January 2007.

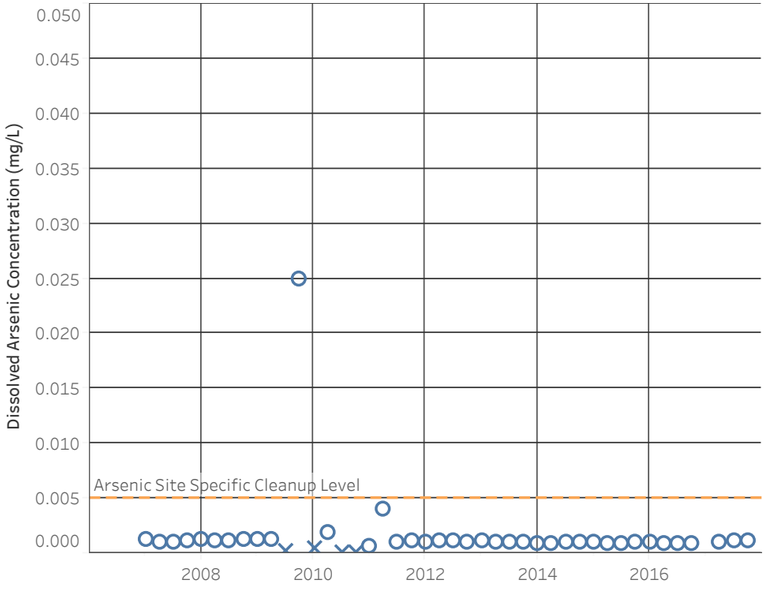
MW-5 (Background Well)



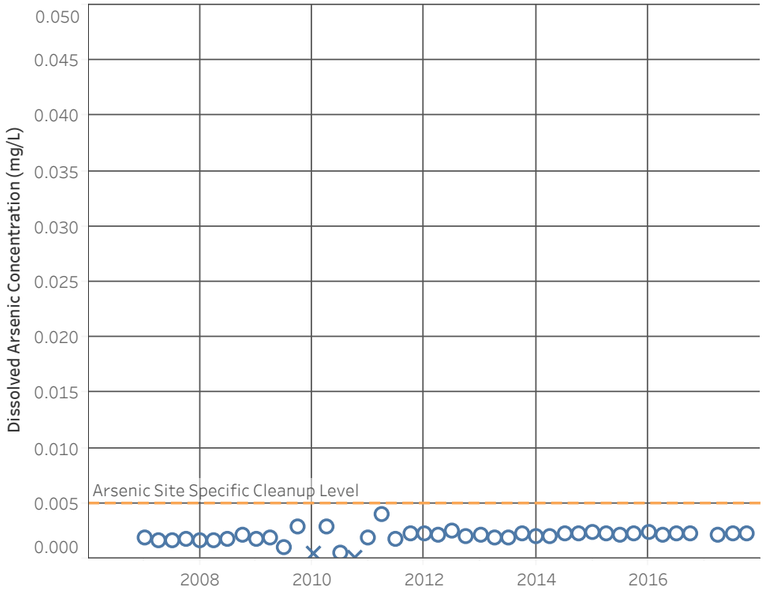

MW-6



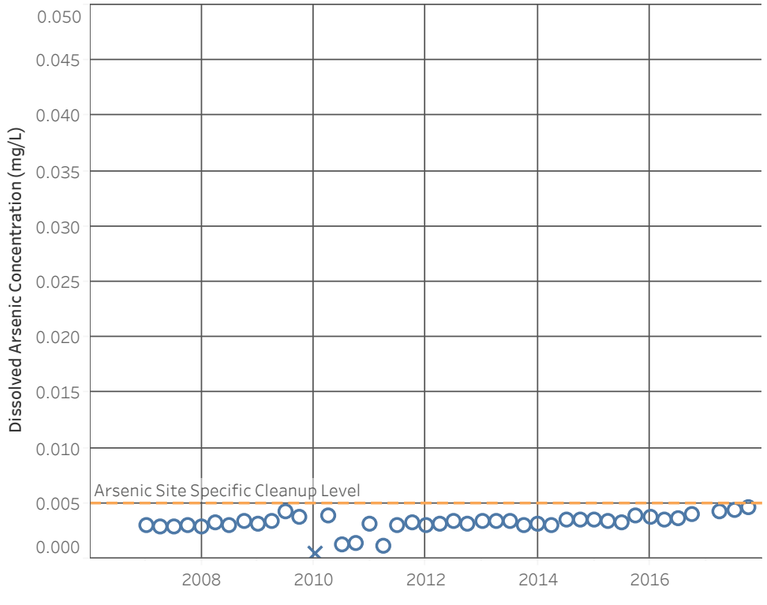

MW-7



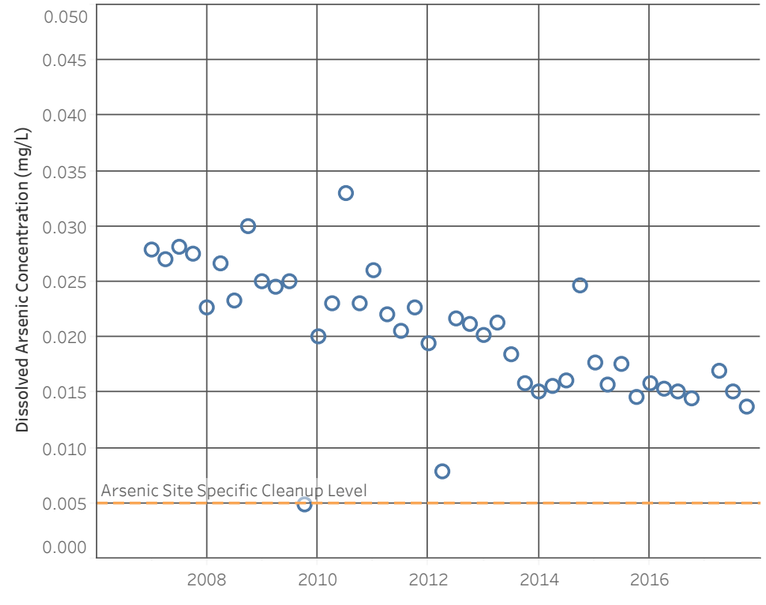

MW-12I




MW-13D




MW-14



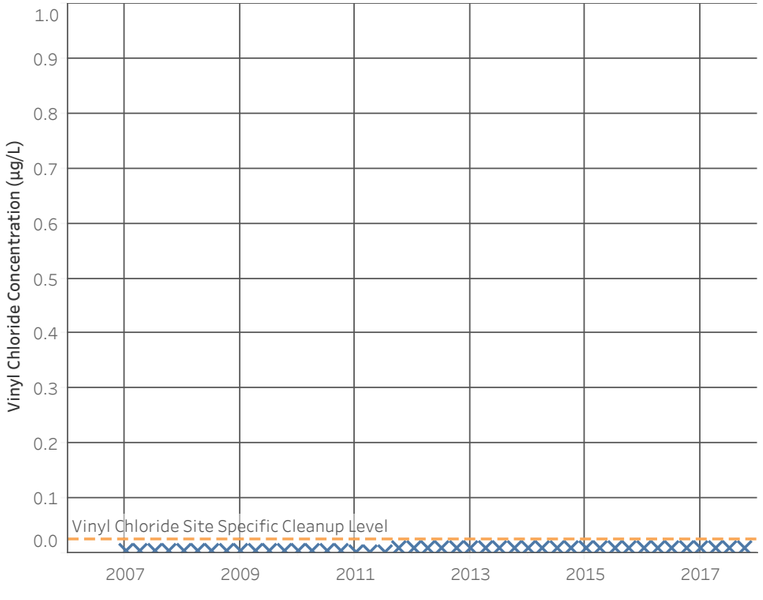

**Note:** Non-detected values are shown at 1/2 the reporting limit.
Results from First Quarter 2017 were rejected. See text.

Result Flags
O Detected
✕ U - Non-Detect

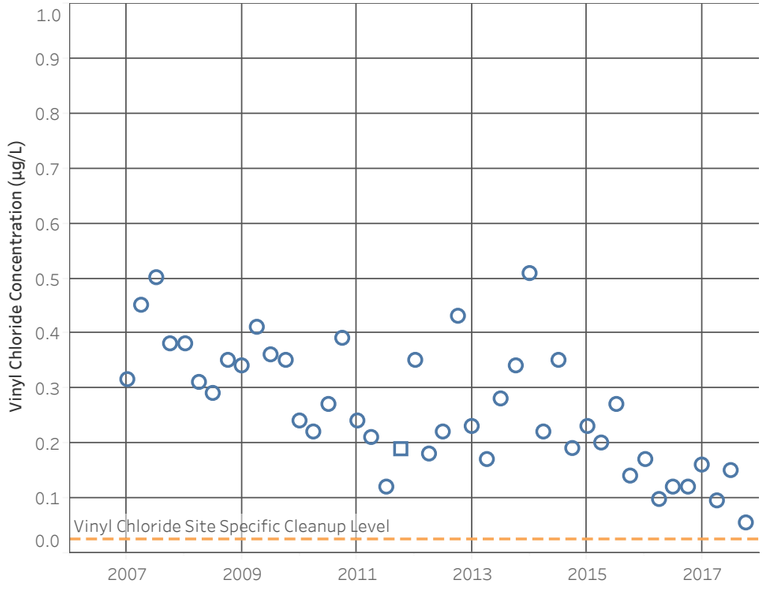
Aspect Consulting
11/28/2017
Trend Plots (As)

**Figure C-1 - Dissolved Arsenic Sampling Results**
2017 Annual Environmental Monitoring Report
Hansville Landfill
Kitsap County, WA

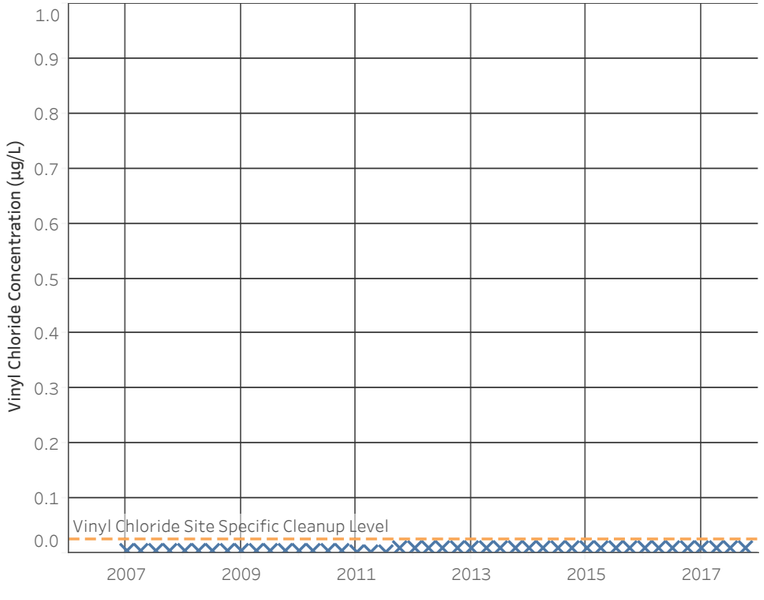
MW-5 (Background Well)



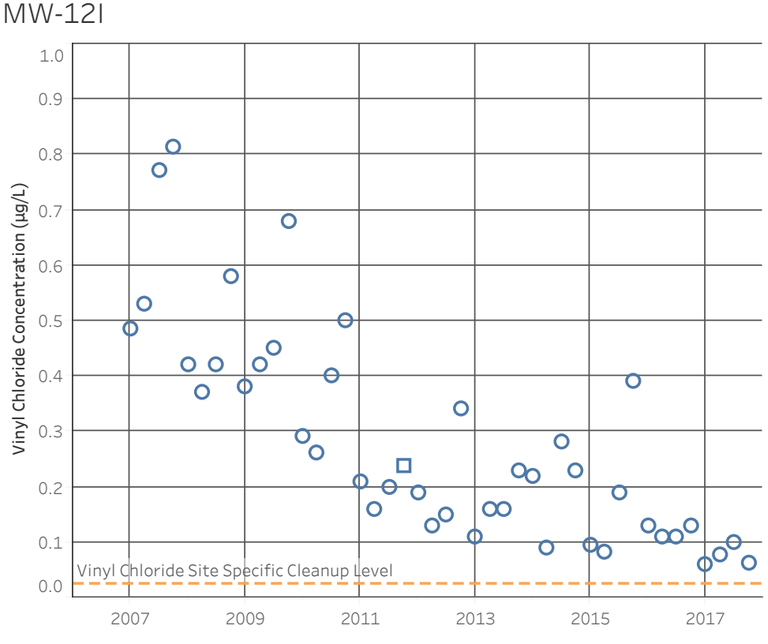

MW-6



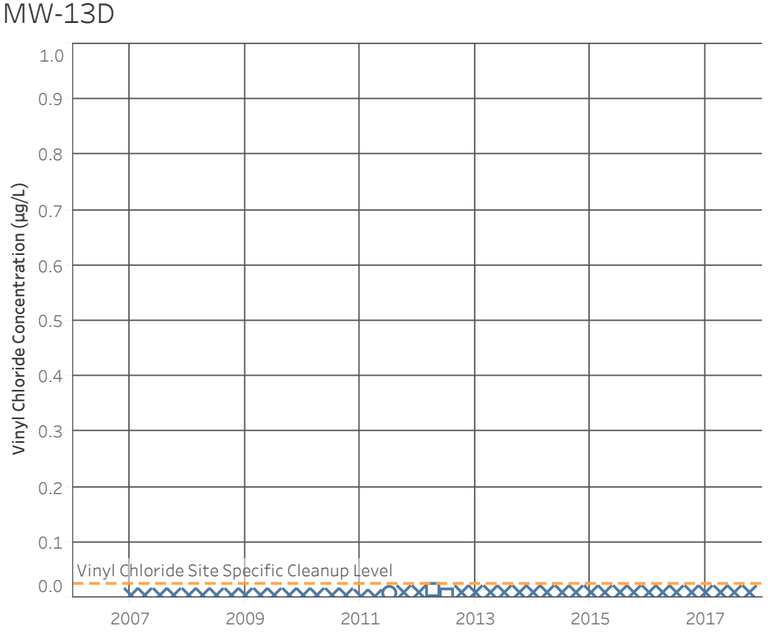

MW-7



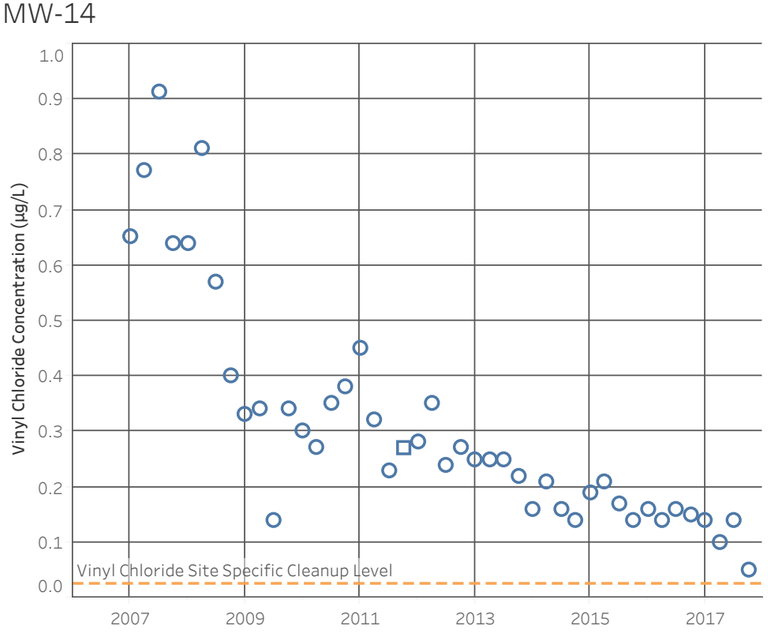

MW-12I




MW-13D




MW-14



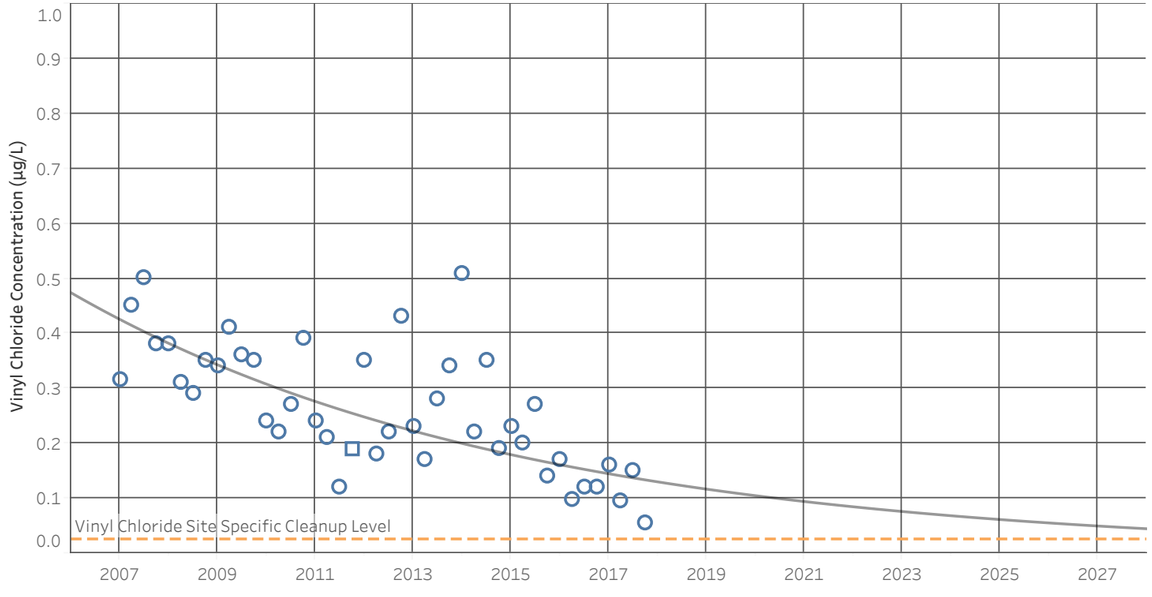

**Note:** Non-detected values are shown at 1/2 the reporting limit.

Result Flags
○ Detected □ J - Estimate ✕ U - Non-Detect

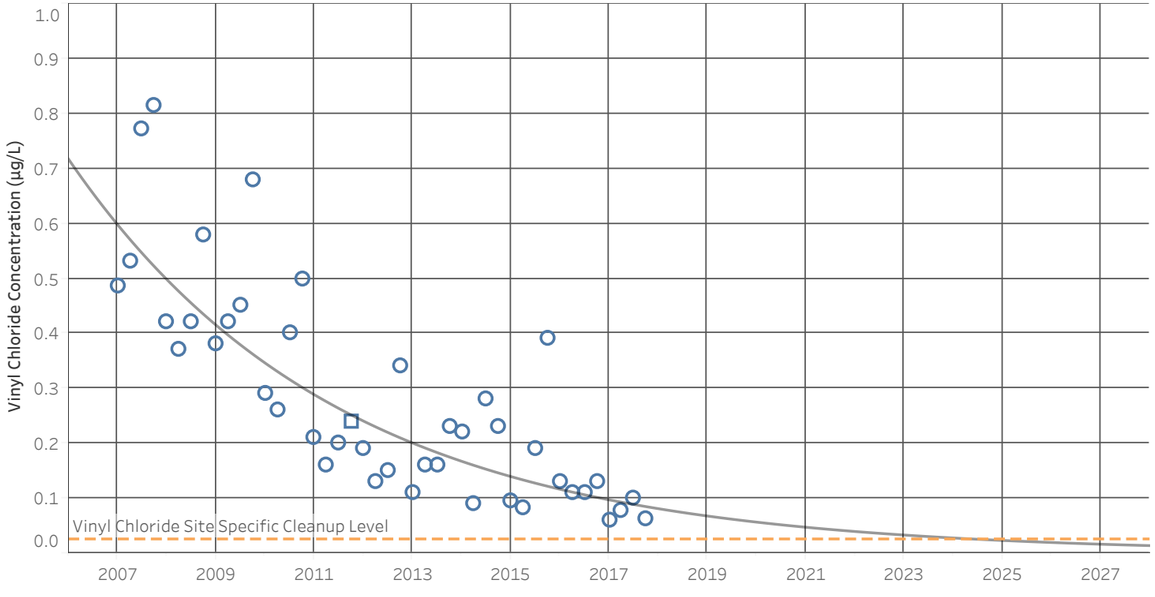
Aspect Consulting
11/28/2017
Trend Plots (VC)

**Figure C-2 - Vinyl Chloride Sampling Results**
2017 Annual Environmental Monitoring Report
Hansville Landfill
Kitsap County, WA

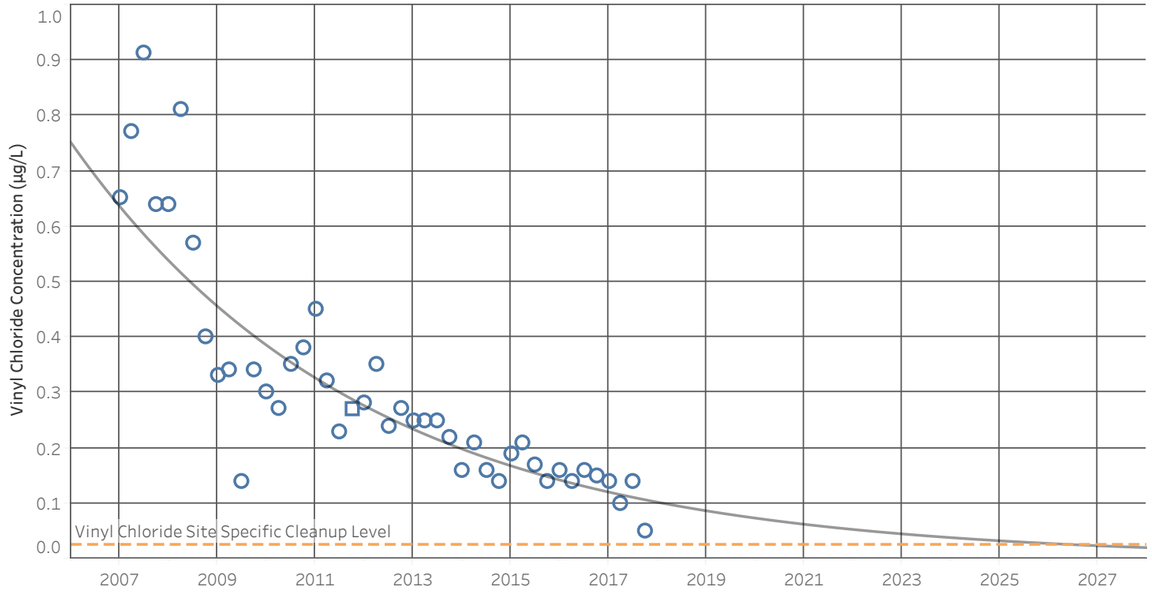
## MW-6 Vinyl Chloride Trend



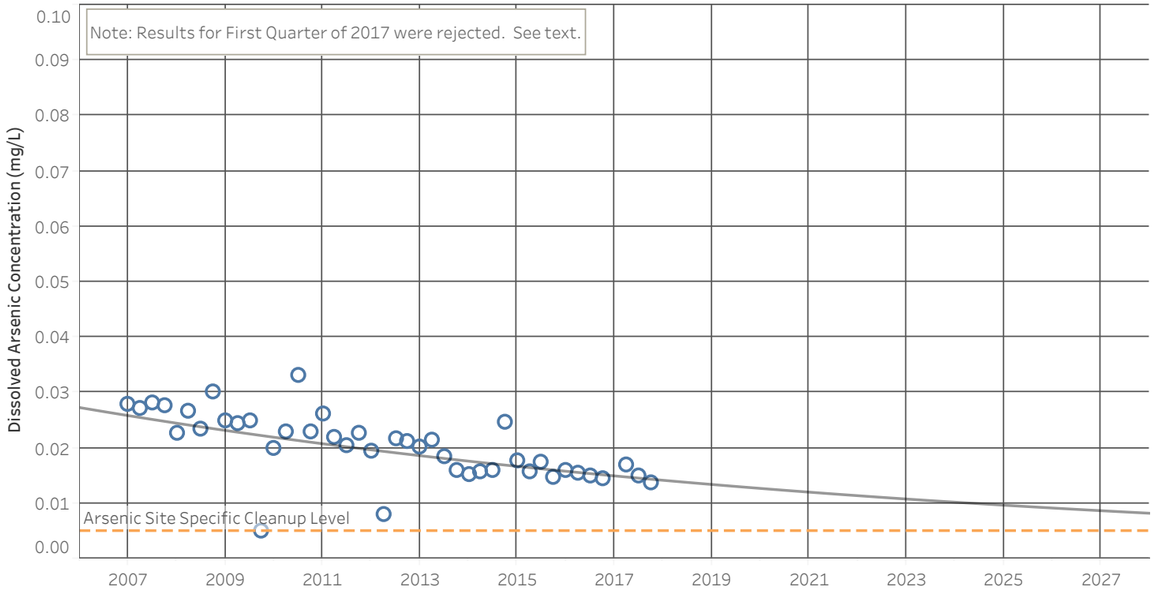

## MW-12I Vinyl Chloride Trend




## MW-14 Vinyl Chloride Trend




## MW-14 Dissolved Arsenic Trend




**Note:** Non-detected values are shown at 1/2 the reporting limit.
Attentuation curves based on exponential least squares fit to the data.

Result Flags
○ Detected □ J - Estimate ✕ U - Non-Detect

Aspect CONSULTING

**Aspect Consulting**
11/28/2017
Trend Plots (VC)

**Figure C-3 - 10 Year Attenuation Curves**
2017 Annual Environmental Monitoring Report
Hansville Landfill
Kitsap County, WA

# APPENDIX D

# Fourth Quarter Field Forms and Laboratory Reports

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-6 Page: 1 of 1

Project Name: Hansville LF
Project Number:
Date: 10/10/17
Developed by: AHP
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): 72.72
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| 1717 | | | | | | | | | | start |
| 1722 | | | 72.81 | 13.1 | 871 | 0.30 | 7.15 | 78.8 | 1.41 | |
| 1725 | | | 72.81 | 13.6 | 847 | 0.40 | 7.16 | 76.7 | 1.68 | |
| 1729 | | | - | 15.2 | 841 | 0.47 | 7.15 | 75.2 | 2.15 | |
| 1732 | | | | 15.7 | 840 | 0.47 | 7.14 | 74.6 | 1.91 | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

### SAMPLE INVENTORY

| Time | Volume mL | Bottle Type | | Quantity | Filtration | Preservation | Appearance: Color | Appearance: Turbidity & Sediment | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 1735 | 500 | Amb | | 1 | — | Sulf | | | |
| | 1000 | Poly | | 1 | — | — | | | |
| | 500 | Poly | | 1 | — | — | | | |
| | 40 | VOA | | 3 | — | HCl | | | |
| | 500 | Poly | | 2 | Y | Nitric | | | |
| | 250 | Poly | | 1 | Y | — | | | |

### METHODS

Sampling Equipment with IDs: _____
Purging Equipment: _____ Decon Equipment: _____
Disposal of Discharged Water: _____
Observations/Comments: _____

Aspect CONSULTING

Sample number MW-14-101017

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-14 Page: 1 of 1

Project Name: Hansville LF
Date: 10/10/2017
Sampled by: NHC
Measuring Point of Well: TOC
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Project Number:
Starting Water Level (ft TOC): 80.71
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

## PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (°C) | Specific Conductance (µS/cm) | Dissolved Oxygen (mg/L) | pH | ORP (mv) | Turbidity (NTU) | Comments |
| 1610 | | .5 | | | | | | | | Start |
| 1615 | | | 80.82 | 11.8 | 476.4 | 6.58 | 7.06 | 142.2 | 3.88 | |
| 1620 | | | 80.82 | 13.0 | 502.4 | 4.05 | 7.07 | 81.8 | 2.25 | |
| 1625 | | | – | 14.6 | 489.5 | 3.03 | 7.07 | 69.6 | 1.38 | |
| 1630 | | | | 15.3 | 481.5 | 2.64 | 7.07 | 66.1 | 0.58 | |
| 1633 | | | | 15.4 | 477.9 | 2.53 | 7.07 | 64.5 | 0.56 | |
| 1636 | | | | 15.4 | 475.2 | 2.49 | 7.07 | 62.3 | 0.41 | sample |

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

## SAMPLE INVENTORY

| Time | Volume | Bottle Type | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Color | Turbidity & Sediment | |
| 1640 | 500mL | amber | 1 | – | sulf | | | |
| | 1L | poly | 1 | – | – | | | |
| | 40mL | VOA | 3 | – | HCl | | | |
| | 500 | poly | 1 | – | – | | | |
| | 500 | poly | 2 | Y | Nitr | | | |
| | 250 | poly | 1 | Y | – | | | |

## METHODS

Parameters measured with (instrument model & serial number): Red YSI
Purging Equipment: Grundfos + peristaltic Decon Equipment: soap + DI water
Disposal of Discharged Water: site
Observations/Comments: duplicate under name MW-20DD-101017

Aspect CONSULTING

Sample number MW-13D-101017

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-13D Page: 1 of 1

Project Name: Hansville LF
Date: 10/10/17
Sampled by: NHC
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Project Number:
Starting Water Level (ft TOC):
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC):

## PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (°C) | Specific Conductance (µS/cm) | Dissolved Oxygen (mg/L) | pH | ORP (mv) | Turbidity (NTU) | Comments |
| 1345 | | .6 | 10.67 | | | | | | | Start |
| 1350 | | | 11.22 | 10.7 | 346.5 | 3.02 | 7.68 | -0.6 | 2.58 | |
| 1353 | | | 11.18 | 10.9 | 348.7 | 1.68 | 7.70 | -5.5 | 0.11 | |
| 1356 | | | 11.2 | 11.0 | 349.4 | 0.96 | 7.71 | -8.6 | 0.21 | |
| 1359 | | | ~~11.1~~ | 11.1 | 349.6 | 0.42 | 7.71 | -11.6 | 0.01 | |
| 1402 | | | | 11.1 | 349.1 | 0.21 | 7.71 | -14.1 | 0.00 | Sample |

Total Gallons Purged:
Total Casing Volumes Removed:
Ending Water Level (ft TOC):
Ending Total Depth (ft TOC):

## SAMPLE INVENTORY

| Time | Volume | Bottle Type | Quantity | Filtration | Preservation | Appearance: Color | Appearance: Turbidity & Sediment | Remarks |
|---|---|---|---|---|---|---|---|---|
| 1405 | 500mL | amber | 1 | - | Surf | | | |
| | 1L | poly | 1 | - | - | | | |
| | 40mL | VOA | 3 | - | HCl | | | |
| | 500 | poly | 1 | - | - | | | |
| | 500 | poly | 2 | Y | nHNO3 | | | |
| | 250 | poly | 1 | Y | - | | | |

## METHODS

Parameters measured with (instrument model & serial number): Red YSI
Purging Equipment: peristaltic / Grundfos
Decon Equipment: soap + DI water
Disposal of Discharged Water: site
Observations/Comments:

Aspect CONSULTING

Sample number SW-6

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: _____ Page: 1 of 1

Project Name: Hansville LS
Date: 10/10/17
Sampled by: NHC + AHP
Measuring Point of Well: _____
Screened Interval (ft. TOC) _____
Filter Pack Interval (ft. TOC) _____

Project Number: _____
Starting Water Level (ft TOC): _____
Casing Stickup (ft): _____
Total Depth (ft TOC): _____
Casing Diameter (inches): _____

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 3/4"= 0.02 gpf 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
3/4"= 0.09 Lpf 2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

## PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (°C) | Specific Conductance (µS/cm) | Dissolved Oxygen (mg/L) | pH | ORP (mv) | Turbidity (NTU) | Comments |
| | | | | | | | | | | |
| 1316 | | | | 10.7 | 123.9 | 10.18 | 7.45 | 1.6 | 19.6 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

## SAMPLE INVENTORY

| Time | Volume | Bottle Type | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Color | Turbidity & Sediment | |
| 1310 | 500mL | Amb | 1 | — | Salt N/A | | | |
| | 1L | Poly | 1 | — | N/A | | | |
| | 40mL | VOA | 3 | — | 3HCl | | | |
| | 500 | Poly | 1 | — | N/A | | | |
| | 500 | Poly | 2 | Y | Nitric | | | |
| | 250 | Poly | 1 | Y | N/A | | | |

## METHODS

Parameters measured with (instrument model & serial number): Red YSI
Purging Equipment: _____ Decon Equipment: _____
Disposal of Discharged Water: _____
Observations/Comments: very low flow

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: SW-7 Page: 1 of 1

Project Name: Hamwic LF
Project Number:
Date: 10/6/17
Developed by: AHC
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC):
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

## PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| | | | | | | | 7.91 | | | |
| 1450 | | | | 10.8 | 218.7 | 10.84 | ~~7.8~~ | 104.2 | | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

## SAMPLE INVENTORY

| Time | Volume mL | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 1450 | 500 | Amb | | 1 | — | Sulf | | | |
| | 1000 | Poly | | 1 | — | — | | | |
| | 40mL | VOA | | 3 | — | HCl | | | |
| | 500mL | Poly | | 1 | — | — | | | |
| | 500mL | Poly | | 2 | Y | $HNO_3$ | | | |
| | 250mL | Poly | | 1 | Y | — | | | |

## METHODS

Sampling Equipment with IDs:
Purging Equipment: Decon Equipment:
Disposal of Discharged Water:
Observations/Comments:

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: SW-1 Page: ___ of ___

Project Name: Hansville LF
Project Number: _____

Date: 10/10/17
Developed by: AHT
Measuring Point of Well: _____
Screened Interval (ft. TOC) _____
Filter Pack Interval (ft. TOC) _____

Starting Water Level (ft TOC): _____
Casing Stickup (ft): _____
Total Depth (ft TOC): _____
Casing Diameter (inches): _____

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| 1200 | | | | 10.4 | 339.9 | 10.36 | 7.55 | 106.3 | 2.17 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

### SAMPLE INVENTORY

| Time | Volume | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 1200 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

### METHODS

Sampling Equipment with IDs: _____

Purging Equipment: _____ Decon Equipment: _____

Disposal of Discharged Water: _____

Observations/Comments: _____

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

**WELL NUMBER:** SW-4 **Page:** ___ of ___

Project Name: Hansville LF
Project Number: _____
Date: 10/10/17
Developed by: NHC
Measuring Point of Well: _____
Screened Interval (ft. TOC) _____
Filter Pack Interval (ft. TOC) _____

Starting Water Level (ft TOC): _____
Casing Stickup (ft): _____
Total Depth (ft TOC): _____
Casing Diameter (inches): _____

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| | | | | | | | | | | |
| 1245 | | | | 10.7 | 675.5 | 10.65 | 7.51 | 136.6 | 4.26 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

### SAMPLE INVENTORY

| Time | Volume | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 1245 | 500mL | Amb | | 1 | — | Sulf | | | |
| | 1L | Poly | | 1 | — | — | | | |
| | 40mL | VOA | | 3 | — | HCl | | | |
| | 500mL | Poly | | 1 | — | — | | | |
| | 500mL | Poly | | 2 | Y | Nitr | | | |
| | 250mL | Poly | | 1 | Y | — | | | |

### METHODS

Sampling Equipment with IDs: _____
Purging Equipment: _____ Decon Equipment: _____
Disposal of Discharged Water: _____
Observations/Comments: _____

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-12I Page: 1 of 1

Project Name: Hansville LF
Project Number:
Date: 10/10/2019
Developed by:
Measuring Point of Well:
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): 9.4
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| 1134 | | .4 | | | | | | | | start |
| 1139 | | | 9.78 | 10.3 | 299.3 | 2.22 | 7.31 | 39.4 | 0.08 | |
| 1144 | | | 9.82 | 10.6 | 304.7 | 0.64 | 7.31 | 45.71 | 0.01 | |
| 1149 | | | 9.82 | 10.9 | 304.4 | 0.25 | 7.31 | 50.0 | 0.01 | |
| 1152 | | | - | 11.0 | 304.9 | 0.21 | 7.31 | 52.1 | 0.16 | sample |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Total Gallons Purged: _____ Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

### SAMPLE INVENTORY

| Time | Volume | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 1155 | 500mL | amber | | 1 | - | sulf | | | |
| | 1L | poly | | 1 | - | - | | | |
| | 40mL | VOA | | 3 | - | HCl | | | |
| | 500mL | poly | | 1 | - | - | | | |
| | 500mL | poly | | 2 | yes | nitric | | | |
| | 250mL | poly | | 1 | yes | - | | | |

### METHODS

Sampling Equipment with IDs: Grundfos, peristaltic
Purging Equipment: Red YSI Decon Equipment: Soapy DI water
Disposal of Discharged Water: site

Observations/Comments:

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-5 Page: 1 of 1

Project Name: Hansville LF
Project Number:
Date: 10/10/2017
Developed by:
Measuring Point of Well: TOC
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): 98.20
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume _____ (ft Water) x _____ (Lpfv)(gpf) = _____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): _____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| 0952 | | .7 | | | | | | | | start |
| 0957 | | | 98.22 | 11.0 | 263.4 | 8.93 | 7.35 | 131.2 | 1.39 | |
| 1002 | | | 98.22 | 12.0 | 269.1 | 8.89 | 7.35 | 109.2 | 0.91 | |
| 1007 | | | – | 12.9 | 264.4 | 8.93 | 7.35 | 98.0 | 0.54 | |
| 1011 | | | | 13.1 | 264.2 | 8.97 | 7.35 | 96.5 | 0.45 | |
| 1014 | | | | 13.2 | 264.5 | 8.92 | 7.35 | 95.3 | 0.59 | sample |

Total Gallons Purged: 7.5 Total Casing Volumes Removed: _____

Ending Water Level (ft TOC): _____ Ending Total Depth (ft TOC): _____

### SAMPLE INVENTORY

| Time | Volume | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 1020 | 500mL | amber | | 1 | no | sulf | | | |
| | 1L | poly | | 1 | no | none | | | |
| 40mL | ~~500mL~~ | VOA | | 3 | no | HCl | | | |
| | 500mL | poly | | 1 | no | none | | | |
| | 500mL | poly | | 2 | yes | nitric | | | |
| | 250mL | poly | | 1 | yes | none | | | |

### METHODS

Sampling Equipment with IDs: Grunfos, peristaltic
Purging Equipment: Red YSI Decon Equipment: soap + DI water
Disposal of Discharged Water: site

Observations/Comments:

Aspect CONSULTING

## GROUNDWATER SAMPLING RECORD

WELL NUMBER: MW-7 Page: 1 of 1

Project Name: Hansville LF
Project Number:
Date: 10/10/19
Developed by:
Measuring Point of Well: TOC
Screened Interval (ft. TOC)
Filter Pack Interval (ft. TOC)

Starting Water Level (ft TOC): 83.0
Casing Stickup (ft):
Total Depth (ft TOC):
Casing Diameter (inches):

Casing Volume ____ (ft Water) x ____ (Lpfv)(gpf) = ____ (L)(gal)
Casing volumes: 2" = 0.16 gpf 4" = 0.65 gpf 6" = 1.47 gpf
2" = 0.62 Lpf 4" = 2.46 Lpf 6" = 5.56 Lpf

Sample Intake Depth (ft TOC): ____

### PURGING MEASUREMENTS

| Criteria: | | Typical 0.1-0.5 Lpm | Stable and minimal and | na | ± 3% | ± 10% | ± 0.1 | ± 10 mV | ± 10% | |
|---|---|---|---|---|---|---|---|---|---|---|
| Time | Cumul. Volume (gal or L) | Purge Rate (gpm or Lpm) | Water Level (ft) | Temp. (C or F) | Specific Conductivity (µS/cm) | Dissolved Oxygen (mg/L) | pH | Eh ORP (mv) | Turbidity (NTU) | Comments |
| 0827 | | .7 | | | | 1.91 | | | | Start |
| 0832 | | | 82.9 | 10.9 | 526.0 | ~~12.5~~ | 6.82 | 127.0 | 6.50 | |
| 0837 | | | 82.89 | 12.0 | 522.6 | 1.77 | 6.82 | 114.9 | 3.65 | |
| 0842 | | | - | 12.5 | 522.2 | 1.78 | 6.83 | 111.1 | 1.19 | |
| 0847 | | | - | 12.8 | ~~523.0~~ | 1.77 | 6.83 | 109.8 | 0.90 | |
| 0852 | | | | 12.8 | 522.0 | 1.75 | 6.84 | 109.6 | 0.74 | Sample |

Total Gallons Purged: 10
Total Casing Volumes Removed: ____

Ending Water Level (ft TOC): ____
Ending Total Depth (ft TOC): ____

### SAMPLE INVENTORY

| Time | Volume | Bottle Type | | Quantity | Filtration | Preservation | Appearance | | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Color | Turbidity & Sediment | |
| 0855 | ~~1L~~ 500mL | amber | | 1 | none | sulf | | | |
| | 1L | poly | | 1 | none | none | | | |
| | 40mL | VOA | | 3 | none | HCl | | | |
| | 500mL | poly | | 1 | none | none | | | |
| | 500mL | poly | | 2 | yes | nitric | | | |
| | 250mL | poly | | 1 | yes | none | | | |

### METHODS

Sampling Equipment with IDs: Grundfos, peristaltic
Purging Equipment: Red YSI
Decon Equipment: Soap + DI water
Disposal of Discharged Water: Site
Observations/Comments:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 280-102219-1

Job Description: Hansville Landfill

For:
Aspect Consulting
350 Madison Ave N
Bainbridge Island, WA 98110

Attention: Mr. Aaron Pruitt

Approved for release.
Betsy A Sara
Project Manager II
10/27/2017 9:25 AM

Betsy A Sara, Project Manager II
4955 Yarrow Street, Arvada, CO, 80002
(303)736-0189
betsy.sara@testamericainc.com
10/27/2017

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

# Table of Contents

**CASE NARRATIVE**

**Client: Aspect Consulting**

**Project: Hansville Landfill**

**Report Number: 280-102219-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

**Sample Receiving**

The samples were received on 10/12/2017; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 3.5º C, 3.8º C and 5.4º C

Six hydrochloric preserved VOA vials for a TRIP BLANK were received but were not listed on the chain of custody. The laboratory proceeded with the 8260C SIM analysis. The client was notified on 10/12/2017.

**Holding Times**

All holding times were within established control limits.

**Method Blanks**

All Method Blanks were within established control limits.

**Laboratory Control Samples (LCS)**

All Laboratory Control Samples were within established control limits.

**Matrix Spike (MS) and Matrix Spike Duplicate (MSD**)

Sample MW-5-101017 was selected to fulfill the laboratory batch quality control requirements for Method 350.1. Analysis of the laboratory generated MS/MSD for this sample exhibited recoveries of Ammonia above the upper control limit. Because the corresponding Laboratory Control Sample and the Method Blank sample were within control limits, this anomaly may be due to matrix interference and no corrective action was taken.

All other MS and MSD samples were within established control limits.

**General Comments**

The analysis for Method 8260C SIM was performed by TestAmerica Buffalo. Their address and phone number are:
TestAmerica Buffalo
10 Hazelwood Drive, Suite 106
Amherst, NY 14228
716-691-2600

The analysis for Nitrate, Nitrite, Ortho-phosphate Method 300.0, and Dissolved Arsenic Method 200.8 were performed by ARI. Their address and phone number are:
Analytical Resources, Inc.
4611 S.134th Place
Tukwila, WA 98168-3240
206-695-6200

# EXECUTIVE SUMMARY - Detections

Client: Aspect Consulting Job Number: 280-102219-1

| Lab Sample ID / Analyte | Client Sample ID | Result | Qualifier | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-102219-1** | **MW-7-101017** | | | | | |
| Chloride | | 1.7 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 4.2 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 150 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 150 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 1.3 | | 1.0 | mg/L | SM 5310B |
| **280-102219-2** | **MW-5-101017** | | | | | |
| Chloride | | 2.8 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 8.6 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 62 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 62 | | 5.0 | mg/L | SM 2320B |
| **280-102219-3** | **MW-12I-101017** | | | | | |
| Vinyl chloride | | 0.063 | | 0.020 | ug/L | 8260C SIM |
| Chloride | | 2.4 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 4.8 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 87 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 87 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 2.2 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 46 | | 1.0 | ug/L | 6020 |
| **280-102219-4** | **SW-4-101017** | | | | | |
| Chloride | | 14 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 20 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 160 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 160 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 6.0 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 30 | | 1.0 | ug/L | 6020 |
| **280-102219-5** | **SW-1-101017** | | | | | |
| Chloride | | 4.6 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 10 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 76 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 76 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 2.0 | | 1.0 | mg/L | SM 5310B |

# EXECUTIVE SUMMARY - Detections

Client: Aspect Consulting Job Number: 280-102219-1

| Lab Sample ID / Analyte | Client Sample ID | Result | Qualifier | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-102219-6** | **SW-7-101017** | | | | | |
| Chloride | | 3.9 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 6.5 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 63 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 63 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 6.5 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 6.4 | | 1.0 | ug/L | 6020 |
| **280-102219-7** | **SW-6-101017** | | | | | |
| Chloride | | 4.1 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 3.0 | | 1.0 | mg/L | 300.0 |
| Ammonia as N | | 0.078 | | 0.030 | mg/L | 350.1 |
| Total Alkalinity | | 70 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 70 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 11 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 220 | | 1.0 | ug/L | 6020 |
| **280-102219-8** | **MW-13D-101017** | | | | | |
| Chloride | | 5.8 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 17 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 77 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 77 | | 5.0 | mg/L | SM 2320B |
| ***Dissolved*** | | | | | | |
| Manganese | | 23 | | 1.0 | ug/L | 6020 |
| **280-102219-9** | **MW-14-101017** | | | | | |
| Vinyl chloride | | 0.046 | | 0.020 | ug/L | 8260C SIM |
| Chloride | | 8.9 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 13 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 110 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 110 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 1.1 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 650 | | 1.0 | ug/L | 6020 |

# EXECUTIVE SUMMARY - Detections

Client: Aspect Consulting Job Number: 280-102219-1

| Lab Sample ID / Analyte | Client Sample ID | Result | Qualifier | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-102219-10** | **MW-6-101017** | | | | | |
| Vinyl chloride | | 0.056 | | 0.020 | ug/L | 8260C SIM |
| Chloride | | 23 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 32 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 170 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 170 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 1.5 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 460 | | 1.0 | ug/L | 6020 |
| **280-102219-11** | **MW-20DD-101017** | | | | | |
| Vinyl chloride | | 0.050 | | 0.020 | ug/L | 8260C SIM |
| Chloride | | 9.5 | | 1.0 | mg/L | 300.0 |
| Sulfate | | 13 | | 1.0 | mg/L | 300.0 |
| Total Alkalinity | | 110 | | 5.0 | mg/L | SM 2320B |
| Bicarbonate Alkalinity | | 110 | | 5.0 | mg/L | SM 2320B |
| Total Organic Carbon - Average | | 1.1 | | 1.0 | mg/L | SM 5310B |
| ***Dissolved*** | | | | | | |
| Manganese | | 740 | | 1.0 | ug/L | 6020 |

# METHOD SUMMARY

Client: Aspect Consulting Job Number: 280-102219-1

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Water** | | | |
| Metals (ICP/MS) | TAL DEN | SW846 6020 | |
| Preparation, Total Recoverable or Dissolved Metals | TAL DEN | | SW846 3005A |
| Sample Filtration, Field | | | FIELD_FLTRD |
| Anions, Ion Chromatography | TAL DEN | MCAWW 300.0 | |
| Nitrogen, Ammonia | TAL DEN | MCAWW 350.1 | |
| Alkalinity | TAL DEN | SM SM 2320B | |
| Organic Carbon, Total (TOC) | TAL DEN | SM SM 5310B | |
| Volatile Organic Compounds (GC/MS) | TAL BUF | SW846 8260C SIM | |
| Purge and Trap | TAL BUF | | SW846 5030C |
| General Sub Contract Method | SC0056 | Subcontract | |

### Lab References:

SC0056 = Analytical Resources, Inc

TAL BUF = TestAmerica Buffalo

TAL DEN = TestAmerica Denver

### Method References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

# METHOD / ANALYST SUMMARY

Client: Aspect Consulting

Job Number: 280-102219-1

| Method | Analyst | Analyst ID |
|---|---|---|
| SW846 8260C SIM | Cwiklinski, Charles D | CDC |
| SW846 6020 | Rhoades, Chris R | CRR |
| MCAWW 300.0 | Benson, Alex F | AFB |
| MCAWW 350.1 | Moore, Kevin A | KAM |
| SM SM 2320B | Duplin, Alysha 1 | A1D |
| SM SM 5310B | Jewell, Connie C | CCJ |

# SAMPLE SUMMARY

Client: Aspect Consulting Job Number: 280-102219-1

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 280-102219-1 | MW-7-101017 | Water | 10/10/2017 0855 | 10/12/2017 0840 |
| 280-102219-2 | MW-5-101017 | Water | 10/10/2017 1020 | 10/12/2017 0840 |
| 280-102219-3 | MW-12I-101017 | Water | 10/10/2017 1155 | 10/12/2017 0840 |
| 280-102219-4 | SW-4-101017 | Water | 10/10/2017 1245 | 10/12/2017 0840 |
| 280-102219-5 | SW-1-101017 | Water | 10/10/2017 1200 | 10/12/2017 0840 |
| 280-102219-6 | SW-7-101017 | Water | 10/10/2017 1450 | 10/12/2017 0840 |
| 280-102219-7 | SW-6-101017 | Water | 10/10/2017 1310 | 10/12/2017 0840 |
| 280-102219-8 | MW-13D-101017 | Water | 10/10/2017 1405 | 10/12/2017 0840 |
| 280-102219-9 | MW-14-101017 | Water | 10/10/2017 1640 | 10/12/2017 0840 |
| 280-102219-10 | MW-6-101017 | Water | 10/10/2017 1735 | 10/12/2017 0840 |
| 280-102219-11 | MW-20DD-101017 | Water | 10/10/2017 0000 | 10/12/2017 0840 |
| 280-102219-12TB | TRIP BLANK | Water | 10/10/2017 0000 | 10/12/2017 0840 |

# SAMPLE RESULTS

Client: Aspect Consulting | Job Number: 280-102219-1

**Client Sample ID:** **MW-7-101017**

Lab Sample ID: 280-102219-1 | Date Sampled: 10/10/2017 0855
Client Matrix: Water | Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4500.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1505 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1505 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 102 | | 50 - 150 |
| TBA-d9 (Surr) | 75 | | 50 - 150 |

Client: Aspect Consulting | Job Number: 280-102219-1

**Client Sample ID:** **MW-5-101017**

Lab Sample ID: 280-102219-2 | Date Sampled: 10/10/2017 1020
Client Matrix: Water | Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4501.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1529 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1529 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 101 | | 50 - 150 |
| TBA-d9 (Surr) | 77 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: MW-12I-101017**

Lab Sample ID: 280-102219-3 Date Sampled: 10/10/2017 1155
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4502.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1553 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1553 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | 0.063 | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 102 | | 50 - 150 |
| TBA-d9 (Surr) | 78 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: SW-4-101017**

Lab Sample ID: 280-102219-4 Date Sampled: 10/10/2017 1245
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4503.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1617 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1617 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 100 | | 50 - 150 |
| TBA-d9 (Surr) | 77 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: SW-1-101017**

Lab Sample ID: 280-102219-5 Date Sampled: 10/10/2017 1200
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4504.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1642 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1642 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 96 | | 50 - 150 |
| TBA-d9 (Surr) | 74 | | 50 - 150 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **SW-7-101017**

Lab Sample ID: 280-102219-6
Client Matrix: Water

Date Sampled: 10/10/2017 1450
Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4505.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1707 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1707 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 103 | | 50 - 150 |
| TBA-d9 (Surr) | 74 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: SW-6-101017**

Lab Sample ID: 280-102219-7 Date Sampled: 10/10/2017 1310
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4506.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1731 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1731 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 99 | | 50 - 150 |
| TBA-d9 (Surr) | 71 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: MW-13D-101017**

Lab Sample ID: 280-102219-8 Date Sampled: 10/10/2017 1405
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4507.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1755 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1755 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 107 | | 50 - 150 |
| TBA-d9 (Surr) | 78 | | 50 - 150 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-14-101017**

Lab Sample ID: 280-102219-9
Client Matrix: Water

Date Sampled: 10/10/2017 1640
Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4508.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1820 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1820 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | 0.046 | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 100 | | 50 - 150 |
| TBA-d9 (Surr) | 76 | | 50 - 150 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-6-101017**

Lab Sample ID: 280-102219-10
Client Matrix: Water

Date Sampled: 10/10/2017 1735
Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4509.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1844 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1844 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | 0.056 | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 101 | | 50 - 150 |
| TBA-d9 (Surr) | 78 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID: MW-20DD-101017**

Lab Sample ID: 280-102219-11 Date Sampled: 10/10/2017 0000
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4510.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1908 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1908 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | 0.050 | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 109 | | 50 - 150 |
| TBA-d9 (Surr) | 85 | | 50 - 150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Client Sample ID:** **TRIP BLANK**

Lab Sample ID: 280-102219-12TB Date Sampled: 10/10/2017 0000
Client Matrix: Water Date Received: 10/12/2017 0840

**8260C SIM Volatile Organic Compounds (GC/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 8260C SIM | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Prep Method: | 5030C | Prep Batch: | N/A | Lab File ID: | J4511.D |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1933 | | | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1933 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 102 | | 50 - 150 |
| TBA-d9 (Surr) | 87 | | 50 - 150 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-7-101017**

Lab Sample ID: 280-102219-1
Client Matrix: Water

Date Sampled: 10/10/2017 0855
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 182SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2306 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | ND | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-5-101017**

Lab Sample ID: 280-102219-2
Client Matrix: Water

Date Sampled: 10/10/2017 1020
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 183SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2310 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | ND | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-12I-101017**

Lab Sample ID: 280-102219-3
Client Matrix: Water

Date Sampled: 10/10/2017 1155
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 188SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2327 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 46 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **SW-4-101017**

Lab Sample ID: 280-102219-4
Client Matrix: Water

Date Sampled: 10/10/2017 1245
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 191SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2337 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 30 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **SW-1-101017**

Lab Sample ID: 280-102219-5
Client Matrix: Water

Date Sampled: 10/10/2017 1200
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 192SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2341 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | ND | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **SW-7-101017**

Lab Sample ID: 280-102219-6
Client Matrix: Water

Date Sampled: 10/10/2017 1450
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 193SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2344 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 6.4 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **SW-6-101017**

Lab Sample ID: 280-102219-7
Client Matrix: Water

Date Sampled: 10/10/2017 1310
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 194SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2347 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 220 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-13D-101017**

Lab Sample ID: 280-102219-8
Client Matrix: Water

Date Sampled: 10/10/2017 1405
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 195SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2351 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 23 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-14-101017**

Lab Sample ID: 280-102219-9
Client Matrix: Water

Date Sampled: 10/10/2017 1640
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 196SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2354 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 650 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-6-101017**

Lab Sample ID: 280-102219-10
Client Matrix: Water

Date Sampled: 10/10/2017 1735
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 197SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2358 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 460 | | 1.0 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Client Sample ID:** **MW-20DD-101017**

Lab Sample ID: 280-102219-11
Client Matrix: Water

Date Sampled: 10/10/2017 0000
Date Received: 10/12/2017 0840

**6020 Metals (ICP/MS)-Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| Analysis Method: | 6020 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Prep Method: | 3005A | Prep Batch: | 280-391231 | Lab File ID: | 198SMPL.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/17/2017 0001 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |

| Analyte | Result (ug/L) | Qualifier | RL |
|---|---|---|---|
| Manganese | 740 | | 1.0 |

**General Chemistry**

**Client Sample ID:** **MW-7-101017**

Lab Sample ID: 280-102219-1 Date Sampled: 10/10/2017 0855
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 1.7 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/16/2017 2324 | | | | | |
| Sulfate | 4.2 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/16/2017 2324 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1711 | | | | | |
| Total Alkalinity | 150 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1641 | | | | | |
| Bicarbonate Alkalinity | 150 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1641 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1641 | | | | | |
| Total Organic Carbon - Average | 1.3 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 1821 | | | | | |

**General Chemistry**

**Client Sample ID: MW-5-101017**

Lab Sample ID: 280-102219-2 Date Sampled: 10/10/2017 1020
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 2.8 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/16/2017 2341 | | | | | |
| Sulfate | 8.6 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/16/2017 2341 | | | | | |
| Ammonia as N | ND | F1 | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1719 | | | | | |
| Total Alkalinity | 62 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1637 | | | | | |
| Bicarbonate Alkalinity | 62 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1637 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1637 | | | | | |
| Total Organic Carbon - Average | ND | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 1835 | | | | | |

**General Chemistry**

**Client Sample ID:** **MW-12I-101017**

Lab Sample ID: 280-102219-3 Date Sampled: 10/10/2017 1155
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 2.4 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0048 | | | | | |
| Sulfate | 4.8 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0048 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1739 | | | | | |
| Total Alkalinity | 87 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1752 | | | | | |
| Bicarbonate Alkalinity | 87 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1752 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1752 | | | | | |
| Total Organic Carbon - Average | 2.2 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 1852 | | | | | |

**General Chemistry**

**Client Sample ID:** **SW-4-101017**

Lab Sample ID: 280-102219-4 Date Sampled: 10/10/2017 1245
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 14 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0105 | | | | | |
| Sulfate | 20 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0105 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1741 | | | | | |
| Total Alkalinity | 160 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1727 | | | | | |
| Bicarbonate Alkalinity | 160 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1727 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1727 | | | | | |
| Total Organic Carbon - Average | 6.0 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 1939 | | | | | |

**General Chemistry**

**Client Sample ID:** **SW-1-101017**

Lab Sample ID: 280-102219-5 Date Sampled: 10/10/2017 1200
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 4.6 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0121 | | | | | |
| Sulfate | 10 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0121 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1743 | | | | | |
| Total Alkalinity | 76 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1716 | | | | | |
| Bicarbonate Alkalinity | 76 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1716 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1716 | | | | | |
| Total Organic Carbon - Average | 2.0 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 1954 | | | | | |

**General Chemistry**

**Client Sample ID:** **SW-7-101017**

Lab Sample ID: 280-102219-6 Date Sampled: 10/10/2017 1450
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 3.9 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0138 | | | | | |
| Sulfate | 6.5 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0138 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1745 | | | | | |
| Total Alkalinity | 63 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1652 | | | | | |
| Bicarbonate Alkalinity | 63 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1652 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1652 | | | | | |
| Total Organic Carbon - Average | 6.5 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2010 | | | | | |

**General Chemistry**

**Client Sample ID:** **SW-6-101017**

Lab Sample ID: 280-102219-7 Date Sampled: 10/10/2017 1310
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 4.1 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0155 | | | | | |
| Sulfate | 3.0 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0155 | | | | | |
| Ammonia as N | 0.078 | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1747 | | | | | |
| Total Alkalinity | 70 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1732 | | | | | |
| Bicarbonate Alkalinity | 70 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1732 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1732 | | | | | |
| Total Organic Carbon - Average | 11 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2025 | | | | | |

**General Chemistry**

**Client Sample ID:** **MW-13D-101017**

Lab Sample ID: 280-102219-8 Date Sampled: 10/10/2017 1405
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 5.8 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0245 | | | | | |
| Sulfate | 17 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0245 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1749 | | | | | |
| Total Alkalinity | 77 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1737 | | | | | |
| Bicarbonate Alkalinity | 77 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1737 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1737 | | | | | |
| Total Organic Carbon - Average | ND | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2040 | | | | | |

**General Chemistry**

**Client Sample ID:** **MW-14-101017**

Lab Sample ID: 280-102219-9 Date Sampled: 10/10/2017 1640
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 8.9 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0302 | | | | | |
| Sulfate | 13 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0302 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1751 | | | | | |
| Total Alkalinity | 110 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1646 | | | | | |
| Bicarbonate Alkalinity | 110 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1646 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1646 | | | | | |
| Total Organic Carbon - Average | 1.1 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2124 | | | | | |

**General Chemistry**

**Client Sample ID:** **MW-6-101017**

Lab Sample ID: 280-102219-10 Date Sampled: 10/10/2017 1735
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 23 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0319 | | | | | |
| Sulfate | 32 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0319 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1753 | | | | | |
| Total Alkalinity | 170 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1742 | | | | | |
| Bicarbonate Alkalinity | 170 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1742 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1742 | | | | | |
| Total Organic Carbon - Average | 1.5 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2139 | | | | | |

**General Chemistry**

**Client Sample ID:** **MW-20DD-101017**

Lab Sample ID: 280-102219-11 Date Sampled: 10/10/2017 0000
Client Matrix: Water Date Received: 10/12/2017 0840

| Analyte | Result | Qual | Units | RL | Dil | Method |
|---|---|---|---|---|---|---|
| Chloride | 9.5 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0336 | | | | | |
| Sulfate | 13 | | mg/L | 1.0 | 1.0 | 300.0 |
| Analysis Batch: 280-391539 | Analysis Date: 10/17/2017 0336 | | | | | |
| Ammonia as N | ND | | mg/L | 0.030 | 1.0 | 350.1 |
| Analysis Batch: 280-391542 | Analysis Date: 10/16/2017 1755 | | | | | |
| Total Alkalinity | 110 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1747 | | | | | |
| Bicarbonate Alkalinity | 110 | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1747 | | | | | |
| Carbonate Alkalinity | ND | | mg/L | 5.0 | 1.0 | SM 2320B |
| Analysis Batch: 280-391353 | Analysis Date: 10/15/2017 1747 | | | | | |
| Total Organic Carbon - Average | 1.1 | | mg/L | 1.0 | 1.0 | SM 5310B |
| Analysis Batch: 280-391373 | Analysis Date: 10/13/2017 2153 | | | | | |

# DATA REPORTING QUALIFIERS

Client: Aspect Consulting Job Number: 280-102219-1

| Lab Section | Qualifier | Description |
|---|---|---|
| General Chemistry | | |
| | F1 | MS and/or MSD Recovery is outside acceptance limits. |

# QUALITY CONTROL RESULTS

Client: Aspect Consulting Job Number: 280-102219-1

## QC Association Summary

| Lab Sample ID | Client Sample ID | Report Basis | Client Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| **GC/MS VOA** | | | | | |
| **Analysis Batch:480-381998** | | | | | |
| LCS 480-381998/7 | Lab Control Sample | T | Water | 8260C SIM | |
| LCSD 480-381998/8 | Lab Control Sample Duplicate | T | Water | 8260C SIM | |
| MB 480-381998/10 | Method Blank | T | Water | 8260C SIM | |
| 280-102219-1 | MW-7-101017 | T | Water | 8260C SIM | |
| 280-102219-2 | MW-5-101017 | T | Water | 8260C SIM | |
| 280-102219-3 | MW-12I-101017 | T | Water | 8260C SIM | |
| 280-102219-4 | SW-4-101017 | T | Water | 8260C SIM | |
| 280-102219-5 | SW-1-101017 | T | Water | 8260C SIM | |
| 280-102219-6 | SW-7-101017 | T | Water | 8260C SIM | |
| 280-102219-7 | SW-6-101017 | T | Water | 8260C SIM | |
| 280-102219-8 | MW-13D-101017 | T | Water | 8260C SIM | |
| 280-102219-9 | MW-14-101017 | T | Water | 8260C SIM | |
| 280-102219-10 | MW-6-101017 | T | Water | 8260C SIM | |
| 280-102219-11 | MW-20DD-101017 | T | Water | 8260C SIM | |
| 280-102219-12TB | TRIP BLANK | T | Water | 8260C SIM | |

**Report Basis**
T = Total

Client: Aspect Consulting Job Number: 280-102219-1

## QC Association Summary

| Lab Sample ID | Client Sample ID | Report Basis | Client Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| **Metals** | | | | | |
| **Prep Batch: 280-391231** | | | | | |
| LCS 280-391231/2-A | Lab Control Sample | R | Water | 3005A | |
| MB 280-391231/1-A | Method Blank | R | Water | 3005A | |
| 280-102219-1 | MW-7-101017 | D | Water | 3005A | |
| 280-102219-2 | MW-5-101017 | D | Water | 3005A | |
| 280-102219-2MS | Matrix Spike | D | Water | 3005A | |
| 280-102219-2MSD | Matrix Spike Duplicate | D | Water | 3005A | |
| 280-102219-3 | MW-12I-101017 | D | Water | 3005A | |
| 280-102219-4 | SW-4-101017 | D | Water | 3005A | |
| 280-102219-5 | SW-1-101017 | D | Water | 3005A | |
| 280-102219-6 | SW-7-101017 | D | Water | 3005A | |
| 280-102219-7 | SW-6-101017 | D | Water | 3005A | |
| 280-102219-8 | MW-13D-101017 | D | Water | 3005A | |
| 280-102219-9 | MW-14-101017 | D | Water | 3005A | |
| 280-102219-10 | MW-6-101017 | D | Water | 3005A | |
| 280-102219-11 | MW-20DD-101017 | D | Water | 3005A | |
| **Analysis Batch:280-391548** | | | | | |
| LCS 280-391231/2-A | Lab Control Sample | R | Water | 6020 | 280-391231 |
| MB 280-391231/1-A | Method Blank | R | Water | 6020 | 280-391231 |
| 280-102219-1 | MW-7-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-2 | MW-5-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-2MS | Matrix Spike | D | Water | 6020 | 280-391231 |
| 280-102219-2MSD | Matrix Spike Duplicate | D | Water | 6020 | 280-391231 |
| 280-102219-3 | MW-12I-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-4 | SW-4-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-5 | SW-1-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-6 | SW-7-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-7 | SW-6-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-8 | MW-13D-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-9 | MW-14-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-10 | MW-6-101017 | D | Water | 6020 | 280-391231 |
| 280-102219-11 | MW-20DD-101017 | D | Water | 6020 | 280-391231 |

**Report Basis**
D = Dissolved
R = Total Recoverable

Client: Aspect Consulting Job Number: 280-102219-1

## QC Association Summary

| Lab Sample ID | Client Sample ID | Report Basis | Client Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| **General Chemistry** | | | | | |
| **Analysis Batch:280-391353** | | | | | |
| LCS 280-391353/30 | Lab Control Sample | T | Water | SM 2320B | |
| LCS 280-391353/56 | Lab Control Sample | T | Water | SM 2320B | |
| MB 280-391353/31 | Method Blank | T | Water | SM 2320B | |
| MB 280-391353/57 | Method Blank | T | Water | SM 2320B | |
| 280-102219-1 | MW-7-101017 | T | Water | SM 2320B | |
| 280-102219-2 | MW-5-101017 | T | Water | SM 2320B | |
| 280-102219-3 | MW-12I-101017 | T | Water | SM 2320B | |
| 280-102219-4 | SW-4-101017 | T | Water | SM 2320B | |
| 280-102219-5 | SW-1-101017 | T | Water | SM 2320B | |
| 280-102219-5DU | Duplicate | T | Water | SM 2320B | |
| 280-102219-6 | SW-7-101017 | T | Water | SM 2320B | |
| 280-102219-7 | SW-6-101017 | T | Water | SM 2320B | |
| 280-102219-8 | MW-13D-101017 | T | Water | SM 2320B | |
| 280-102219-9 | MW-14-101017 | T | Water | SM 2320B | |
| 280-102219-10 | MW-6-101017 | T | Water | SM 2320B | |
| 280-102219-11 | MW-20DD-101017 | T | Water | SM 2320B | |
| **Analysis Batch:280-391373** | | | | | |
| LCS 280-391373/3 | Lab Control Sample | T | Water | SM 5310B | |
| MB 280-391373/4 | Method Blank | T | Water | SM 5310B | |
| 280-102219-1 | MW-7-101017 | T | Water | SM 5310B | |
| 280-102219-2 | MW-5-101017 | T | Water | SM 5310B | |
| 280-102219-3 | MW-12I-101017 | T | Water | SM 5310B | |
| 280-102219-3MS | Matrix Spike | T | Water | SM 5310B | |
| 280-102219-3MSD | Matrix Spike Duplicate | T | Water | SM 5310B | |
| 280-102219-4 | SW-4-101017 | T | Water | SM 5310B | |
| 280-102219-5 | SW-1-101017 | T | Water | SM 5310B | |
| 280-102219-6 | SW-7-101017 | T | Water | SM 5310B | |
| 280-102219-7 | SW-6-101017 | T | Water | SM 5310B | |
| 280-102219-8 | MW-13D-101017 | T | Water | SM 5310B | |
| 280-102219-9 | MW-14-101017 | T | Water | SM 5310B | |
| 280-102219-10 | MW-6-101017 | T | Water | SM 5310B | |
| 280-102219-11 | MW-20DD-101017 | T | Water | SM 5310B | |

Client: Aspect Consulting Job Number: 280-102219-1

## QC Association Summary

| Lab Sample ID | Client Sample ID | Report Basis | Client Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| **General Chemistry** | | | | | |
| **Analysis Batch:280-391539** | | | | | |
| LCS 280-391539/4 | Lab Control Sample | T | Water | 300.0 | |
| LCSD 280-391539/5 | Lab Control Sample Duplicate | T | Water | 300.0 | |
| MB 280-391539/6 | Method Blank | T | Water | 300.0 | |
| 280-102219-1 | MW-7-101017 | T | Water | 300.0 | |
| 280-102219-2 | MW-5-101017 | T | Water | 300.0 | |
| 280-102219-2DU | Duplicate | T | Water | 300.0 | |
| 280-102219-2MS | Matrix Spike | T | Water | 300.0 | |
| 280-102219-2MSD | Matrix Spike Duplicate | T | Water | 300.0 | |
| 280-102219-3 | MW-12I-101017 | T | Water | 300.0 | |
| 280-102219-4 | SW-4-101017 | T | Water | 300.0 | |
| 280-102219-5 | SW-1-101017 | T | Water | 300.0 | |
| 280-102219-6 | SW-7-101017 | T | Water | 300.0 | |
| 280-102219-7 | SW-6-101017 | T | Water | 300.0 | |
| 280-102219-8 | MW-13D-101017 | T | Water | 300.0 | |
| 280-102219-9 | MW-14-101017 | T | Water | 300.0 | |
| 280-102219-10 | MW-6-101017 | T | Water | 300.0 | |
| 280-102219-11 | MW-20DD-101017 | T | Water | 300.0 | |
| 280-102219-11DU | Duplicate | T | Water | 300.0 | |
| 280-102219-11MS | Matrix Spike | T | Water | 300.0 | |
| 280-102219-11MSD | Matrix Spike Duplicate | T | Water | 300.0 | |
| **Analysis Batch:280-391542** | | | | | |
| LCS 280-391542/18 | Lab Control Sample | T | Water | 350.1 | |
| LCS 280-391542/59 | Lab Control Sample | T | Water | 350.1 | |
| LCSD 280-391542/19 | Lab Control Sample Duplicate | T | Water | 350.1 | |
| LCSD 280-391542/60 | Lab Control Sample Duplicate | T | Water | 350.1 | |
| MB 280-391542/20 | Method Blank | T | Water | 350.1 | |
| MB 280-391542/61 | Method Blank | T | Water | 350.1 | |
| 280-102219-1 | MW-7-101017 | T | Water | 350.1 | |
| 280-102219-2 | MW-5-101017 | T | Water | 350.1 | |
| 280-102219-2MS | Matrix Spike | T | Water | 350.1 | |
| 280-102219-2MSD | Matrix Spike Duplicate | T | Water | 350.1 | |
| 280-102219-3 | MW-12I-101017 | T | Water | 350.1 | |
| 280-102219-4 | SW-4-101017 | T | Water | 350.1 | |
| 280-102219-5 | SW-1-101017 | T | Water | 350.1 | |
| 280-102219-6 | SW-7-101017 | T | Water | 350.1 | |
| 280-102219-7 | SW-6-101017 | T | Water | 350.1 | |
| 280-102219-8 | MW-13D-101017 | T | Water | 350.1 | |
| 280-102219-9 | MW-14-101017 | T | Water | 350.1 | |
| 280-102219-10 | MW-6-101017 | T | Water | 350.1 | |
| 280-102219-11 | MW-20DD-101017 | T | Water | 350.1 | |

**Report Basis**
T = Total

## Surrogate Recovery Report

**8260C SIM Volatile Organic Compounds (GC/MS)**

**Client Matrix: Water**

| Lab Sample ID | Client Sample ID | DBFM %Rec | TBA %Rec |
|---|---|---|---|
| 280-102219-1 | MW-7-101017 | 102 | 75 |
| 280-102219-2 | MW-5-101017 | 101 | 77 |
| 280-102219-3 | MW-12I-101017 | 102 | 78 |
| 280-102219-4 | SW-4-101017 | 100 | 77 |
| 280-102219-5 | SW-1-101017 | 96 | 74 |
| 280-102219-6 | SW-7-101017 | 103 | 74 |
| 280-102219-7 | SW-6-101017 | 99 | 71 |
| 280-102219-8 | MW-13D-101017 | 107 | 78 |
| 280-102219-9 | MW-14-101017 | 100 | 76 |
| 280-102219-10 | MW-6-101017 | 101 | 78 |
| 280-102219-11 | MW-20DD-101017 | 109 | 85 |
| 280-102219-12 | TRIP BLANK | 102 | 87 |
| MB 480-381998/10 | | 96 | 71 |
| LCS 480-381998/7 | | 115 | 76 |
| LCSD 480-381998/8 | | 116 | 81 |

| Surrogate | Acceptance Limits |
|---|---|
| DBFM = Dibromofluoromethane (Surr) | 50-150 |
| TBA = TBA-d9 (Surr) | 50-150 |

Client: Aspect Consulting Job Number: 280-102219-1

**Method Blank - Batch: 480-381998** **Method: 8260C SIM**
**Preparation: 5030C**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 480-381998/10 | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | J4499.D |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1440 | Units: | ug/L | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1440 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Vinyl chloride | ND | | 0.020 |

| Surrogate | % Rec | Acceptance Limits |
|---|---|---|
| Dibromofluoromethane (Surr) | 96 | 50 - 150 |
| TBA-d9 (Surr) | 71 | 50 - 150 |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 480-381998** **Method: 8260C SIM**
**Preparation: 5030C**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 480-381998/7 | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | J4496.D |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1319 | Units: | ug/L | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1319 | | | | 25 mL |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| LCSD Lab Sample ID: | LCSD 480-381998/8 | Analysis Batch: | 480-381998 | Instrument ID: | HP5973J |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | J4497.D |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 25 mL |
| Analysis Date: | 10/16/2017 1344 | Units: | ug/L | Final Weight/Volume: | 25 mL |
| Prep Date: | 10/16/2017 1344 | | | | 25 mL |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | LCS | LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
| Vinyl chloride | 81 | 83 | 50 - 150 | 2 | 20 | | |

| Surrogate | LCS % Rec | LCSD % Rec | Acceptance Limits |
|---|---|---|---|
| Dibromofluoromethane (Surr) | 115 | 116 | 50 - 150 |
| TBA-d9 (Surr) | 76 | 81 | 50 - 150 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Laboratory Control/**
**Laboratory Duplicate Data Report - Batch: 480-381998**

**Method: 8260C SIM**
**Preparation: 5030C**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 480-381998/7 | Units: ug/L | | LCSD Lab Sample ID: | LCSD 480-381998/8 |
| Client Matrix: | Water | | | Client Matrix: | Water |
| Dilution: | 1.0 | | | Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 1319 | | | Analysis Date: | 10/16/2017 1344 |
| Prep Date: | 10/16/2017 1319 | | | Prep Date: | 10/16/2017 1344 |
| Leach Date: | N/A | | | Leach Date: | N/A |

| Analyte | LCS Spike Amount | LCSD Spike Amount | LCS Result/Qual | LCSD Result/Qual |
|---|---|---|---|---|
| Vinyl chloride | 0.200 | 0.200 | 0.162 | 0.165 |

Client: Aspect Consulting Job Number: 280-102219-1

**Method Blank - Batch: 280-391231**

**Method: 6020**
**Preparation: 3005A**
**Total Recoverable**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391231/1-A | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Client Matrix: | Water | Prep Batch: | 280-391231 | Lab File ID: | 180_BLK.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2259 | Units: | ug/L | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Manganese | ND | | 1.0 |

**Lab Control Sample - Batch: 280-391231**

**Method: 6020**
**Preparation: 3005A**
**Total Recoverable**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-391231/2-A | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Client Matrix: | Water | Prep Batch: | 280-391231 | Lab File ID: | 181_LCS.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2303 | Units: | ug/L | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Manganese | 40.0 | 39.5 | 99 | 85 - 117 | |

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391231**

**Method: 6020**
**Preparation: 3005A**
**Dissolved**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Client Matrix: | Water | Prep Batch: | 280-391231 | Lab File ID: | 185SMPL.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2316 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| MSD Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391548 | Instrument ID: | MT_078 |
| Client Matrix: | Water | Prep Batch: | 280-391231 | Lab File ID: | 186SMPL.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 50 mL |
| Analysis Date: | 10/16/2017 2320 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | 10/16/2017 1417 | | | | |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Manganese | 101 | 101 | 85 - 117 | 0 | 20 | | |

Client: Aspect Consulting

Job Number: 280-102219-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391231**

**Method: 6020**
**Preparation: 3005A**
**Dissolved**

| | | | | |
|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Units: ug/L | MSD Lab Sample ID: | 280-102219-2 |
| Client Matrix: | Water | | Client Matrix: | Water |
| Dilution: | 1.0 | | Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 2316 | | Analysis Date: | 10/16/2017 2320 |
| Prep Date: | 10/16/2017 1417 | | Prep Date: | 10/16/2017 1417 |
| Leach Date: | N/A | | Leach Date: | N/A |

| Analyte | Sample Result/Qual | MS Spike Amount | MSD Spike Amount | MS Result/Qual | MSD Result/Qual |
|---|---|---|---|---|---|
| Manganese | ND | 40.0 | 40.0 | 40.5 | 40.4 |

**Method Blank - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391539/6 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 06.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/16/2017 2155 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Chloride | ND | | 1.0 |
| Sulfate | ND | | 1.0 |

**Method Reporting Limit Check - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MRL 280-391539/3 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 03.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/16/2017 2105 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Chloride | 2.50 | ND | 100 | 50 - 150 | |
| Sulfate | 2.50 | ND | 115 | 50 - 150 | |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391539/4 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 04.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/16/2017 2122 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |
| LCSD Lab Sample ID: | LCSD 280-391539/5 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 05.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/16/2017 2139 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | LCS | LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
| Chloride | 100 | 100 | 90 - 110 | 0 | 10 | | |
| Sulfate | 99 | 100 | 90 - 110 | 1 | 10 | | |

Client: Aspect Consulting

Job Number: 280-102219-1

**Laboratory Control/**
**Laboratory Duplicate Data Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391539/4 | Units: mg/L | LCSD Lab Sample ID: | LCSD 280-391539/5 |
| Client Matrix: | Water | | Client Matrix: | Water |
| Dilution: | 1.0 | | Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 2122 | | Analysis Date: | 10/16/2017 2139 |
| Prep Date: | N/A | | Prep Date: | N/A |
| Leach Date: | N/A | | Leach Date: | N/A |

| Analyte | LCS Spike Amount | LCSD Spike Amount | LCS Result/Qual | LCSD Result/Qual |
|---|---|---|---|---|
| Chloride | 100 | 100 | 100 | 100 |
| Sulfate | 100 | 100 | 99.4 | 99.9 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 10.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/17/2017 0014 | | | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| MSD Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 11.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/17/2017 0031 | | | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Chloride | 102 | 103 | 80 - 120 | 1 | 20 | | |
| Sulfate | 101 | 102 | 80 - 120 | 1 | 20 | | |

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-11 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 24.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/17/2017 0409 | | | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| MSD Lab Sample ID: | 280-102219-11 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 25.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/17/2017 0426 | | | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Chloride | 102 | 101 | 80 - 120 | 1 | 20 | | |
| Sulfate | 101 | 100 | 80 - 120 | 1 | 20 | | |

Client: Aspect Consulting

Job Number: 280-102219-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Units: mg/L | MSD Lab Sample ID: | 280-102219-2 | |
| Client Matrix: | Water | | Client Matrix: | Water | |
| Dilution: | 1.0 | | Dilution: | 1.0 | |
| Analysis Date: | 10/17/2017 0014 | | Analysis Date: | 10/17/2017 0031 | |
| Prep Date: | N/A | | Prep Date: | N/A | |
| Leach Date: | N/A | | Leach Date: | N/A | |

| Analyte | Sample Result/Qual | MS Spike Amount | MSD Spike Amount | MS Result/Qual | MSD Result/Qual |
|---|---|---|---|---|---|
| Chloride | 2.8 | 25.0 | 25.0 | 28.2 | 28.5 |
| Sulfate | 8.6 | 25.0 | 25.0 | 33.8 | 34.2 |

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-11 | Units: mg/L | MSD Lab Sample ID: | 280-102219-11 | |
| Client Matrix: | Water | | Client Matrix: | Water | |
| Dilution: | 1.0 | | Dilution: | 1.0 | |
| Analysis Date: | 10/17/2017 0409 | | Analysis Date: | 10/17/2017 0426 | |
| Prep Date: | N/A | | Prep Date: | N/A | |
| Leach Date: | N/A | | Leach Date: | N/A | |

| Analyte | Sample Result/Qual | MS Spike Amount | MSD Spike Amount | MS Result/Qual | MSD Result/Qual |
|---|---|---|---|---|---|
| Chloride | 9.5 | 25.0 | 25.0 | 34.8 | 34.7 |
| Sulfate | 13 | 25.0 | 25.0 | 38.6 | 38.4 |

**Duplicate - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 09.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/16/2017 2357 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|
| Chloride | 2.8 | 2.81 | 0.1 | 15 | |
| Sulfate | 8.6 | 8.56 | 0.5 | 15 | |

**Duplicate - Batch: 280-391539**

**Method: 300.0**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-102219-11 | Analysis Batch: | 280-391539 | Instrument ID: | WC_IonChrom12 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 23.0000.d |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 5 mL |
| Analysis Date: | 10/17/2017 0353 | Units: | mg/L | Final Weight/Volume: | 5 mL |
| Prep Date: | N/A | | | | 25 uL |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|
| Chloride | 9.5 | 9.48 | 0.2 | 15 | |
| Sulfate | 13 | 13.4 | 0.6 | 15 | |

**Method Blank - Batch: 280-391542** **Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391542/20 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/16/2017 1555 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Ammonia as N | ND | | 0.030 |

**Method Blank - Batch: 280-391542** **Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391542/61 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/16/2017 1717 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Ammonia as N | ND | | 0.030 |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391542/18 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 100 mL |
| Analysis Date: | 10/16/2017 1551 | Units: | mg/L | Final Weight/Volume: | 100 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |
| LCSD Lab Sample ID: | LCSD 280-391542/19 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 100 mL |
| Analysis Date: | 10/16/2017 1553 | Units: | mg/L | Final Weight/Volume: | 100 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | LCS | LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
| Ammonia as N | 101 | 101 | 90 - 110 | 0 | 10 | | |

**Lab Control Sample/**
**Lab Control Sample Duplicate Recovery Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391542/59 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 100 mL |
| Analysis Date: | 10/16/2017 1713 | Units: | mg/L | Final Weight/Volume: | 100 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |
| LCSD Lab Sample ID: | LCSD 280-391542/60 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 100 mL |
| Analysis Date: | 10/16/2017 1715 | Units: | mg/L | Final Weight/Volume: | 100 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | LCS | LCSD | Limit | RPD | RPD Limit | LCS Qual | LCSD Qual |
| Ammonia as N | 103 | 103 | 90 - 110 | 0 | 10 | | |

Client: Aspect Consulting

Job Number: 280-102219-1

**Laboratory Control/**
**Laboratory Duplicate Data Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | |
|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391542/18 | Units: mg/L | |
| Client Matrix: | Water | | |
| Dilution: | 1.0 | | |
| Analysis Date: | 10/16/2017 1551 | | |
| Prep Date: | N/A | | |
| Leach Date: | N/A | | |

| | |
|---|---|
| LCSD Lab Sample ID: | LCSD 280-391542/19 |
| Client Matrix: | Water |
| Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 1553 |
| Prep Date: | N/A |
| Leach Date: | N/A |

| Analyte | LCS Spike Amount | LCSD Spike Amount | LCS Result/Qual | LCSD Result/Qual |
|---|---|---|---|---|
| Ammonia as N | 2.50 | 2.50 | 2.52 | 2.53 |

**Laboratory Control/**
**Laboratory Duplicate Data Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | |
|---|---|---|---|
| LCS Lab Sample ID: | LCS 280-391542/59 | Units: mg/L | |
| Client Matrix: | Water | | |
| Dilution: | 1.0 | | |
| Analysis Date: | 10/16/2017 1713 | | |
| Prep Date: | N/A | | |
| Leach Date: | N/A | | |

| | |
|---|---|
| LCSD Lab Sample ID: | LCSD 280-391542/60 |
| Client Matrix: | Water |
| Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 1715 |
| Prep Date: | N/A |
| Leach Date: | N/A |

| Analyte | LCS Spike Amount | LCSD Spike Amount | LCS Result/Qual | LCSD Result/Qual |
|---|---|---|---|---|
| Ammonia as N | 2.50 | 2.50 | 2.59 | 2.59 |

Client: Aspect Consulting Job Number: 280-102219-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 10 mL |
| Analysis Date: | 10/16/2017 1721 | | | Final Weight/Volume: | 10 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| MSD Lab Sample ID: | 280-102219-2 | Analysis Batch: | 280-391542 | Instrument ID: | WC_Alp 3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | C:\FLOW_4\101417.RS |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | 10 mL |
| Analysis Date: | 10/16/2017 1723 | | | Final Weight/Volume: | 10 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Ammonia as N | 110 | 111 | 90 - 110 | 1 | 10 | | F1 |

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391542**

**Method: 350.1**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-2 | Units: mg/L | | MSD Lab Sample ID: | 280-102219-2 |
| Client Matrix: | Water | | | Client Matrix: | Water |
| Dilution: | 1.0 | | | Dilution: | 1.0 |
| Analysis Date: | 10/16/2017 1721 | | | Analysis Date: | 10/16/2017 1723 |
| Prep Date: | N/A | | | Prep Date: | N/A |
| Leach Date: | N/A | | | Leach Date: | N/A |

| Analyte | Sample Result/Qual | MS Spike Amount | MSD Spike Amount | MS Result/Qual | MSD Result/Qual | |
|---|---|---|---|---|---|---|
| Ammonia as N | ND | 1.00 | 1.00 | 1.10 | 1.11 | F1 |

Client: Aspect Consulting

Job Number: 280-102219-1

**Method Blank - Batch: 280-391353**

**Method: SM 2320B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391353/31 | Analysis Batch: | 280-391353 | Instrument ID: | WC-AT3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | alk 101517.TXT |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/15/2017 1459 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Total Alkalinity | ND | | 5.0 |
| Bicarbonate Alkalinity | ND | | 5.0 |
| Carbonate Alkalinity | ND | | 5.0 |

**Method Blank - Batch: 280-391353**

**Method: SM 2320B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391353/57 | Analysis Batch: | 280-391353 | Instrument ID: | WC-AT3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | alk 101517.TXT |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/15/2017 1711 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Total Alkalinity | ND | | 5.0 |
| Bicarbonate Alkalinity | ND | | 5.0 |
| Carbonate Alkalinity | ND | | 5.0 |

Client: Aspect Consulting Job Number: 280-102219-1

**Lab Control Sample - Batch: 280-391353** **Method: SM 2320B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-391353/30 | Analysis Batch: | 280-391353 | Instrument ID: | WC-AT3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | alk 101517.TXT |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/15/2017 1454 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Total Alkalinity | 200 | 204 | 102 | 90 - 110 | |

**Lab Control Sample - Batch: 280-391353** **Method: SM 2320B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-391353/56 | Analysis Batch: | 280-391353 | Instrument ID: | WC-AT3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | alk 101517.TXT |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/15/2017 1707 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Total Alkalinity | 200 | 201 | 101 | 90 - 110 | |

**Duplicate - Batch: 280-391353** **Method: SM 2320B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | 280-102219-5 | Analysis Batch: | 280-391353 | Instrument ID: | WC-AT3 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | alk 101517.TXT |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/15/2017 1721 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Sample Result/Qual | Result | RPD | Limit | Qual |
|---|---|---|---|---|---|
| Total Alkalinity | 76 | 76.4 | 0.8 | 10 | |

Client: Aspect Consulting Job Number: 280-102219-1

**Method Blank - Batch: 280-391373**

**Method: SM 5310B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | MB 280-391373/4 | Analysis Batch: | 280-391373 | Instrument ID: | WC_SHI2 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 101317B.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/13/2017 1459 | Units: | mg/L | Final Weight/Volume: | |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Result | Qual | RL |
|---|---|---|---|
| Total Organic Carbon - Average | ND | | 1.0 |

**Lab Control Sample - Batch: 280-391373**

**Method: SM 5310B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| Lab Sample ID: | LCS 280-391373/3 | Analysis Batch: | 280-391373 | Instrument ID: | WC_SHI2 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 101317B.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/13/2017 1444 | Units: | mg/L | Final Weight/Volume: | 100 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| Analyte | Spike Amount | Result | % Rec. | Limit | Qual |
|---|---|---|---|---|---|
| Total Organic Carbon - Average | 25.0 | 24.7 | 99 | 88 - 112 | |

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391373**

**Method: SM 5310B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-3 | Analysis Batch: | 280-391373 | Instrument ID: | WC_SHI2 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 101317B.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/13/2017 1907 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | | | | | |
|---|---|---|---|---|---|
| MSD Lab Sample ID: | 280-102219-3 | Analysis Batch: | 280-391373 | Instrument ID: | WC_SHI2 |
| Client Matrix: | Water | Prep Batch: | N/A | Lab File ID: | 101317B.txt |
| Dilution: | 1.0 | Leach Batch: | N/A | Initial Weight/Volume: | |
| Analysis Date: | 10/13/2017 1924 | | | Final Weight/Volume: | 50 mL |
| Prep Date: | N/A | | | | |
| Leach Date: | N/A | | | | |

| | % Rec. | | | | | | |
|---|---|---|---|---|---|---|---|
| Analyte | MS | MSD | Limit | RPD | RPD Limit | MS Qual | MSD Qual |
| Total Organic Carbon - Average | 92 | 92 | 88 - 112 | 0 | 15 | | |

Client: Aspect Consulting

Job Number: 280-102219-1

**Matrix Spike/**
**Matrix Spike Duplicate Recovery Report - Batch: 280-391373**

**Method: SM 5310B**
**Preparation: N/A**

| | | | | | |
|---|---|---|---|---|---|
| MS Lab Sample ID: | 280-102219-3 | Units: mg/L | MSD Lab Sample ID: | 280-102219-3 | |
| Client Matrix: | Water | | Client Matrix: | Water | |
| Dilution: | 1.0 | | Dilution: | 1.0 | |
| Analysis Date: | 10/13/2017 1907 | | Analysis Date: | 10/13/2017 1924 | |
| Prep Date: | N/A | | Prep Date: | N/A | |
| Leach Date: | N/A | | Leach Date: | N/A | |

| Analyte | Sample Result/Qual | MS Spike Amount | MSD Spike Amount | MS Result/Qual | MSD Result/Qual |
|---|---|---|---|---|---|
| Total Organic Carbon - Average | 2.2 | 25.0 | 25.0 | 25.2 | 25.1 |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-1** **Client ID: MW-7-101017**

Sample Date/Time: 10/10/2017 08:55 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-1 | | 480-381998 | | 10/16/2017 15:05 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-1 | | 480-381998 | | 10/16/2017 15:05 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-1-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-1-A | | 280-391548 | 280-391231 | 10/16/2017 23:06 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-1 | | 280-391539 | | 10/16/2017 23:24 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-1 | | 280-391542 | | 10/16/2017 17:11 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-1 | | 280-391353 | | 10/15/2017 16:41 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-1 | | 280-391373 | | 10/13/2017 18:21 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-2** **Client ID: MW-5-101017**

Sample Date/Time: 10/10/2017 10:20 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-2 | | 480-381998 | | 10/16/2017 15:29 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-2 | | 480-381998 | | 10/16/2017 15:29 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-2-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-2-A | | 280-391548 | 280-391231 | 10/16/2017 23:10 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-2 | | 280-391539 | | 10/16/2017 23:41 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-2 | | 280-391542 | | 10/16/2017 17:19 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-2 | | 280-391353 | | 10/15/2017 16:37 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-2 | | 280-391373 | | 10/13/2017 18:35 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-2 MS** **Client ID: MW-5-101017**

Sample Date/Time: 10/10/2017 10:20 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:3005A | 280-102219-C-2-B MS | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-2-B MS | | 280-391548 | 280-391231 | 10/16/2017 23:16 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-2 MS | | 280-391539 | | 10/17/2017 00:14 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-2 MS | | 280-391542 | | 10/16/2017 17:21 | 1 | TAL DEN | KAM |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-2 MSD** **Client ID: MW-5-101017**

Sample Date/Time: 10/10/2017 10:20 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:3005A | 280-102219-C-2-C MSD | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-2-C MSD | | 280-391548 | 280-391231 | 10/16/2017 23:20 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-2 MSD | | 280-391539 | | 10/17/2017 00:31 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-2 MSD | | 280-391542 | | 10/16/2017 17:23 | 1 | TAL DEN | KAM |

**Lab ID: 280-102219-2 DU** **Client ID: MW-5-101017**

Sample Date/Time: 10/10/2017 10:20 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:300.0 | 280-102219-A-2 DU | | 280-391539 | | 10/16/2017 23:57 | 1 | TAL DEN | AFB |

**Lab ID: 280-102219-3** **Client ID: MW-12I-101017**

Sample Date/Time: 10/10/2017 11:55 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-3 | | 480-381998 | | 10/16/2017 15:53 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-3 | | 480-381998 | | 10/16/2017 15:53 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-3-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-3-A | | 280-391548 | 280-391231 | 10/16/2017 23:27 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-3 | | 280-391539 | | 10/17/2017 00:48 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-3 | | 280-391542 | | 10/16/2017 17:39 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-3 | | 280-391353 | | 10/15/2017 17:52 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-3 | | 280-391373 | | 10/13/2017 18:52 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-3 MS** **Client ID: MW-12I-101017**

Sample Date/Time: 10/10/2017 11:55 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:SM 5310B | 280-102219-B-3 MS | | 280-391373 | | 10/13/2017 19:07 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-3 MSD** **Client ID: MW-12I-101017**

Sample Date/Time: 10/10/2017 11:55 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:SM 5310B | 280-102219-B-3 MSD | | 280-391373 | | 10/13/2017 19:24 | 1 | TAL DEN | CCJ |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-4** **Client ID: SW-4-101017**

Sample Date/Time: 10/10/2017 12:45 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-4 | | 480-381998 | | 10/16/2017 16:17 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-4 | | 480-381998 | | 10/16/2017 16:17 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-4-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-4-A | | 280-391548 | 280-391231 | 10/16/2017 23:37 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-4 | | 280-391539 | | 10/17/2017 01:05 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-4 | | 280-391542 | | 10/16/2017 17:41 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-4 | | 280-391353 | | 10/15/2017 17:27 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-4 | | 280-391373 | | 10/13/2017 19:39 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-5** **Client ID: SW-1-101017**

Sample Date/Time: 10/10/2017 12:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-5 | | 480-381998 | | 10/16/2017 16:42 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-5 | | 480-381998 | | 10/16/2017 16:42 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-5-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-5-A | | 280-391548 | 280-391231 | 10/16/2017 23:41 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-5 | | 280-391539 | | 10/17/2017 01:21 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-5 | | 280-391542 | | 10/16/2017 17:43 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-5 | | 280-391353 | | 10/15/2017 17:16 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-5 | | 280-391373 | | 10/13/2017 19:54 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-5 DU** **Client ID: SW-1-101017**

Sample Date/Time: 10/10/2017 12:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:SM 2320B | 280-102219-A-5 DU | | 280-391353 | | 10/15/2017 17:21 | 1 | TAL DEN | A1D |

**Lab ID: 280-102219-6** **Client ID: SW-7-101017**

Sample Date/Time: 10/10/2017 14:50 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-6 | | 480-381998 | | 10/16/2017 17:07 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-6 | | 480-381998 | | 10/16/2017 17:07 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-6-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-6-A | | 280-391548 | 280-391231 | 10/16/2017 23:44 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-6 | | 280-391539 | | 10/17/2017 01:38 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-6 | | 280-391542 | | 10/16/2017 17:45 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-6 | | 280-391353 | | 10/15/2017 16:52 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-6 | | 280-391373 | | 10/13/2017 20:10 | 1 | TAL DEN | CCJ |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-7** **Client ID: SW-6-101017**

Sample Date/Time: 10/10/2017 13:10 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-7 | | 480-381998 | | 10/16/2017 17:31 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-7 | | 480-381998 | | 10/16/2017 17:31 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-7-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-7-A | | 280-391548 | 280-391231 | 10/16/2017 23:47 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-7 | | 280-391539 | | 10/17/2017 01:55 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-7 | | 280-391542 | | 10/16/2017 17:47 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-7 | | 280-391353 | | 10/15/2017 17:32 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-7 | | 280-391373 | | 10/13/2017 20:25 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-8** **Client ID: MW-13D-101017**

Sample Date/Time: 10/10/2017 14:05 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-8 | | 480-381998 | | 10/16/2017 17:55 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-8 | | 480-381998 | | 10/16/2017 17:55 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-8-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-8-A | | 280-391548 | 280-391231 | 10/16/2017 23:51 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-8 | | 280-391539 | | 10/17/2017 02:45 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-8 | | 280-391542 | | 10/16/2017 17:49 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-8 | | 280-391353 | | 10/15/2017 17:37 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-8 | | 280-391373 | | 10/13/2017 20:40 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-9** **Client ID: MW-14-101017**

Sample Date/Time: 10/10/2017 16:40 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-9 | | 480-381998 | | 10/16/2017 18:20 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-9 | | 480-381998 | | 10/16/2017 18:20 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-9-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-9-A | | 280-391548 | 280-391231 | 10/16/2017 23:54 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-9 | | 280-391539 | | 10/17/2017 03:02 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-9 | | 280-391542 | | 10/16/2017 17:51 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-9 | | 280-391353 | | 10/15/2017 16:46 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-9 | | 280-391373 | | 10/13/2017 21:24 | 1 | TAL DEN | CCJ |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-10 Client ID: MW-6-101017**

Sample Date/Time: 10/10/2017 17:35 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-10 | | 480-381998 | | 10/16/2017 18:44 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-10 | | 480-381998 | | 10/16/2017 18:44 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-10-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-10-A | | 280-391548 | 280-391231 | 10/16/2017 23:58 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-10 | | 280-391539 | | 10/17/2017 03:19 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-10 | | 280-391542 | | 10/16/2017 17:53 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-10 | | 280-391353 | | 10/15/2017 17:42 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-10 | | 280-391373 | | 10/13/2017 21:39 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-11 Client ID: MW-20DD-101017**

Sample Date/Time: 10/10/2017 00:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-D-11 | | 480-381998 | | 10/16/2017 19:08 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-D-11 | | 480-381998 | | 10/16/2017 19:08 | 1 | TAL BUF | CDC |
| P:3005A | 280-102219-C-11-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | 280-102219-C-11-A | | 280-391548 | 280-391231 | 10/17/2017 00:01 | 1 | TAL DEN | CRR |
| A:300.0 | 280-102219-A-11 | | 280-391539 | | 10/17/2017 03:36 | 1 | TAL DEN | AFB |
| A:350.1 | 280-102219-B-11 | | 280-391542 | | 10/16/2017 17:55 | 1 | TAL DEN | KAM |
| A:SM 2320B | 280-102219-A-11 | | 280-391353 | | 10/15/2017 17:47 | 1 | TAL DEN | A1D |
| A:SM 5310B | 280-102219-B-11 | | 280-391373 | | 10/13/2017 21:53 | 1 | TAL DEN | CCJ |

**Lab ID: 280-102219-11 MS Client ID: MW-20DD-101017**

Sample Date/Time: 10/10/2017 00:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:300.0 | 280-102219-A-11 MS | | 280-391539 | | 10/17/2017 04:09 | 1 | TAL DEN | AFB |

**Lab ID: 280-102219-11 MSD Client ID: MW-20DD-101017**

Sample Date/Time: 10/10/2017 00:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:300.0 | 280-102219-A-11 MSD | | 280-391539 | | 10/17/2017 04:26 | 1 | TAL DEN | AFB |

**Lab ID: 280-102219-11 DU Client ID: MW-20DD-101017**

Sample Date/Time: 10/10/2017 00:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:300.0 | 280-102219-A-11 DU | | 280-391539 | | 10/17/2017 03:53 | 1 | TAL DEN | AFB |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: 280-102219-12** **Client ID: TRIP BLANK**

Sample Date/Time: 10/10/2017 00:00 Received Date/Time: 10/12/2017 08:40

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | 280-102219-F-12 | | 480-381998 | | 10/16/2017 19:33 | 1 | TAL BUF | CDC |
| A:8260C SIM | 280-102219-F-12 | | 480-381998 | | 10/16/2017 19:33 | 1 | TAL BUF | CDC |

**Lab ID: MB** **Client ID: N/A**

Sample Date/Time: N/A Received Date/Time: N/A

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | MB 480-381998/10 | | 480-381998 | | 10/16/2017 14:40 | 1 | TAL BUF | CDC |
| A:8260C SIM | MB 480-381998/10 | | 480-381998 | | 10/16/2017 14:40 | 1 | TAL BUF | CDC |
| P:3005A | MB 280-391231/1-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | MB 280-391231/1-A | | 280-391548 | 280-391231 | 10/16/2017 22:59 | 1 | TAL DEN | CRR |
| A:300.0 | MB 280-391539/6 | | 280-391539 | | 10/16/2017 21:55 | 1 | TAL DEN | AFB |
| A:350.1 | MB 280-391542/20 | | 280-391542 | | 10/16/2017 15:55 | 1 | TAL DEN | KAM |
| A:350.1 | MB 280-391542/61 | | 280-391542 | | 10/16/2017 17:17 | 1 | TAL DEN | KAM |
| A:SM 2320B | MB 280-391353/31 | | 280-391353 | | 10/15/2017 14:59 | 1 | TAL DEN | A1D |
| A:SM 2320B | MB 280-391353/57 | | 280-391353 | | 10/15/2017 17:11 | 1 | TAL DEN | A1D |
| A:SM 5310B | MB 280-391373/4 | | 280-391373 | | 10/13/2017 14:59 | 1 | TAL DEN | CCJ |

**Lab ID: LCS** **Client ID: N/A**

Sample Date/Time: N/A Received Date/Time: N/A

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | LCS 480-381998/7 | | 480-381998 | | 10/16/2017 13:19 | 1 | TAL BUF | CDC |
| A:8260C SIM | LCS 480-381998/7 | | 480-381998 | | 10/16/2017 13:19 | 1 | TAL BUF | CDC |
| P:3005A | LCS 280-391231/2-A | | 280-391548 | 280-391231 | 10/16/2017 14:17 | 1 | TAL DEN | MLS |
| A:6020 | LCS 280-391231/2-A | | 280-391548 | 280-391231 | 10/16/2017 23:03 | 1 | TAL DEN | CRR |
| A:300.0 | LCS 280-391539/4 | | 280-391539 | | 10/16/2017 21:22 | 1 | TAL DEN | AFB |
| A:350.1 | LCS 280-391542/18 | | 280-391542 | | 10/16/2017 15:51 | 1 | TAL DEN | KAM |
| A:350.1 | LCS 280-391542/59 | | 280-391542 | | 10/16/2017 17:13 | 1 | TAL DEN | KAM |
| A:SM 2320B | LCS 280-391353/30 | | 280-391353 | | 10/15/2017 14:54 | 1 | TAL DEN | A1D |
| A:SM 2320B | LCS 280-391353/56 | | 280-391353 | | 10/15/2017 17:07 | 1 | TAL DEN | A1D |
| A:SM 5310B | LCS 280-391373/3 | | 280-391373 | | 10/13/2017 14:44 | 1 | TAL DEN | CCJ |

Client: Aspect Consulting Job Number: 280-102219-1

## Laboratory Chronicle

**Lab ID: LCSD** **Client ID: N/A**

Sample Date/Time: N/A Received Date/Time: N/A

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| P:5030C | LCSD 480-381998/8 | | 480-381998 | | 10/16/2017 13:44 | 1 | TAL BUF | CDC |
| A:8260C SIM | LCSD 480-381998/8 | | 480-381998 | | 10/16/2017 13:44 | 1 | TAL BUF | CDC |
| A:300.0 | LCSD 280-391539/5 | | 280-391539 | | 10/16/2017 21:39 | 1 | TAL DEN | AFB |
| A:350.1 | LCSD 280-391542/19 | | 280-391542 | | 10/16/2017 15:53 | 1 | TAL DEN | KAM |
| A:350.1 | LCSD 280-391542/60 | | 280-391542 | | 10/16/2017 17:15 | 1 | TAL DEN | KAM |

**Lab ID: MRL** **Client ID: N/A**

Sample Date/Time: N/A Received Date/Time: N/A

| Method | Bottle ID | Run | Analysis Batch | Prep Batch | Date Prepared / Analyzed | Dil | Lab | Analyst |
|---|---|---|---|---|---|---|---|---|
| A:300.0 | MRL 280-391539/3 | | 280-391539 | | 10/16/2017 21:05 | 1 | TAL DEN | AFB |

**Lab References:**
TAL BUF = TestAmerica Buffalo
TAL DEN = TestAmerica Denver

**Analytical Resources, Incorporated**
Analytical Chemists and Consultants

26 October 2017

Betsy Sara
Test America - Denver
4955 Yarrow Street
Arvada, CO 80002

RE: Hansville

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

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

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

| Associated Work Order(s) | Associated SDG ID(s) |
|---|---|
| 17J0147 | N/A |

Amanda Volgardsen

Digitally signed by Amanda Volgardsen
DN: c=US, st=Washington, l=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com
Date: 2017.10.26 12:30:32 -07'00'

---

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

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

Analytical Resources, Inc.

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

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006

PJLA Testing
Accreditation # 66169

17J0147

ARI

America Denver
5 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information | Sampler: | Lab PM: Sara, Betsy A | Carrier Tracking No(s): | COC No: 280-23414-6845.1 |
|---|---|---|---|---|
| Client Contact: Aaron Pruitt | Phone: 206-595-6605 | E-Mail: betsy.sara@testamericainc.com | | Page: |
| Company: Aspect Consulting, LLC | | | | Job #: |
| Address: 350 Madison Ave N | Due Date Requested: | | | |
| City: Bainbridge Island | TAT Requested (days): | | | |
| State, Zip: WA, 98110 | PO #: Purchase Order not required | | | |
| Phone: | WO #: | | | |
| Email: | Project #:skip sites/events 28006013 - 2Q/3Q/4Q Sampling | | | |
| Project Name: Hansville Landfill | SSOW#: | | | |
| Site: Washington | | | | |

**Analysis Requested**

Preservation Codes:

| | |
|---|---|
| A - HCL | M - Hexane |
| B - NaOH | N - None |
| C - Zn Acetate | O - AsNaO2 |
| D - Nitric Acid | P - Na2O4S |
| E - NaHSO4 | Q - Na2SO3 |
| F - MeOH | R - Na2S2SO3 |
| G - Amchlor | S - H2SO4 |
| H - Ascorbic Acid | T - TSP Dodecahydrate |
| I - Ice | U - Acetone |
| J - DI Water | V - MCAA |
| K - EDTA | W - ph 4-5 |
| L - EDA | Z - other (specify) |

Other:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 8260C SIM - Vinyl Chloride (TA Buffalo) | Dissolved Metals | Ammonia/TOC | Alks/Cl/SO4/NO3/NO3(IC) | Ortho-phosphate (field filtered)- direct sub to ARI | Dissolved Arsenice - direct sub to ARI | Nitrate/Nitrite (IC) - direct sub to ARI | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | A | D | S | N | N | D | N | | |
| MW-7 - 101017 | 10/10/17 | 855 | | W | Y | | | | | | ✓ | ✓ | ✓ | | Short Holds: NO3/NO2(IC), O-phos (IC)- direct subbed to ARI |
| MW-5 - 101017 | | 1020 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| MW-12I - 101017 | | 1155 | | | Y | | | | | | ✓ | ✓ | ✓ | | Diss As,NO3,NO2,o-phos subbed direct to ARI |
| SW-4 - 101017 | | 1245 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| SW-1 - 101017 | | 1200 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| SW-7 - 101017 | | 1450 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| SW-6 - 101017 | | 1310 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| MW-13D - 101017 | | 1405 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| MW-14 - 101017 | | 1540 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| MW-6 - 101017 | | 1735 | | | Y | | | | | | ✓ | ✓ | ✓ | | |
| MW20DD - 101017 | | — | | | Y | | | | | | ✓ | ✓ | ✓ | | |

**Possible Hazard Identification**
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|
| Relinquished by: | Date/Time: 10-11-17 0630 | Company: Aspect | Received by: Brittney Hall |
| Relinquished by: | Date/Time: | Company | Received by: |
| Relinquished by: | Date/Time: | Company | Received by: |

| Date/Time: 10/11/17 16:30 | Company: ARI |
|---|---|
| Date/Time: | Company |
| Date/Time: | Company |

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:





10/27/2017

Analytical Resources, Incorporated
Analytical Chemists and Consultants

# Cooler Receipt Form

ARI Client: Test America Denver  Project Name: Hansville Landfill

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

Assigned ARI Job No: 17J0147  Tracking No: _____ (NA)

**Preliminary Examination Phase:**

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

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.7
Time: 6:30

If cooler temperature is out of compliance fill out form 00070F  Temp Gun ID#: D0052066

Cooler Accepted by: B.H.  Date: 10/11/17  Time: 6:30

*Complete custody forms and attach all shipping documents*

## Log-In Phase:

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

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

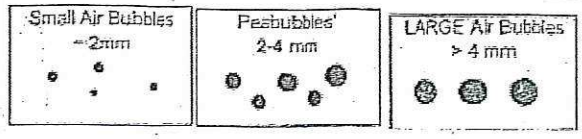
Samples Logged by: B.H  Date: 10/11/17  Time: 6:50

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

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---|---|---|---|
| MW-6 | MW-6-101017 | | |
| | | | |
| | | | |
| | | | |

*Additional Notes, Discrepancies, & Resolutions:*

By: B.H.  Date: 10/11/17




Small → "sm" ( < 2 mm )
Peabubbles → "pb" ( 2 to < 4 mm )
Large → "lg" ( 4 to < 6 mm )
Headspace → "hs" ( > 6 mm )

**WORK ORDER**

17J0147

**Client:** Test America - Denver
**Project Manager:** Amanda Volgardsen
**Project:** Hansville
**Project Number:** 28006013-2Q/3Q/4Q Sampling

## Preservation Confirmation

| Container ID | Container Type | | pH | |
|---|---|---|---|---|
| 17J0147-01 A | Miscellaneous Container | | | |
| 17J0147-01 B | Miscellaneous Container | | | |
| 17J0147-01 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-02 A | Miscellaneous Container | | | |
| 17J0147-02 B | Miscellaneous Container | | | |
| 17J0147-02 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-03 A | Miscellaneous Container | | | |
| 17J0147-03 B | Miscellaneous Container | | | |
| 17J0147-03 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-04 A | Miscellaneous Container | | | |
| 17J0147-04 B | Miscellaneous Container | | | |
| 17J0147-04 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-05 A | Miscellaneous Container | | | |
| 17J0147-05 B | Miscellaneous Container | | | |
| 17J0147-05 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-06 A | Miscellaneous Container | | | |
| 17J0147-06 B | Miscellaneous Container | | | |
| 17J0147-06 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-07 A | Miscellaneous Container | | | |
| 17J0147-07 B | Miscellaneous Container | | | |
| 17J0147-07 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-08 A | Miscellaneous Container | | | |
| 17J0147-08 B | Miscellaneous Container | | | |
| 17J0147-08 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-09 A | Miscellaneous Container | | | |
| 17J0147-09 B | Miscellaneous Container | | | |
| 17J0147-09 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-10 A | Miscellaneous Container | | | |
| 17J0147-10 B | Miscellaneous Container | | | |
| 17J0147-10 C | Miscellaneous Container | $HNO_3$ | <2 | Pass |
| 17J0147-11 A | Miscellaneous Container | | | |

B.H.
Reviewed By

10/11/17
Date

**WORK ORDER**

17J0147

| | | | |
|---|---|---|---|
| **Client: Test America - Denver** | | **Project Manager: Amanda Volgardsen** | |
| **Project: Hansville** | | **Project Number: 28006013-2Q/3Q/4Q Sampling** | |
| 17J0147-11 B | Miscellaneous Container | | |
| 17J0147-11 C | Miscellaneous Container | $HNO_3$ | <2 Pass |

B.H.
Preservation Confirmed By

10/11/17
Date

B.H.
Reviewed By

10/11/17
Date

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## ANALYTICAL REPORT FOR SAMPLES

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| MW-7-101017 | 17J0147-01 | Water | 10-Oct-2017 08:55 | 11-Oct-2017 06:30 |
| MW-5-101017 | 17J0147-02 | Water | 10-Oct-2017 10:20 | 11-Oct-2017 06:30 |
| MW-12I-101017 | 17J0147-03 | Water | 10-Oct-2017 11:55 | 11-Oct-2017 06:30 |
| SW-4-101017 | 17J0147-04 | Water | 10-Oct-2017 12:45 | 11-Oct-2017 06:30 |
| SW-1-101017 | 17J0147-05 | Water | 10-Oct-2017 12:00 | 11-Oct-2017 06:30 |
| SW-7-101017 | 17J0147-06 | Water | 10-Oct-2017 14:50 | 11-Oct-2017 06:30 |
| SW-6-101017 | 17J0147-07 | Water | 10-Oct-2017 13:10 | 11-Oct-2017 06:30 |
| MW-13D-101017 | 17J0147-08 | Water | 10-Oct-2017 14:05 | 11-Oct-2017 06:30 |
| MW-14-101017 | 17J0147-09 | Water | 10-Oct-2017 16:40 | 11-Oct-2017 06:30 |
| MW-6-101017 | 17J0147-10 | Water | 10-Oct-2017 17:35 | 11-Oct-2017 06:30 |
| MW-20DD-101017 | 17J0147-11 | Water | 10-Oct-2017 00:00 | 11-Oct-2017 06:30 |





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

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

# Case Narrative

**Sample receipt**

Samples as listed on the preceding page were received October 11, 2017 under ARI workorder 17J0147. For details regarding sample receipt, please refer to the Cooler Receipt Form.

**Dissolved Arsenic - EPA Method 200.8**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

**Anions - EPA Method 300.0**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample MW-7-101017. The matrix spike percent recoveries and duplicate RPD were within QC limits.

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-7-101017**

**17J0147-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 08:55
Analyzed: 18-Oct-2017 18:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00110** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-7-101017**

**17J0147-01 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 08:55
Analyzed: 11-Oct-2017 12:38

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.639** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-5-101017**

**17J0147-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 10:20
Analyzed: 18-Oct-2017 18:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00195** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-5-101017**

**17J0147-02 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 10:20
Analyzed: 11-Oct-2017 13:28

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.896** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-12I-101017**

**17J0147-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 11:55
Analyzed: 18-Oct-2017 18:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00224** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## MW-12I-101017

**17J0147-03 (Water)**

### Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 11:55
Analyzed: 11-Oct-2017 13:45

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-4-101017**

**17J0147-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 12:45
Analyzed: 18-Oct-2017 18:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00209** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-4-101017**

**17J0147-04 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 12:45
Analyzed: 11-Oct-2017 14:02

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.796** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-1-101017**

**17J0147-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 12:00
Analyzed: 18-Oct-2017 19:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00164** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-1-101017**

**17J0147-05 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 12:00
Analyzed: 11-Oct-2017 14:18

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **1.47** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-7-101017**

**17J0147-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 14:50
Analyzed: 18-Oct-2017 19:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00151** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-7-101017**

**17J0147-06 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 14:50
Analyzed: 11-Oct-2017 15:09

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.764** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-6-101017**

**17J0147-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 13:10
Analyzed: 18-Oct-2017 19:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00631** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**SW-6-101017**

**17J0147-07 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 13:10
Analyzed: 11-Oct-2017 15:26

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.110** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-13D-101017**

**17J0147-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 14:05
Analyzed: 18-Oct-2017 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00463** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-13D-101017**

**17J0147-08 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 14:05
Analyzed: 11-Oct-2017 15:42

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | **0.10** | mg-P/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-14-101017**

**17J0147-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 16:40
Analyzed: 18-Oct-2017 19:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.0137** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## MW-14-101017

**17J0147-09 (Water)**

### Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 16:40
Analyzed: 11-Oct-2017 15:59

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.467** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | **0.11** | mg-P/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-6-101017**

**17J0147-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 17:35
Analyzed: 18-Oct-2017 19:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.00143** | mg/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-6-101017**

**17J0147-10 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 17:35
Analyzed: 11-Oct-2017 16:16

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | ND | mg-P/L | U |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-6-101017**

**17J0147-10RE1 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 17:35
Analyzed: 11-Oct-2017 17:31

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 2 | 0.200 | **4.20** | mg-N/L | D |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 2 | 0.200 | **0.243** | mg-N/L | D |





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

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-20DD-101017**

**17J0147-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 200.8 UCT-KED
Instrument: ICPMS2

Sampled: 10/10/2017 00:00
Analyzed: 18-Oct-2017 19:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BFJ0323 Sample Size: 25 mL
Prepared: 12-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Arsenic, Dissolved | 7440-38-2 | 1 | 0.000200 | **0.0135** | mg/L | |





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

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

**MW-20DD-101017**

**17J0147-11 (Water)**

## Wet Chemistry

Method: EPA 300.0
Instrument: DX500

Sampled: 10/10/2017 00:00
Analyzed: 11-Oct-2017 16:33

Sample Preparation: Preparation Method: No Prep Wet Chem
Preparation Batch: BFJ0291
Prepared: 11-Oct-2017
Sample Size: 5 mL
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrate-N | 14797-55-8 | 1 | 0.100 | **0.428** | mg-N/L | |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Nitrite-N | 14797-65-0 | 1 | 0.100 | ND | mg-N/L | U |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---|---|---|---|---|---|---|
| Orthophosphorus | 1426-54-42 | 1 | 0.10 | **0.10** | mg-P/L | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## Metals and Metallic Compounds (dissolved) - Quality Control

### Batch BFJ0323 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte | Isotope | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (BFJ0323-BLK1)** | | | | Prepared: 12-Oct-2017 Analyzed: 17-Oct-2017 18:44 | | | | | | | |
| Arsenic, Dissolved | 75a | ND | 0.000200 | mg/L | | | | | | | U |
| **LCS (BFJ0323-BS1)** | | | | Prepared: 12-Oct-2017 Analyzed: 17-Oct-2017 19:28 | | | | | | | |
| Arsenic, Dissolved | 75a | 0.0255 | 0.000200 | mg/L | 0.0250 | | 102 | 80-120 | | | |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## Wet Chemistry - Quality Control

### Batch BFJ0291 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Blank (BFJ0291-BLK1)** | | | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 12:04 | | | | | | | |
| Nitrate-N | ND | 0.100 | mg-N/L | | | | | | | U |
| Nitrite-N | ND | 0.100 | mg-N/L | | | | | | | U |
| Orthophosphorus | ND | 0.10 | mg-P/L | | | | | | | U |
| **LCS (BFJ0291-BS1)** | | | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 12:21 | | | | | | | |
| Nitrate-N | 1.48 | 0.100 | mg-N/L | 1.50 | | 98.7 | 75-125 | | | |
| Nitrite-N | 1.45 | 0.100 | mg-N/L | 1.50 | | 96.9 | 75-125 | | | |
| Orthophosphorus | 1.43 | 0.10 | mg-P/L | 1.50 | | 95.6 | 75-125 | | | |
| **Duplicate (BFJ0291-DUP1)** | **Source: 17J0147-01** | | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 12:55 | | | | | | | |
| Nitrate-N | 0.641 | 0.100 | mg-N/L | | 0.639 | | | 0.31 | 20 | |
| Nitrite-N | ND | 0.100 | mg-N/L | | ND | | | | | U |
| Orthophosphorus | ND | 0.10 | mg-P/L | | ND | | | | | U |
| **Matrix Spike (BFJ0291-MS1)** | **Source: 17J0147-01** | | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 13:11 | | | | | | | |
| Nitrate-N | 2.70 | 0.200 | mg-N/L | 2.00 | 0.639 | 103 | 75-125 | | | D |
| Nitrite-N | 2.02 | 0.200 | mg-N/L | 2.00 | ND | 101 | 75-125 | | | D |
| Orthophosphorus | 1.95 | 0.20 | mg-P/L | 2.00 | ND | 97.7 | 75-125 | | | D |

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

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## Certified Analyses included in this Report

| Analyte | Certifications |
|---|---|
| ***EPA 200.8 UCT-KED in Water*** | |
| Arsenic-75a | NELAP,WADOE,WA-DW,DoD-ELAP |
| ***EPA 300.0 in Water*** | |
| Nitrate-N | DoD-ELAP,WADOE,WA-DW,NELAP |
| Nitrite-N | DoD-ELAP,WADOE,WA-DW,NELAP |
| Orthophosphorus | DoD-ELAP,WADOE,WA-DW,NELAP |

| Code | Description | Number | Expires |
|---|---|---|---|
| ADEC | Alaska Dept of Environmental Conservation | UST-033 | 09/01/2017 |
| CALAP | California Department of Public Health CAELAP | 2748 | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169 | 02/07/2019 |
| NELAP | ORELAP - Oregon Laboratory Accreditation Program | WA100006 | 05/11/2018 |
| WADOE | WA Dept of Ecology | C558 | 06/30/2018 |
| WA-DW | Ecology - Drinking Water | C558 | 06/30/2018 |

| | | |
|---|---|---|
| Test America - Denver | Project: Hansville | |
| 4955 Yarrow Street | Project Number: 28006013-2Q/3Q/4Q Sampling | **Reported:** |
| Arvada CO, 80002 | Project Manager: Betsy Sara | 26-Oct-2017 12:29 |

## Notes and Definitions

| | |
|---|---|
| U | This analyte is not detected above the applicable reporting or detection limit. |
| J | Estimated concentration value detected below the reporting limit. |
| D | The reported value is from a dilution |
| DET | Analyte DETECTED |
| ND | Analyte NOT DETECTED at or above the reporting limit |
| NR | Not Reported |
| dry | Sample results reported on a dry weight basis |
| RPD | Relative Percent Difference |
| [2C] | Indicates this result was quantified on the second column on a dual column analysis. |

**TestAmerica Denver**
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

# Chain of Custod

280-102219 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information | Sampler: Aaron Pruitt | Lab PM: Sara, Betsy A | OC No: 80-23414-6845.1 |
|---|---|---|---|
| Client Contact: Aaron Pruitt | Phone: 206-595-6615 | E-Mail: betsy.sara@testamericainc.com | Page: 1 / 2 |
| Company: Aspect Consulting, LLC | | | Job #: |
| Address: 350 Madison Ave N | Due Date Requested: | | |
| City: Bainbridge Island | TAT Requested (days): | | |
| State, Zip: WA, 98110 | | | |
| Phone: | PO #: Purchase Order not required | | |
| Email: | WO #: | | |
| Project Name: Hansville Landfill | Project #:skip sites/events 28006013 - 2Q/3Q/4Q Sampling | | |
| Site: Washington | SSOW#: | | |

**Analysis Requested**

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

| Sample Identification | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=soil, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 8260C SIM - Vinyl Chloride (TA Buffalo) | Dissolved Metals | Ammonia/TOC | Alks/Cl/SO4/NO3/NO3(IC) | Ortho-phosphate (field filtered)- direct sub to ARI | Dissolved Arsenice - direct sub to ARI | Nitrate/Nitrite (IC) - direct sub to ARI | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | A | D | S | N | N | D | N | | |
| MW-7-101017 | 10/10/17 | 0955 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | Short Holds: NO3/NO2(IC), O-phos (IC)- drect subbed to ARI |
| MW-5_101017 | | 1020 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| MW-12I-101017 | | 1155 | | W | Y | | ✓ | ✓ | ✓ | – | | | | | Diss As,NO3,NO2,o-phos subbed direct to ARI |
| SW-4-101017 | | 1245 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| SW-1-101017 | | 1200 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| SW-7_101017 | | 1450 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| SW-6-101017 | | 1310 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| MW-13D-101017 | | 1405 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | Run only one trip Blank |
| MW-14-101017 | | 1640 | | W | Y | | ✓ | ✓ | ✓ | ✓ | | | | | |
| MW-6-101017 | | 1735 | | W | X | | ✓ | ✓ | ✓ | ✓ | | | | | |
| MW-20DD-101017 | | — | | W | X | | ✓ | ✓ | ✓ | ✓ | | | | | |

**Possible Hazard Identification**
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
|---|---|---|---|---|---|
| Aaron Pruitt | 10/11/17 1230 | Aspect | | 10-12-17 0840 | TAD |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

Custody Seals Intact: ∆ Yes ∆ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 3.7, 5.3, 3.4 IR#7 +0.1 Transfer 10-12-17



10/27/2017

**TestAmerica Denver**
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information (Sub Contract Lab) | Sampler: | Lab PM: Sara, Betsy A | Carrier Tracking No(s): | COC No: 280-415238.1 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: | E-Mail: betsy.sara@testamericainc.com | State of Origin: Washington | Page: Page 1 of 2 |
| Company: TestAmerica Laboratories, Inc. | | Accreditations Required (See note): State Program - Washington | | Job #: 280-102219-1 |
| Address: 10 Hazelwood Drive, , | Due Date Requested: 10/24/2017 | | | |
| City: Amherst | TAT Requested (days): | | | |
| State, Zip: NY, 14228-2298 | | | | |
| Phone: 716-691-2600(Tel) 716-691-7991(Fax) | PO #: | | | |
| Email: | WO #: | | | |
| Project Name: Hansville Landfill | Project #: 28006013 | | | |
| Site: Hansville | SSOW#: | | | |

**Analysis Requested**

**Preservation Codes:**

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=Comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 8260C_SIM/5030C (MOD) Local Method | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| MW-7-101017 (280-102219-1) | 10/10/17 | 08:55 Pacific | | Water | | | X | 3 | |
| MW-5-101017 (280-102219-2) | 10/10/17 | 10:20 Pacific | | Water | | | X | 3 | |
| MW-12I-101017 (280-102219-3) | 10/10/17 | 11:55 Pacific | | Water | | | X | 3 | |
| SW-4-101017 (280-102219-4) | 10/10/17 | 12:45 Pacific | | Water | | | X | 3 | |
| SW-1-101017 (280-102219-5) | 10/10/17 | 12:00 Pacific | | Water | | | X | 3 | |
| SW-7-101017 (280-102219-6) | 10/10/17 | 14:50 Pacific | | Water | | | X | 3 | |
| SW-6-101017 (280-102219-7) | 10/10/17 | 13:10 Pacific | | Water | | | X | 3 | |
| MW-13D-101017 (280-102219-8) | 10/10/17 | 14:05 Pacific | | Water | | | X | 3 | |
| MW-14-101017 (280-102219-9) | 10/10/17 | 16:40 Pacific | | Water | | | X | 3 | |

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

| ***Possible Hazard Identification*** *Unconfirmed* | ***Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months* |
|---|---|
| Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2 | Special Instructions/QC Requirements: |

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: |
|---|---|---|---|

| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
|---|---|---|---|---|---|
| | 10/12/17 1700 | | | 10/13/17 0900 | TA Buf. |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: #1 2.6°C |
|---|---|---|



10/27/2017

**TestAmerica Denver**
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

# Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

| Client Information (Sub Contract Lab) | Sampler: | Lab PM: Sara, Betsy A | Carrier Tracking No(s): | COC No: 280-415238.2 |
|---|---|---|---|---|
| Client Contact: Shipping/Receiving | Phone: | E-Mail: betsy.sara@testamericainc.com | State of Origin: Washington | Page: Page 2 of 2 |
| Company: TestAmerica Laboratories, Inc. | | Accreditations Required (See note): State Program - Washington | | Job #: 280-102219-1 |
| Address: 10 Hazelwood Drive, , | Due Date Requested: 10/24/2017 | | | |
| City: Amherst | TAT Requested (days): | | | |
| State, Zip: NY, 14228-2298 | | | | |
| Phone: 716-691-2600(Tel) 716-691-7991(Fax) | PO #: | | | |
| Email: | WO #: | | | |
| Project Name: Hansville Landfill | Project #: 28006013 | | | |
| Site: Hansville | SSOW#: | | | |

**Analysis Requested**

**Preservation Codes:**

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Z - other (specify)

Other:

| Sample Identification - Client ID (Lab ID) | Sample Date | Sample Time | Sample Type (C=comp, G=grab) | Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air) | Field Filtered Sample (Yes or No) | Perform MS/MSD (Yes or No) | 8260C_SIM/5030C (MOD) Local Method | Total Number of containers | Special Instructions/Note: |
|---|---|---|---|---|---|---|---|---|---|
| | | | Preservation Code: | | | | | | |
| MW-6-101017 (280-102219-10) | 10/10/17 | 17:35 Pacific | | Water | | | X | 3 | |
| MW-20DD-101017 (280-102219-11) | 10/10/17 | Pacific | | Water | | | X | 3 | |
| TRIP BLANK (280-102219-12) | 10/10/17 | Pacific | | Water | | | X | 6 | |

Page 112 of 114

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to TestAmerica Laboratories, Inc.

| *Possible Hazard Identification* | *Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)* |
|---|---|
| *Unconfirmed* | ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months* |
| Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2 | Special Instructions/QC Requirements: |

| Empty Kit Relinquished by: | Date: | Time: | Method of Shipment: | | |
|---|---|---|---|---|---|
| Relinquished by: | Date/Time: 10/12/17 1700 | Company | Received by: | Date/Time: 10/13/17 0900 | Company TA Buf. |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |
| Relinquished by: | Date/Time: | Company | Received by: | Date/Time: | Company |

| Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: #1 2.6°, |
|---|---|---|

10/27/2017

# Login Sample Receipt Checklist

Client: Aspect Consulting

Job Number: 280-102219-1

**Login Number: 102219**
**List Number: 1**
**Creator: Pottruff, Reed W**

**List Source: TestAmerica Denver**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | N/A | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | False | No: Received Trip Blank(s) not listed on COC. |
| Samples are received within Holding Time (Excluding tests with immediate HTs).. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | True | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Sampling Company provided. | True | |
| Samples received within 48 hours of sampling. | True | |
| Samples requiring field filtration have been filtered in the field. | True | |
| Chlorine Residual checked. | True | |

# Login Sample Receipt Checklist

Client: Aspect Consulting

Job Number: 280-102219-1

**Login Number: 102219**
**List Number: 2**
**Creator: Hulbert, Michael J**

**List Source: TestAmerica Buffalo**
**List Creation: 10/14/17 12:31 PM**

| Question | Answer | Comment |
|---|---|---|
| Radioactivity either was not measured or, if measured, is at or below background | True | |
| The cooler's custody seal, if present, is intact. | True | |
| The cooler or samples do not appear to have been compromised or tampered with. | True | |
| Samples were received on ice. | True | |
| Cooler Temperature is acceptable. | True | |
| Cooler Temperature is recorded. | True | 2.6 #1 |
| COC is present. | True | |
| COC is filled out in ink and legible. | True | |
| COC is filled out with all pertinent information. | True | |
| Is the Field Sampler's name present on COC? | True | |
| There are no discrepancies between the sample IDs on the containers and the COC. | True | |
| Samples are received within Holding Time (Excluding tests with immediate HTs).. | True | |
| Sample containers have legible labels. | True | |
| Containers are not broken or leaking. | True | |
| Sample collection date/times are provided. | True | |
| Appropriate sample containers are used. | True | |
| Sample bottles are completely filled. | True | |
| Sample Preservation Verified | True | |
| There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs | True | |
| VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter. | True | |
| If necessary, staff have been informed of any short hold time or quick TAT needs | True | |
| Multiphasic samples are not present. | True | |
| Samples do not require splitting or compositing. | True | |
| Sampling Company provided. | True | |
| Samples received within 48 hours of sampling. | False | |
| Samples requiring field filtration have been filtered in the field. | N/A | |
| Chlorine Residual checked. | N/A | |

# APPENDIX E

# Annual Inspection Forms – Kitsap Public Health District

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

May 2, 2017

Alexis McKinnon
Kitsap County Public Works
614 Division Street, MS-27
Port Orchard, WA 98366

RE: 2017 1st QUARTER HANSVILLE LANDFILL INSPECTION

Dear Ms. McKinnon:

The Kitsap Public Health District (Health District) is writing to relay the results of the 1st quarter inspection of 2017 at the Hansville Landfill. Enclosed please find a copy of the inspection checklist/report for the quarterly inspection conducted on December 20, 2016 at approximately 2:00 p.m.

The following items were noted or discussed:

- Landfill site conditions were excellent.
- Provide documentation for monitoring well decommissioned in December 2016.
- Improvements to manifolds appear to be complete.
  A.Mckinnon reported problems with 1st Quarter sample results taken by Aspect Consulting. Improper sampling skewed dissolved metal results. Dave South with Ecology advised to reject results and to omit from any statistical analysis.
- A copy of the inspection form is attached.

If you have any questions or comments please feel free to contact me at (360) 728-2308.

Sincerely,

Richard Bazzell, R.S.
Environmental Health Specialist
Solid and Hazardous Waste Program

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

# SOLID WASTE FACILITY INSPECTION FORM

**Facility Name:** Hansville Landfill **Operator:** Kitsap County **Phone #:**

**Location of Facility:**

**Inspector:** R. Burrell **Date:** 03/29/2017 **Time:** 1000

**Type of Inspection Checklist Used:** **Facility Representative Present:** A. Mck

| Reason for Inspection | Type of Inspection | Results | Sample Taken? |
|---|---|---|---|
| X Scheduled | X Full Quarterly | X Compliant | ___ Yes X No |
| ___ Return | ___ Brief | ___ Non-Compliant | |
| ___ Complaint | ___ No Entry | ___ Approved | |
| ___ Permit Investigation | ___ Consultation | ___ Disapproved | **Attachments?** (photos, etc.) |
| ___ Sample | ___ Plan Review | ___ Other | ___ Yes X No |
| ___ By Request | ___ Site Review | | Type? |
| ___ Other | ___ Other | | |

| Item # | Description (see attached checklist for complete list of items) | Correction Date |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Comments:** Final report received for 2016. Full inspection of landfill resulted in no apparent problems. Discussed sample results from 1st Qtr 2017; ECY (D. Swith) advised to omit samples / reject dissolved metal results. * will not be included w/ statistical analysis due to incorrect sample procedures.

**Signatures:** _____ Facility Representative _____ KPHD Inspector

**File Name:** _____

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

June 8, 2017

Alexis McKinnon
Kitsap County Public Works
614 Division Street, MS-27
Port Orchard, WA 98366

RE: HANSVILLE LANDFILL INSPECTION, 2017 2nd QUARTER

Dear Ms. McKinnon:

The Kitsap Public Health District (Health District) is writing to relay the results of the 2nd quarter inspection of 2017 at the Hansville Landfill. Enclosed please find a copy of the inspection checklist/report for the quarterly inspection conducted on June 6th, 2017 9:00 am.

The following items were noted or discussed:

- Landfill site conditions were good. We discussed mowing of the landfill.
- Security issues still are a problem. Options are being developed.
- We discussed changes to how the landfill gas system is being operated.
- Gas line condensate issues will be explored this summer.
- The next inspection is scheduled for September 2017
- A copy of the inspection form is attached.

If you have any questions or comments please feel free to contact me at (360) 728-2308.

Sincerely,

Grant Holdcroft, RS
Environmental Health Specialist
Solid and Hazardous Waste Program

enc: Inspection checklist

cc: Project file

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

# SOLID WASTE FACILITY INSPECTION FORM

**Facility Name:** Hansville LF **Operator:** KCPW **Phone #:**

**Location of Facility:** Solid Waste Rd, Hansville

**Inspector:** GA Holdcroft **Date:** 6/6/17 **Time:** 900

**Type of Inspection Checklist Used:** **Facility Representative Present:** Alexis McKinnon.

| Reason for Inspection | Type of Inspection | Results | Sample Taken? |
|---|---|---|---|
| X Scheduled | X Full Quarterly | X Compliant | ___ Yes X No |
| ___ Return | ___ Brief | ___ Non-Compliant | |
| ___ Complaint | ___ No Entry | ___ Approved | |
| ___ Permit Investigation | ___ Consultation | ___ Disapproved | **Attachments? (photos, etc.)** |
| ___ Sample | ___ Plan Review | ___ Other | ___ Yes X No |
| ___ By Request | ___ Site Review | | Type? |
| ___ Other | ___ Other | | |

| Item # | Description (see attached checklist for complete list of items) | Correction Date |
|---|---|---|
| | None. | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Comments:** LF not mowed. Discussion on leaving grass and Tarping and Scotch Broom. Discussion on LF gas. Gas wells outside shut down. Security issues. Fence discussion. ~~Leachate~~ Gas Condensate lines to be investigated this summer.

**Signatures:** Alexis McKinnon
Facility Representative

GA Holdcroft
KPHD Inspector

**File Name:** _____

☑ Db
☐ Letter

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

June 8, 2017

Alexis McKinnon
Kitsap County Public Works
614 Division Street, MS-27
Port Orchard, WA 98366

RE: HANSVILLE LANDFILL INSPECTION, 2017 2nd QUARTER

Dear Ms. McKinnon:

The Kitsap Public Health District (Health District) is writing to relay the results of the 2nd quarter inspection of 2017 at the Hansville Landfill. Enclosed please find a copy of the inspection checklist/report for the quarterly inspection conducted on June 6th, 2017 9:00 am.

The following items were noted or discussed:

- Landfill site conditions were good. We discussed mowing of the landfill.
- Security issues still are a problem. Options are being developed.
- We discussed changes to how the landfill gas system is being operated.
- Gas line condensate issues will be explored this summer.
- The next inspection is scheduled for September 2017
- A copy of the inspection form is attached.

If you have any questions or comments please feel free to contact me at (360) 728-2308.

Sincerely,

Grant Holdcroft, RS
Environmental Health Specialist
Solid and Hazardous Waste Program

enc: Inspection checklist

cc: Project file

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

# SOLID WASTE FACILITY INSPECTION FORM

**Facility Name:** Hansville LF **Operator:** KCPW **Phone #:**

**Location of Facility:** Solid Waste Rd, Hansville

**Inspector:** GA Holdcroft **Date:** 6/6/17 **Time:** 900

**Type of Inspection Checklist Used:** **Facility Representative Present:** Alexis McKinnon.

| Reason for Inspection | Type of Inspection | Results | Sample Taken? |
|---|---|---|---|
| X Scheduled | X Full Quarterly | X Compliant | ___ Yes X No |
| ___ Return | ___ Brief | ___ Non-Compliant | |
| ___ Complaint | ___ No Entry | ___ Approved | |
| ___ Permit Investigation | ___ Consultation | ___ Disapproved | **Attachments? (photos, etc.)** |
| ___ Sample | ___ Plan Review | ___ Other | ___ Yes X No |
| ___ By Request | ___ Site Review | | Type? |
| ___ Other | ___ Other | | |

| Item # | Description (see attached checklist for complete list of items) | Correction Date |
|---|---|---|
| | None. | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Comments:** LF not mowed. Discussion on leaving grass and Tarping and Scotch Broom. Discussion on LF gas. Gas wells outside shut down. Security issues. Fence discussion. ~~Leachate~~ Gas Condensate lines to be investigated this summer.

**Signatures:** Alexis McKinnon
Facility Representative

GA Holdcroft
KPHD Inspector

**File Name:** _____

☑ Db
☐ Letter

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

October 6, 2017

Alexis McKinnon
Kitsap County Public Works
614 Division Street, MS-27
Port Orchard, WA 98366

RE: HANSVILLE LANDFILL INSPECTION, 2017 3rd QUARTER

Dear Ms. McKinnon:

The Kitsap Public Health District (Health District) is writing to relay the results of the 3rd quarter inspection of 2017 at the Hansville Landfill. Enclosed please find a copy of the inspection checklist/report for the quarterly inspection conducted on October 6, 2017, at 10 am.

The following items were noted or discussed:

- KCPW is planning on changing out monitoring well pumps at all wells.
- A runoff control trench has been dug around one of the two gas system condensate sumps.
- Ecoblocks have been placed at the top of a slope on the east end of the landfill to discourage motocross riders in the landfill area.
- Ten more gas wells have had header valves replaced.
- Ecology has assigned a new site manager, Ronald Tim.
- Exposed flex tubing will be replaced in the gas collection system.
- The next inspection is scheduled for December 2017
- A copy of the inspection form is attached.

If you have any questions or comments please feel free to contact me at (360) 728-2308.

Sincerely,

Grant Holdcroft, RS
Environmental Health Specialist
Solid and Hazardous Waste Program

enc: Inspection checklist

cc: Project file

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

# SOLID WASTE FACILITY INSPECTION FORM

**Facility Name:** Hasville LF **Operator:** KCPW **Phone #:**

**Location of Facility:** Ecology Rd, Hasville

**Inspector:** GA Holdcroft **Date:** 10/6/17 **Time:**

**Type of Inspection Checklist Used:** **Facility Representative Present:** Alexis McKinnon

| Reason for Inspection | Type of Inspection | Results | Sample Taken? |
|---|---|---|---|
| X Scheduled | X Full Quarterly | X Compliant | ___ Yes |
| ___ Return | ___ Brief | ___ Non-Compliant | X No |
| ___ Complaint | ___ No Entry | ___ Approved | |
| ___ Permit Investigation | ___ Consultation | ___ Disapproved | **Attachments? (photos, etc.)** |
| ___ Sample | ___ Plan Review | ___ Other | ___ Yes |
| ___ By Request | ___ Site Review | | Type? X No |
| ___ Other | ___ Other | | |

| Item # | Description (see attached checklist for complete list of items) | Correction Date |
|---|---|---|
| | None. | |
| | | |
| | | |
| | | |
| | | |
| | | |

**Comments:** KC planning on changing out monitoring well pumps at all wells. Gas system condensate sump trench installed. Ecoblocks placed to limit intruders from riding at east end of Ladfill. 10 more gas well heads replaced. New site manager assigned by Ecology. Alexis to send to me. Exposed flex tubing in gas collection system to be replaced at next sampling event.

**Signatures:** Alexis McKinnon
Facility Representative

GA Holdcroft
KPHD Inspector

**File Name:** _____

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-337-5235

December 13, 2017

Alexis McKinnon
Kitsap County Public Works
614 Division Street, MS-27
Port Orchard, WA 98366

RE: HANSVILLE LANDFILL INSPECTION, 2017 4th QUARTER

Dear Ms. McKinnon:

The Kitsap Public Health District (Health District) is writing to relay the results of the 4th quarter inspection of 2017 at the Hansville Landfill. Enclosed please find a copy of the inspection checklist/report for the quarterly inspection conducted on December 13, 2017, at 9 am.

The following items were noted or discussed:

- KCPW is in process of changing out monitoring well pumps at all wells.
- Ten more gas wells have had header valves replaced.
- Exposed flex tubing has been replaced in the gas collection system.
- The next inspection is scheduled for February 2017
- A copy of the inspection form is attached.

If you have any questions or comments please feel free to contact me at (360) 728-2308.

Sincerely,

Grant Holdcroft, RS
Environmental Health Specialist
Solid and Hazardous Waste Program

enc: Inspection checklist

cc: Project file

KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street, Suite 300
Bremerton, WA 98337
360-728-2235

# SOLID WASTE FACILITY INSPECTION FORM

**Facility Name:** Hansville Landfill **Operator:** KCPW **Phone #:**

**Location of Facility:** Ecology Rd

**Inspector:** GA Holdcroft **Date:** 12/5/2017 **Time:** 9 am

**Type of Inspection Checklist Used:** None **Facility Representative Present:** Alexis McFinnon

| Reason for Inspection | Type of Inspection | Results | Sample Taken? |
|---|---|---|---|
| X Scheduled | X Full Quarterly | X Compliant | ___ Yes X No |
| ___ Return | ___ Brief | ___ Non-Compliant | |
| ___ Complaint | ___ No Entry | ___ Approved | |
| ___ Permit Investigation | ___ Consultation | ___ Disapproved | **Attachments?** |
| ___ Sample | ___ Plan Review | ___ Other | ___ Yes X No |
| ___ By Request | ___ Site Review | | Type? |
| ___ Other | ___ Other | | |

| Item # | Description (see attached checklist for complete list of items) | Correction Date |
|---|---|---|
| | None | |
| | | |
| | | |
| | | |

**Comments:** Discussed replacement of gas line flex couplings, pumps in monitoring wells.

Alexis McFinnon
Facility Representative

GS A Holdcroft
KPHD Inspector

**File Name:** _____