WCI Austin Landfill, LLC.

2018 Coal Combustion Residuals Annual Monitoring Report

SKB Lansing Landfill
52563 246rd Street
Austin, Minnesota
Permit SW-514

January 31, 2019

2018 Coal Combustion Residuals Annual Monitoring Report

SKB Lansing Landfill
52563 243rd Street
Austin, Minnesota
Permit SW-514

Prepared for:
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Date:
January 31, 2019

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I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature:
Typed or Printed Name: Kevin Michael Lienau
Date: January 31, 2019 License Number: 25086

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Acronyms

BTV	Background Threshold Values
CCR	Coal Combustion Residuals (CCR)
CFR	Code of Federal Regulations
COC	Chemicals of Concern
GES	Groundwater & Environmental Services, Inc.
mg/l	milligrams per liter
MPCA	Minnesota Pollution Control Agency
NGVD	National Geodetic Vertical Datum
pci/l	picoCuries per liter
QA/QC	Quality Assurance/Quality Control
Report	2018 Coal Combustion Residuals Annual Monitoring Report
SAP	Sampling Analysis Plan
SSI	statistically significant increase
Test America	Test America, Inc.
USL	Upper Simultaneous Limit

1 Introduction

The *2018 Combustion Coal Residuals Annual Monitoring Report* (Report) was prepared to summarize the results of the 2018 groundwater monitoring events and associated analysis for Appendix III to Part 257 at the SKB Lansing Landfill. The SKB Lansing Landfill operates under Minnesota Pollution Control Agency (MPCA) Site Permit Number SW-514. The SKB Lansing Landfill is located at 52563 243rd Street in Austin, Mower County, Minnesota (**Figure 1**).

Per the CFR 40.257.90 – 257.98, 2 groundwater sampling events were conducted at the SKB Lansing Landfill in the spring and fall of 2018. Analytical results from the groundwater monitoring events are compared and evaluated to Background Threshold Values (BTVs) established for the SKB Lansing Landfill.

1.1 Scope of Work

The following scope of work was conducted for the 2018 CCR groundwater monitoring events:

- Conduct 2 gauging and sampling events of the site's monitoring wells and piezometers.
- Measure static water elevations for each monitoring well to the nearest 0.01 feet from surveyed reference point.
- Record the volume of water removed from each monitoring well (in gallons) and total well volumes removed before sampling.
- Record field parameter stabilization results from each monitoring well.
- Conduct a statistical evaluation of groundwater sampling analytical data using ProUCL 5.0.00 (Singh, 2013) to determine BTVs for each analyte.
- Select tolerance or prediction interval procedure for future statistical analysis of groundwater monitoring data.
- Prepare a Combustion Coal Residuals (CCR) Annual Groundwater Monitoring Report summarizing the groundwater sampling and statistical evaluation.

2 Site Background

2.1 Site Location and Description

The site is located within a 40-acre parcel of land in Section 21, Township 103 North, Range 18 West, Lansing Township, Mower County, Minnesota. With reference to roadways, the facility is located west of State Highway 218 along Lansing Township Road T-378 (243rd Street). The facility entrance is off Lansing Township Road T-378 (243rd Street). **Figures 1** and **2** provide a Site Location and Site Plan Map.

Located in the Cedar River watershed, the facility property has rolling topography ranging in elevation from 1,218 feet above the National Geodetic Vertical Datum of 1929 (NGVD 29) in the southwest corner to 1,254 feet above NGVD 29 in the north-central portion of the site. Stormwater flows to small natural depressions scattered around the site and to stormwater retention areas in the south and southwest areas of the property. Stormwater ultimately goes to a judicial ditch. The nearest open water body is the Cedar River, located approximately three miles east of the site.

3 Monitoring Network Systems and Sampling Schedule

The groundwater monitoring network at SKB Lansing Landfill was designed based on the analysis of local and regional hydrologic conditions. Currently, the groundwater monitoring network system consists of eight monitoring wells (one set monitors the shallow till layer and one set monitors a deeper sand layer) and five piezometers (see **Figure 2**). Located in the future expansion area are 7 monitoring wells and 5 piezometers that are currently used for groundwater elevation only as noted below. The monitoring wells used as data collection points that have been divided into 2 groups for the purpose of this report:

Gauging and Sampling

- Upgradient Monitoring Points. The upgradient monitoring points consist of the monitoring wells upgradient of the compliance boundary and include MW-1 and MW-1RD.
- Downgradient Monitoring Points. The downgradient monitoring points consist of monitoring wells downgradient of the compliance boundary and include MW-2R, MW-2RD, MW-3, MW-3R, MW-3RD, and MW-4.

Gauging Only

- Downgradient Monitoring Points (elevations only). The downgradient monitoring points consist of monitoring wells downgradient of the compliance boundary and include MW-5S, MW-5D, MW-6S, MW-7S, MW-7D, MW-8S and MW-8D.
- Piezometer Monitoring Points. The piezometer monitoring points consist of shallow monitoring points used to collect groundwater elevations only across the site and include PIEZ-1, PIEZ-2, PIEZ-3, PIEZ-4, PIEZ-5, P-5, P-9, P-10, P-11 and P-13.

For the CCR background evaluation, a total of 2 groundwater monitoring events were conducted in 2018 on the following dates:

- March 22-23, 2018
- October 25-26, 2018

4 Groundwater Sampling Methodology

For the SKB Lansing Landfill CCR sampling events, static groundwater elevations were measured to the nearest 0.01 feet in each monitoring well with a water interface probe prior to groundwater sample collection. Using a well dedicated, pneumatic low-flow bladder pump, each well was purged and field stabilization parameters including temperature, pH, dissolved oxygen, conductance, and redox potential were measured.

Groundwater samples were placed in laboratory-prepared containers and labeled with the following information:

- Unique sample number
- Site name
- Name of sampler
- Time and date

Immediately following collection, samples were placed on ice in a field cooler and shipped with a chain of custody form to a Test America, Inc. (Test America) of Amherst, New York.

Groundwater samples obtained during the 2 sampling events in 2018 were analyzed for parameters specified in Appendix III to Part 257 and are noted below:

Appendix III

General Chemistry

- Chloride (Method 300.0)
- Fluoride (Method 300.0)
- Sulfate as SO_4 (Method 300.0)
- pH (Standard Method 4500 H+ B)
- Total Dissolved Solids (Standard Method 2540C)

Metals

- Boron (Method 6010D)
- Calcium (Method 6010D)

Quality assurance/quality control (QA/QC) samples including duplicate, field, and equipment samples were collected during each sampling event.

5 Groundwater Monitoring Results

5.1 Groundwater Elevation Data

Groundwater elevations recorded during the groundwater monitoring events are presented in **Table 1**. Groundwater contours maps were generated for the March 22 and October 25, 2018 monitoring events. Nine wells monitor the shallow groundwater upgradient and downgradient of the site. Water table contours based on the shallow well data indicate that the shallow groundwater flows to the southwest (**Figures 3** and **5**). Six monitoring wells monitor a deeper water-bearing unit beneath the site. Based on the deeper well data, potentiometric surface contours indicate a southwest flow direction (**Figures 4** and **6**). The groundwater flow directions are consistent with historical flow direction.

5.2 Groundwater Analytical Data

Groundwater analytical results for the CCR monitoring events are presented in **Table 2**. A summary of the stabilization parameter tests performed for each well prior to sampling are provided in **Table 3** and copies of field sampling data sheets are in **Appendix A**. Laboratory analytical reports are included in **Appendix B**.

The calculated BTVs for the SKB Lansing Landfill are provided in **Table 4**. Comparing the 2018 sampling results to the BTVs indicate that Boron exceeded the BTV of 0.51 mg/l and Fluoride exceeded the BTV of 0.26 mg/l.

<u>Result Summary of BTV Exceedances</u>

Boron

- Downgradient monitoring well
  - MW-2R (1.0 mg/l) (3/23/2018)
  - MW-2R (1.2 mg/l) (10/26/2018) – Exceedance confirmed. Statistically significant

Fluoride

- Upgradient monitoring well
  - MW-1RD (0.30 mg/l) (10/26/2018) – Exceedance not confirmed. Not statistically significant
- Downgradient monitoring well
  - MW-3 (0.33 mg/l) (10/26/2018) - Exceedance not confirmed. Not statistically significant

6 Statistical Evaluation Data

This groundwater statistical evaluation for landfill monitoring is conducted in accordance with CFR 40.257.93(f)(3). Specifically, current concentrations were compared to the interwell upper simultaneous limits (USLs) in order to determine if a potential statistically significant increase (SSI) exists at downgradient wells.

The background dataset was determined for each well using analytical results ranging from Spring 2017 to the most recent sampling events in October of 2018.

Statistical evaluation of the 2017 - 2018 CCR groundwater monitoring data determined background concentrations and included:

1) Establishing final background datasets for each chemical of concern (COC) including outlier testing.

2) Deriving statistical, upper bound estimates of the background population for each COC using the final background datasets.

To establish final background datasets for each COC, descriptive statistics, outlier analysis and comparative statistical analysis performed on the background datasets confirmed the data in the background dataset for a given COC as representative of the 'true' background population. Descriptive statistics include the number of samples, the number of detections, the detection frequency, the maximum and minimum detected concentrations, the mean, and the standard deviation of the background data, all of which provide a preliminary examination of data.

Outlier analyses identified potential outliers not representative of the true background population. Including real outliers in a dataset can potentially lead to Type I or Type II errors (USEPA, 2009). Rosner's Outlier Test was performed on background datasets containing four (4) detected values or more (USEPA, 2009). Based on an alpha of 0.05, statistically significant outliers were removed from the background dataset in order to improve the power of the prediction limit (USEPA, 2009). The resulting background dataset for each well and COC is tabulated in **Attachment C**.

For the final background datasets after outlier analyses, summary statistics calculated the number of samples, number of detections, detection frequency, maximum and minimum detected concentrations, mean concentration, and the standard deviation. The final datasets calculations of the underlying distributions employing Shapiro-Wilks (e.g., normal, lognormal, gamma) using ProUCL 5.0.00 (Singh, 2013) before statistical limits were estimated allowed determination of the appropriate estimates that best describe the background datasets.

The following statistical limits for potential use as a background level (Background Threshold Values (BTVs)) were calculated using ProUCL 5.0.00 (Singh, 2013) for each COC when five or more detections were present:

- 95% upper simultaneous limit (USL)

The 95% USL was selected as the proposed BTVs as:

1) Many of the background datasets contain limited sample sizes and, therefore, are unlikely to represent the full range of natural ambient concentrations in the vicinity of the site.

2) This statistic should result in lower Type I error rates (i.e., false positives) and can be used to compare many observations.

If there were no detected results, the highest detection limit was proposed as the BTV. The calculated BTVs are included in **Table 4**. The statistical evaluation data is included in **Appendix C**.

6.1 SSI Determination

The detected concentrations for the first and second half 2018 sampling event with the respective USL are listed below. Compliance is determined by comparing the current concentration to the calculated USL.

Confirmation sampling detected concentrations of Boron in the second half (fall) of 2018 above the respective USL. Boron in monitoring well MW-2R is a confirmed SSI. Confirmatory sampling for detected concentrations of Fluoride at MW-1RD and MW-3 reported above BTV for the second half 2018 sampling event will occur in spring 2019.

Comparison of 2018 Confirmed COC Concentrations to USLs

Monitoring Well	Analyte	First Half 2018 Conc (mg/L)	USL Conc (mg/L)	Second Half 2018 Conc (mg/L)	Percent Non-Detect	USL Notes
MW-2R	Boron	**1.0**	0.51	**1.2**	0%	Non-parametric distribution Confirmed SSI
MW-1RD	Fluoride	ND	0.26	**0.30**	0%	Non-parametric distribution – Not Confirmed
MW-3	Fluoride	ND	0.26	**0.33**	0%	Non-parametric distribution – Not Confirmed

Notes:
Conc – Concentration
KM – Kaplan Meier method for non-detect substitution
Bolded concentration exceeds the respective USL.

7 Conclusions

The groundwater data collected in the 2017 – 2018 sampling events were statistically tested following the concepts outlined in this report to form a background data set. Interwell USLs were developed for Chloride, Fluoride, Sulfate as SO_4, Total Dissolved Solids, Boron, Calcium and in 8 monitoring wells (MW-1, MW-1RD, MW-2R, MW-2RD, MW-3, MW-3R, MW-3RD, and MW-4). Upper and lower threshold values were developed for pH using USL and box plot statistics. The resulting USLs were compared to the current concentrations for each COC and well pair. Compliance is determined by comparing the currently detected concentrations to the calculated USL. Boron in monitoring well MW-2R is a confirmed SSI. Fluoride concentrations of 0.30 mg/L detected in monitoring well MW-1RD and 0.33 mg/l in MW-3 exceed the calculated USL of 0.26 mg/l. Resampling is required to determine if the exceedance are statistically significant.

8 Report Summary

Per the CFR 40.257.90 – 257.98, 2 monitoring events were conducted at the SKB Lansing Landfill in 2018. Groundwater samples were analyzed for parameters indicated in Appendix III to Part 257. Groundwater samples were collected from the monitoring network's eight monitoring wells located at the SKB Lansing Landfill during the monitoring events. Groundwater elevation information from the monitoring data indicates a southwesterly groundwater flow beneath the landfill.

Groundwater sampling was performed in the spring and fall of 2018. The following analytes were reported above the calculated BTVs:

- Boron groundwater concentrations were detected above the BTV at a downgradient monitoring well (MW-2R) during the spring and fall 2018 sampling events. These concentrations indicate a SSI.

- Fluoride groundwater concentrations were detected above the BTV at both an upgradient and downgradient monitoring well during the fall 2018 sampling event. These concentrations indicate a possible SSI. A subsequent confirmation of the concentration must occur for the exceedance to be considered statistically significant.

Detection monitoring (2018 sampling events) determined a SSI of Boron in MW-2R. Therefore, an assessment monitoring program, meeting the requirements of CFR 40.257.95, will be implemented for the SKB Lansing Landfill.

9 Recommendations

CCR groundwater monitoring events will be conducted in the spring and fall of 2019. Groundwater samples will be analyzed for detection monitoring parameters specified in Appendix III of Part 257. Additionally, an assessment monitoring program will be established for the SKB Lansing Landfill. This program will include collecting and analyzing groundwater samples specified in Appendix IV of Part 257.

An evaluation of groundwater analytical results after each monitoring event will be completed to determine if a significant increase over BTVs (**Table 4**) for one or more parameter listed in Appendix III and IV to Part 257 has occurred at any monitoring well. The evaluation will be performed using a tolerance or prediction interval procedure (CFR 40.257.93(f)(3)). The level of each constituent in the monitoring well will be compared to an established BTV generated as the USL. Any single constituent that exceeds the BTV is considered to be an exceedance. Confirmation sampling will determine whether the BTV exceedance is statistically significant.

A 2019 Annual Monitoring Report will be prepared and include sampling results from the 2019 CCR groundwater monitoring events and an evaluation of the analytical results as they pertained to BTVs.

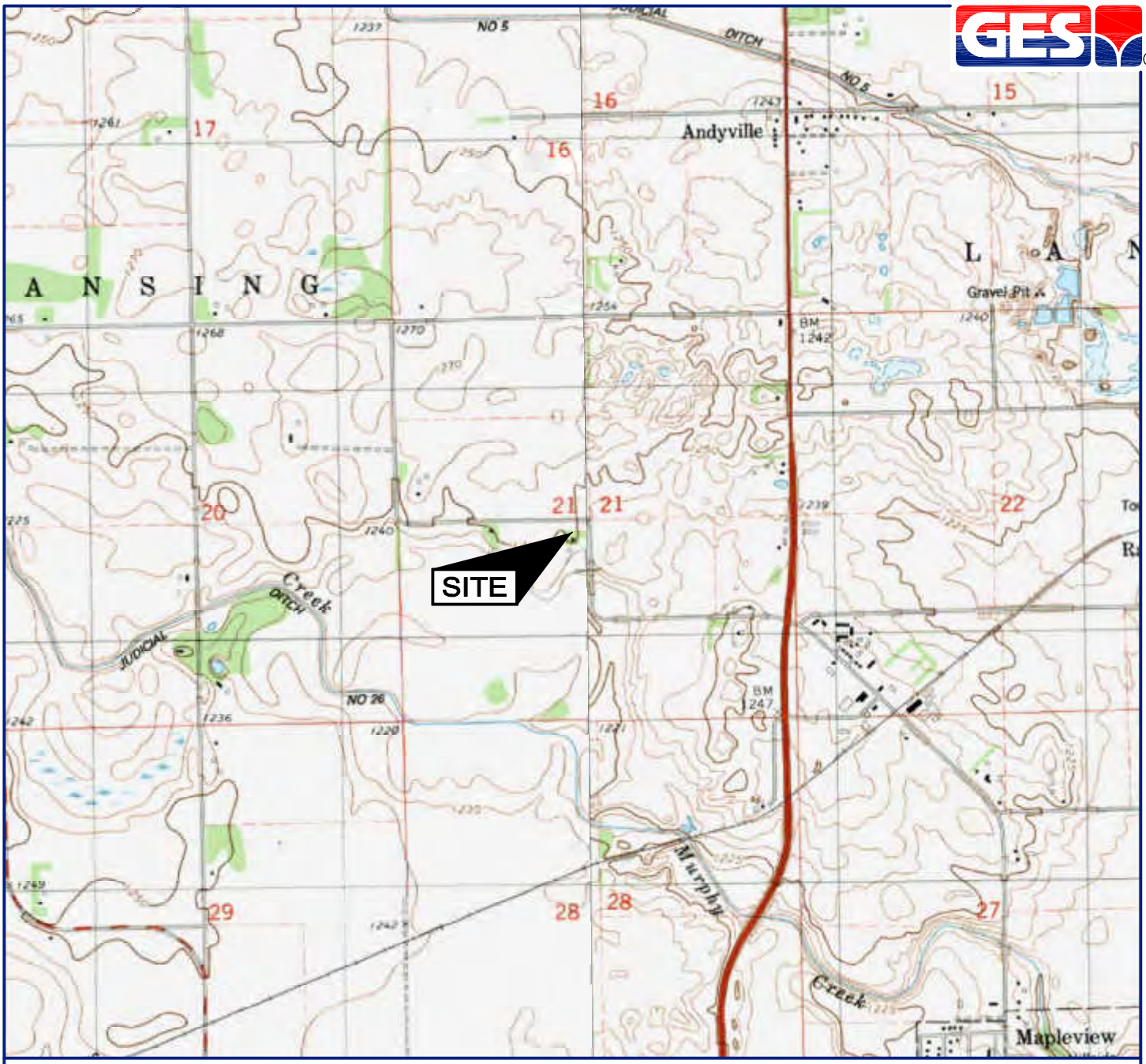
References

Singh and Singh, 2013. *ProUCL Version 5.0.00 Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations,* United States Environmental Protection Agency

United States Environmental Protection Agency, 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities Unified Guidance.* Office of Resource Conservation and Recovery Program Implementation and Information Division, EPA 530/R-09-007, March 2009.

United States Geological Survey, 1975. *Water Resources of The Cedar River Watershed, Southeastern Minnesota.*

Figures



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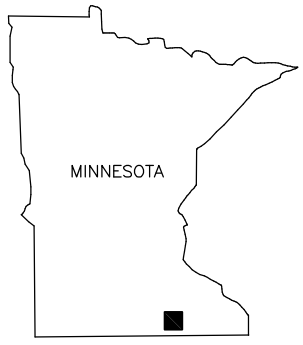
TOPOGRAPHIC QUADRANGLE 1982
AUSTIN EAST, MINNESOTA
CONTOUR INTERVAL = 5'



QUADRANGLE LOCATION

DRAFTED BY: W.G.S. (N.J.)	SITE LOCATION MAP
CHECKED BY:	SKB ENVIRONMENTAL SKB LANSING FACILITY 52563 243rd STREET AUSTIN, MINNESOTA
REVIEWED BY:	
NORTH	Groundwater & Environmental Services, Inc. 1285 CORPORATE CENTER DRIVE, SUITE 120, EAGAN, MN 55121

SCALE IN FEET	DATE	FIGURE
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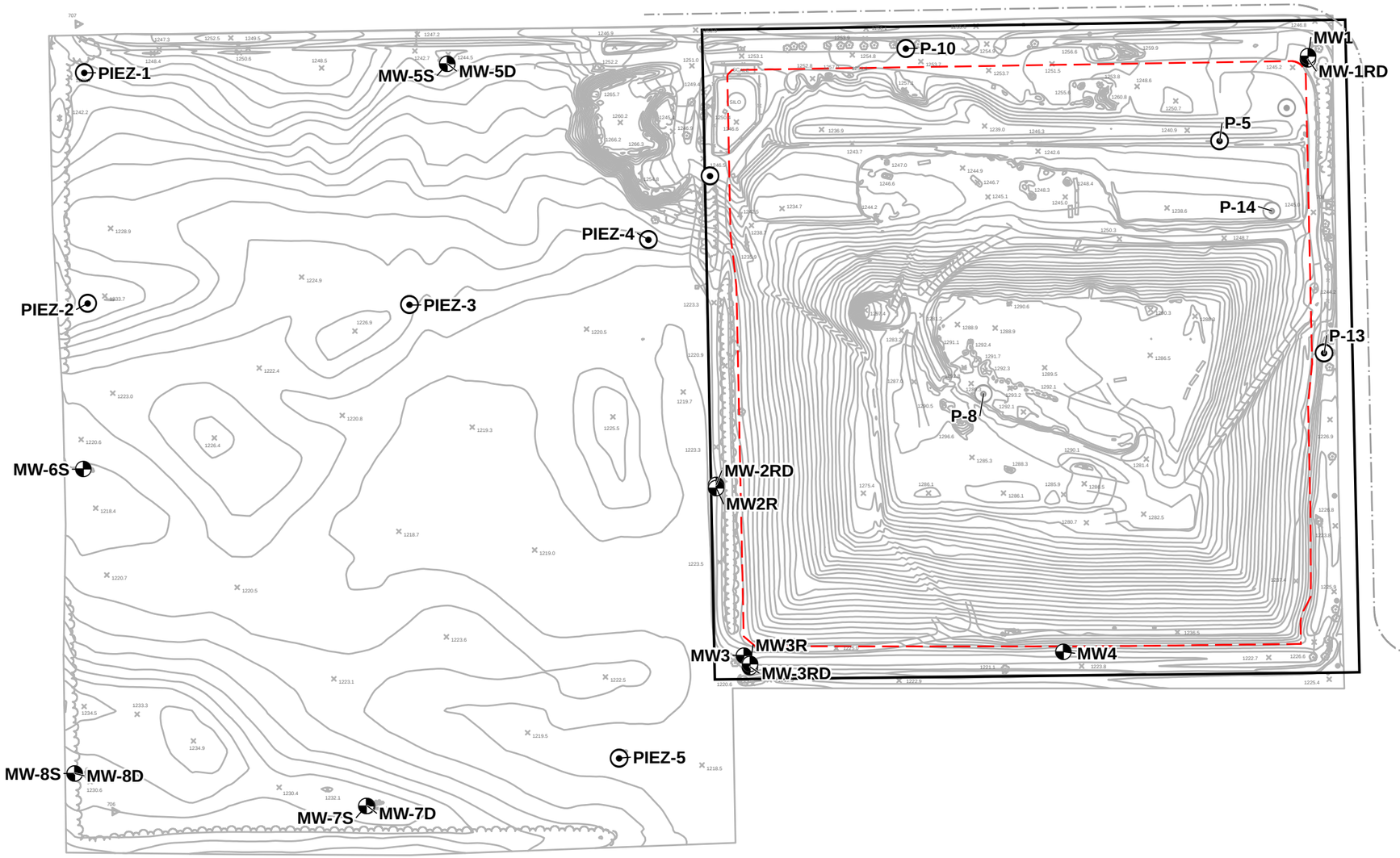

LEGEND

- PROPERTY BOUNDARY
- RIGHT OF WAY
- APPROXIMATE LIMITS OF WASTE
- FENCE
- MONITORING WELL
- PIEZOMETER
- DESTROYED PIEZOMETER

Site Map

SKB Environmental
SKB Lansing Facility
52563 243 RD Street
Austin, Minnesota

Drawn **AMW**
Designed **AMW**
Approved **DMC**

Date **1/10/19**
Figure **2**

N

Scale In Feet (Approximate)
0 250

Groundwater & Environmental Services, Inc.

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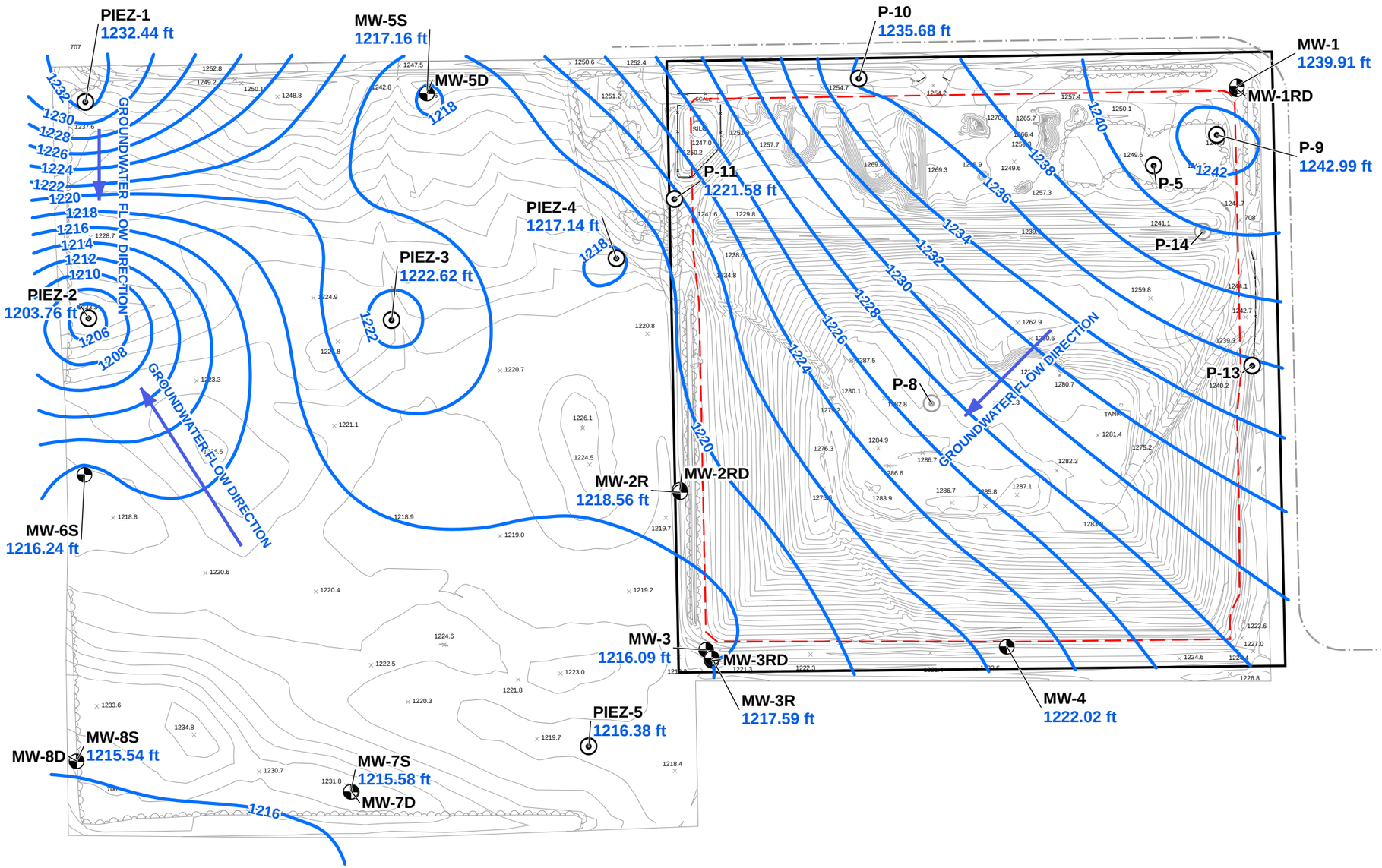

LEGEND

- GROUNDWATER ELEVATION ISOCONTOUR (ft MSL)
- PROPERTY BOUNDARY
- RIGHT OF WAY
- APPROXIMATE LIMITS OF WASTE
- FENCE
- 1216.09 MEASURED GROUNDWATER ELEVATION (ft MSL)
- MONITORING WELL
- PIEZOMETER
- DESTROYED PIEZOMETER

WATER TABLE CONTOUR MAP
MARCH 22, 2018

SKB ENVIRONMENTAL
SKB LANSING FACILITY
52563 243RD STREET
AUSTIN, MINNESOTA

Drawn	Date
JTL	6-26-18
Designed	Figure
JTL	3
Approved	
DMC	

Scale In Feet (Approximate)
0 250

Groundwater & Environmental Services, Inc.

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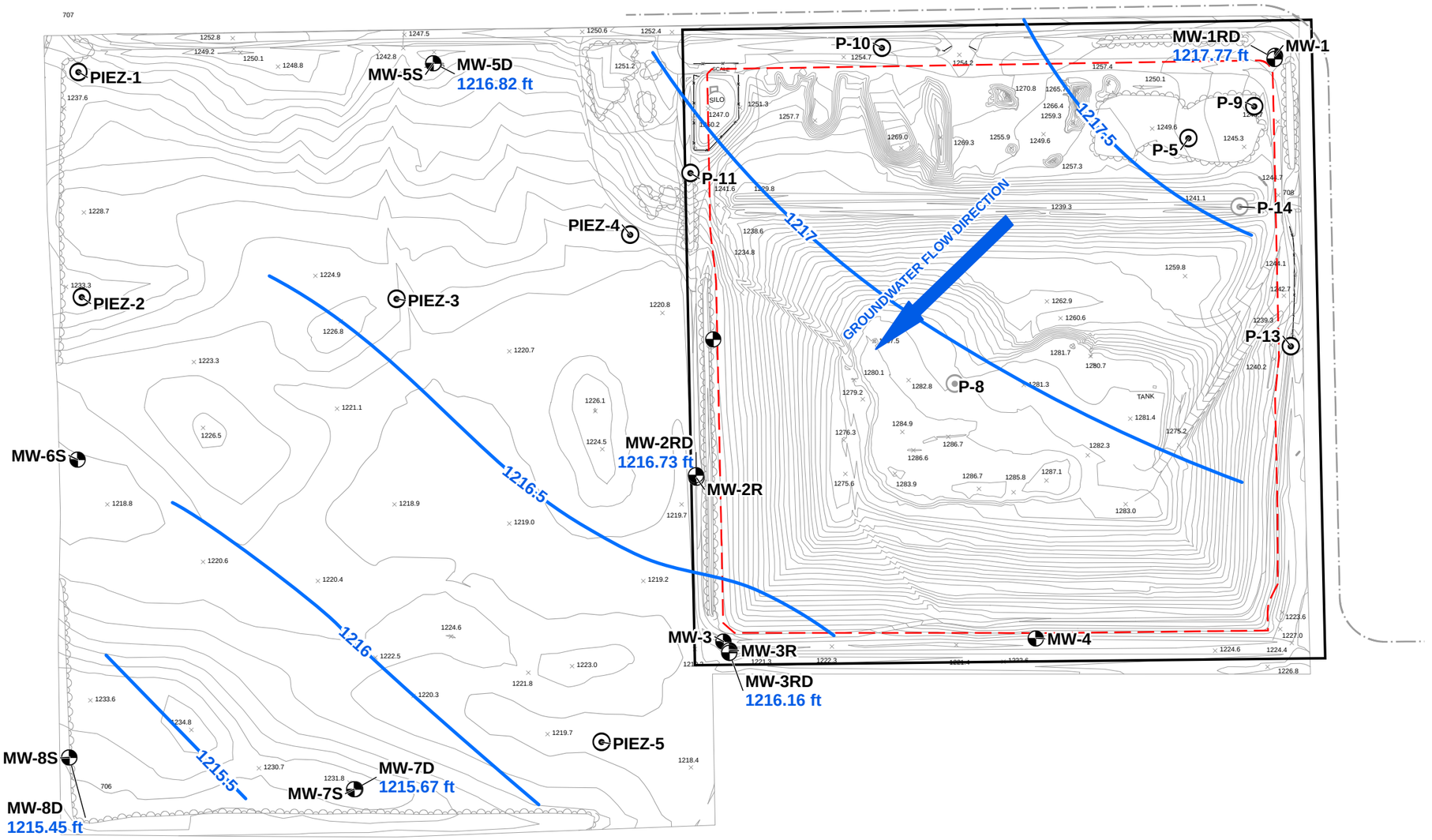

LEGEND

- GROUNDWATER ELEVATION ISOCONTOUR (ft MSL)
- PROPERTY BOUNDARY
- RIGHT OF WAY
- APPROXIMATE LIMITS OF WASTE
- FENCE
- 1216.73 MEASURED GROUNDWATER ELEVATION (ft MSL)
- MONITORING WELL
- PIEZOMETER
- DESTROYED PIEZOMETER

POTENTIOMETRIC SURFACE CONTOUR MAP MARCH 22, 2018

SKB ENVIRONMENTAL
SKB LANSING FACILITY
52563 243RD STREET
AUSTIN, MINNESOTA

Drawn	Date
JTL	6-26-18
Designed	**Figure**
JTL	4
Approved	
DMC	

Scale In Feet (Approximate)
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Groundwater & Environmental Services, Inc.

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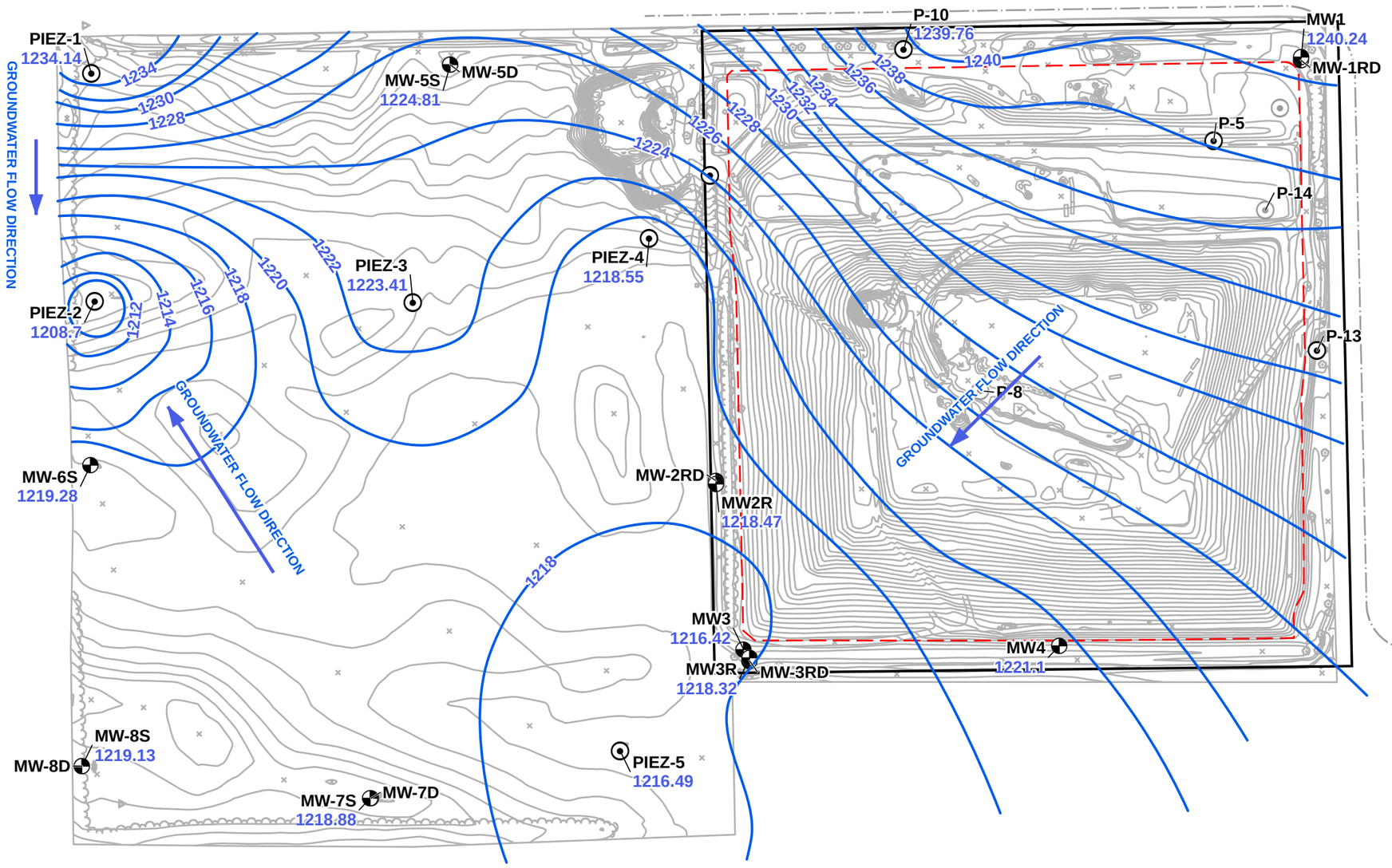

LEGEND

- GROUNDWATER ELEVATION ISOCONTOUR (ft MSL)
- PROPERTY BOUNDARY
- RIGHT OF WAY
- APPROXIMATE LIMITS OF WASTE
- FENCE
- 1216.09 MEASURED GROUNDWATER ELEVATION (ft MSL)
- NM NOT MEASURED
- MONITORING WELL
- PIEZOMETER
- DESTROYED PIEZOMETER

Water Table Contour Map
October 25, 2018

SKB Environmental
SKB Lansing Facility
52563 243 RD Street
Austin, Minnesota

Drawn
AMW
Designed
AMW
Approved
DMC

Date
12/21/18
Figure
5

Scale In Feet (Approximate)
0 250

Groundwater & Environmental Services, Inc.

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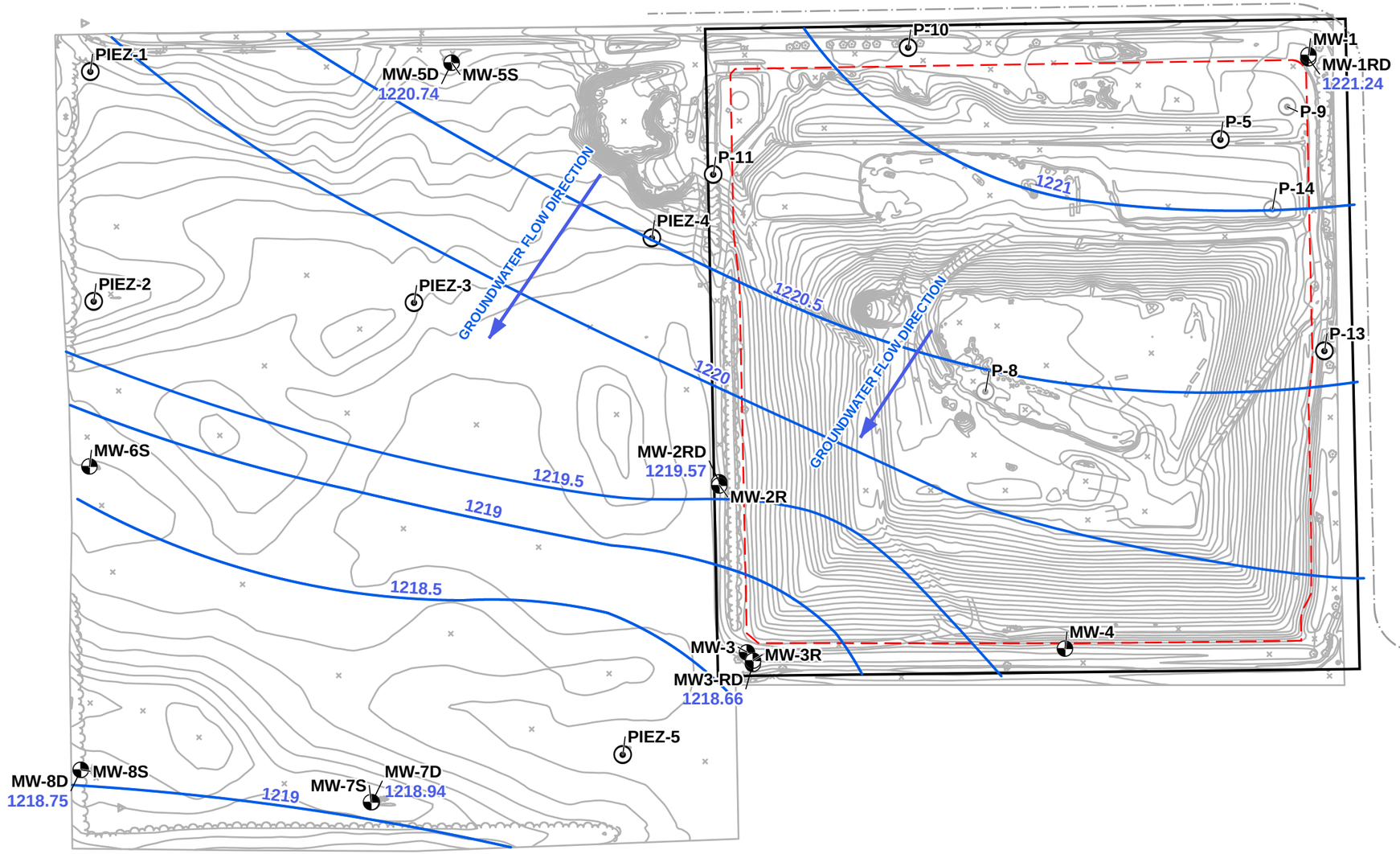

LEGEND

- GROUNDWATER ELEVATION ISOCONTOUR (ft MSL)
- PROPERTY BOUNDARY
- RIGHT OF WAY
- APPROXIMATE LIMITS OF WASTE
- FENCE
- 1216.09 MEASURED GROUNDWATER ELEVATION (ft MSL)
- NM NOT MEASURED
- MONITORING WELL
- PIEZOMETER
- DESTROYED PIEZOMETER

Potentiometric Surface Contour Map
Deep Zone - October 25, 2018

SKB Environmental
SKB Lansing Facility
52563 243 RD Street
Austin, Minnesota

Drawn **AMW**
Designed **AMW**
Approved **DMC**

Date **1/10/19**
Figure **6**

Scale In Feet (Approximate)
0 250

Groundwater & Environmental Services, Inc.

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Tables

CCR 2018 Annual Monitoring Report
SKB Lansing Landfill
52563 243rd Street
Austin, Minnesota

Table 1

Groundwater Elevations

Date	MW-1	MW-1RD	MW-2R	MW-2RD	MW-3	MW-3R	MW-3RD	MW-4
03/22/2018	1239.91	1217.77	1218.56	1216.73	1216.09	1217.59	1216.16	1222.02
10/25/2018	1240.24	1221.24	1218.47	1219.57	1216.42	1218.32	1218.66	1221.10

CCR 2018 Annual Monitoring Report
SKB Lansing Landfill
52563 243rd Street
Austin, Minnesota

Table 2

Well Stabilization Data

Well ID	Sample Date	Purge Rate ml/min	Field pH pH	Field Specific Conductivity umhos/cm	Field Temp deg c
MW-1	3/23/2018	1000	6.98	1472	5.90
MW-1	3/23/2018	1000	6.98	1472	5.90
MW-1	3/23/2018	1000	6.98	1472	5.90
MW-1	3/23/2018	1000	6.98	1472	5.90
MW-1	10/26/2018	1000	7.01	933	10.99
MW-1	10/26/2018	1000	6.84	919	11.84
MW-1	10/26/2018	1000	6.84	933	11.99
MW-1	10/26/2018	1000	6.84	966	12.22
MW-1RD	3/23/2018	1000	7.64	541	8.90
MW-1RD	3/23/2018	1000	7.42	554	8.90
MW-1RD	3/23/2018	1000	7.41	555	9.00
MW-1RD	3/23/2018	1000	7.41	555	9.00
MW-1RD	10/26/2018	1000	7.23	631	9.19
MW-1RD	10/26/2018	1000	7.20	624	9.15
MW-1RD	10/26/2018	1000	7.28	629	9.16
MW-1RD	10/26/2018	1000	7.25	627	9.15
MW-2R	3/23/2018	1000	6.90	1504	6.30
MW-2R	3/23/2018	1000	6.65	1583	6.50
MW-2R	3/23/2018	1000	6.65	1586	6.60
MW-2R	3/23/2018	1000	6.65	1588	6.60
MW-2R	10/26/2018	1000	6.63	1530	13.42
MW-2R	10/26/2018	1000	6.56	1520	13.70
MW-2R	10/26/2018	1000	6.54	1510	13.65
MW-2R	10/26/2018	1000	6.50	1540	13.68
MW-2R	10/26/2018	1000	6.51	1550	13.66
MW-2RD	3/23/2018	1000	7.04	906	10.00
MW-2RD	3/23/2018	1000	7.03	902	10.00
MW-2RD	3/23/2018	1000	7.03	905	10.10
MW-2RD	3/23/2018	1000	7.02	905	10.10
MW-2RD	10/26/2018	1000	7.06	751	10.26
MW-2RD	10/26/2018	1000	6.88	1020	10.22
MW-2RD	10/26/2018	1000	6.88	1020	10.23
MW-2RD	10/26/2018	1000	6.88	1020	10.20
MW-3	3/23/2018	1000	6.74	988	5.30
MW-3	3/23/2018	1000	6.73	986	5.00
MW-3	3/23/2018	1000	6.72	1012	5.20
MW-3	3/23/2018	1000	6.77	1012	5.10
MW-3	10/26/2018	1000	6.69	886	11.72
MW-3	10/26/2018	1000	6.68	1160	12.22
MW-3	10/26/2018	1000	6.63	1190	12.33
MW-3	10/26/2018	1000	6.64	1200	12.23
MW-3R	3/23/2018	1000	6.63	1260	8.70
MW-3R	3/23/2018	1000	6.63	1261	8.70
MW-3R	3/23/2018	1000	6.63	1260	8.70
MW-3R	3/23/2018	1000	6.63	1260	8.70
MW-3R	10/26/2018	1000	6.49	1420	10.04
MW-3R	10/26/2018	1000	6.49	1420	10.02
MW-3R	10/26/2018	1000	6.49	1420	10.04
MW-3R	10/26/2018	1000	6.46	1420	10.02
MW-3RD	3/23/2018	1000	7.05	875	9.30
MW-3RD	3/23/2018	1000	7.05	874	9.30
MW-3RD	3/23/2018	1000	7.05	876	9.30
MW-3RD	3/23/2018	1000	7.05	878	9.30
MW-3RD	3/23/2018	1000	7.05	879	9.30

Table 2

Well Stabilization Data

Well ID	Sample Date	Purge Rate ml/min	Field pH pH	Field Specific Conductivity umhos/cm	Field Temp deg c
MW-3RD	10/26/2018	1000	6.88	984	9.38
MW-3RD	10/26/2018	1000	6.88	985	9.38
MW-3RD	10/26/2018	1000	6.88	985	9.38
MW-3RD	10/26/2018	1000	6.88	984	9.39
MW-4	3/23/2018	1000	7.18	550	3.00
MW-4	3/23/2018	1000	7.18	544	2.60
MW-4	3/23/2018	1000	7.12	602	2.50
MW-4	3/23/2018	1000	7.12	605	2.50
MW-4	10/26/2018	1000	7.15	862	10.87
MW-4	10/26/2018	1000	6.73	1450	11.67
MW-4	10/26/2018	1000	6.71	1510	11.84
MW-4	10/26/2018	1000	6.73	1470	11.89

Table 3

Groundwater Analytical Data

Location	Date	Parameter	Result	Units	CAS #
MW-1	03/23/2018	Boron	< 0.020	mg/l	7440-42-8
MW-1	10/26/2018	Boron	0.073	mg/l	7440-42-8
MW-1	03/23/2018	Calcium	181	mg/l	7440-70-2
MW-1	10/26/2018	Calcium	122	mg/l	7440-70-2
MW-1	03/23/2018	Chloride	305	mg/l	16887-00-6
MW-1	10/26/2018	Chloride	125	mg/l	16887-00-6
MW-1	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-1	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-1	03/23/2018	pH	7.3	pH UNITS	PH
MW-1	10/26/2018	pH	7.1	pH UNITS	PH
MW-1	03/23/2018	Sulfate as SO4	66.2	mg/l	14808-79-8
MW-1	10/26/2018	Sulfate as SO4	48.1	mg/l	14808-79-8
MW-1	03/23/2018	Total Dissolved Solids	820	mg/l	TDS
MW-1	10/26/2018	Total Dissolved Solids	556	mg/l	TDS
MW-1RD	03/23/2018	Boron	< 0.020	mg/l	7440-42-8
MW-1RD	10/26/2018	Boron	< 0.020	mg/l	7440-42-8
MW-1RD	03/23/2018	Calcium	74.6	mg/l	7440-70-2
MW-1RD	10/26/2018	Calcium	78.2	mg/l	7440-70-2
MW-1RD	03/23/2018	Chloride	19.1	mg/l	16887-00-6
MW-1RD	10/26/2018	Chloride	20.6	mg/l	16887-00-6
MW-1RD	03/23/2018	Fluoride	0.22	mg/l	16984-48-8
MW-1RD	10/26/2018	Fluoride	0.30	mg/l	16984-48-8
MW-1RD	03/23/2018	pH	7.6	pH UNITS	PH
MW-1RD	10/26/2018	pH	7.4	pH UNITS	PH
MW-1RD	03/23/2018	Sulfate as SO4	43.9	mg/l	14808-79-8
MW-1RD	10/26/2018	Sulfate as SO4	49.0	mg/l	14808-79-8
MW-1RD	03/23/2018	Total Dissolved Solids	345	mg/l	TDS
MW-1RD	10/26/2018	Total Dissolved Solids	350	mg/l	TDS
MW-2R	03/23/2018	Boron	1.0	mg/l	7440-42-8
MW-2R	10/26/2018	Boron	1.2	mg/l	7440-42-8
MW-2R	03/23/2018	Calcium	240	mg/l	7440-70-2
MW-2R	10/26/2018	Calcium	213	mg/l	7440-70-2
MW-2R	03/23/2018	Chloride	142	mg/l	16887-00-6
MW-2R	10/26/2018	Chloride	80.2	mg/l	16887-00-6
MW-2R	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-2R	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-2R	03/23/2018	pH	6.9	pH UNITS	PH
MW-2R	10/26/2018	pH	6.7	pH UNITS	PH
MW-2R	03/23/2018	Sulfate as SO4	124	mg/l	14808-79-8
MW-2R	10/26/2018	Sulfate as SO4	140	mg/l	14808-79-8
MW-2R	03/23/2018	Total Dissolved Solids	1150	mg/l	TDS
MW-2R	10/26/2018	Total Dissolved Solids	975	mg/l	TDS
MW-2RD	03/23/2018	Boron	0.051	mg/l	7440-42-8
MW-2RD	10/26/2018	Boron	0.059	mg/l	7440-42-8
MW-2RD	03/23/2018	Calcium	131	mg/l	7440-70-2
MW-2RD	10/26/2018	Calcium	137	mg/l	7440-70-2

Table 3

Groundwater Analytical Data

Location	Date	Parameter	Result	Units	CAS #
MW-2RD	03/23/2018	Chloride	35.3	mg/l	16887-00-6
MW-2RD	10/26/2018	Chloride	34.5	mg/l	16887-00-6
MW-2RD	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-2RD	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-2RD	03/23/2018	pH	7.3	pH UNITS	PH
MW-2RD	10/26/2018	pH	7.1	pH UNITS	PH
MW-2RD	03/23/2018	Sulfate as SO4	68.8	mg/l	14808-79-8
MW-2RD	10/26/2018	Sulfate as SO4	86.7	mg/l	14808-79-8
MW-2RD	03/23/2018	Total Dissolved Solids	612	mg/l	TDS
MW-2RD	10/26/2018	Total Dissolved Solids	573	mg/l	TDS
MW-3	03/23/2018	Boron	0.30	mg/l	7440-42-8
MW-3	10/26/2018	Boron	0.50	mg/l	7440-42-8
MW-3	03/23/2018	Calcium	154	mg/l	7440-70-2
MW-3	10/26/2018	Calcium	173	mg/l	7440-70-2
MW-3	03/23/2018	Chloride	48.2	mg/l	16887-00-6
MW-3	10/26/2018	Chloride	27.7	mg/l	16887-00-6
MW-3	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-3	10/26/2018	Fluoride	0.33	mg/l	16984-48-8
MW-3	03/23/2018	pH	7.0	pH UNITS	PH
MW-3	10/26/2018	pH	6.8	pH UNITS	PH
MW-3	03/23/2018	Sulfate as SO4	44.8	mg/l	14808-79-8
MW-3	10/26/2018	Sulfate as SO4	30.8	mg/l	14808-79-8
MW-3	03/23/2018	Total Dissolved Solids	701	mg/l	TDS
MW-3	10/26/2018	Total Dissolved Solids	693	mg/l	TDS
MW-3R	03/23/2018	Boron	0.045	mg/l	7440-42-8
MW-3R	10/26/2018	Boron	0.052	mg/l	7440-42-8
MW-3R	03/23/2018	Calcium	199	mg/l	7440-70-2
MW-3R	10/26/2018	Calcium	214	mg/l	7440-70-2
MW-3R	03/23/2018	Chloride	16.8	mg/l	16887-00-6
MW-3R	10/26/2018	Chloride	19.3	mg/l	16887-00-6
MW-3R	03/23/2018	Fluoride	0.12	mg/l	16984-48-8
MW-3R	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-3R	03/23/2018	pH	6.9	pH UNITS	PH
MW-3R	10/26/2018	pH	6.6	pH UNITS	PH
MW-3R	03/23/2018	Sulfate as SO4	8.4	mg/l	14808-79-8
MW-3R	10/26/2018	Sulfate as SO4	22.9	mg/l	14808-79-8
MW-3R	03/23/2018	Total Dissolved Solids	834	mg/l	TDS
MW-3R	10/26/2018	Total Dissolved Solids	806	mg/l	TDS
MW-3RD	03/23/2018	Boron	0.029	mg/l	7440-42-8
MW-3RD	10/26/2018	Boron	0.031	mg/l	7440-42-8
MW-3RD	03/23/2018	Calcium	124	mg/l	7440-70-2
MW-3RD	10/26/2018	Calcium	128	mg/l	7440-70-2
MW-3RD	03/23/2018	Chloride	29.7	mg/l	16887-00-6
MW-3RD	10/26/2018	Chloride	29.5	mg/l	16887-00-6
MW-3RD	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-3RD	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8

Table 3

Groundwater Analytical Data

Location	Date	Parameter	Result	Units	CAS #
MW-3RD	03/23/2018	pH	7.3	pH UNITS	PH
MW-3RD	10/26/2018	pH	7.1	pH UNITS	PH
MW-3RD	03/23/2018	Sulfate as SO4	97.7	mg/l	14808-79-8
MW-3RD	10/26/2018	Sulfate as SO4	111	mg/l	14808-79-8
MW-3RD	03/23/2018	Total Dissolved Solids	588	mg/l	TDS
MW-3RD	10/26/2018	Total Dissolved Solids	562	mg/l	TDS
MW-4	03/23/2018	Boron	0.12	mg/l	7440-42-8
MW-4	10/26/2018	Boron	0.51	mg/l	7440-42-8
MW-4	03/23/2018	Calcium	80.6	mg/l	7440-70-2
MW-4	10/26/2018	Calcium	221	mg/l	7440-70-2
MW-4	03/23/2018	Chloride	24.5	mg/l	16887-00-6
MW-4	10/26/2018	Chloride	25.4	mg/l	16887-00-6
MW-4	03/23/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-4	10/26/2018	Fluoride	< 0.25	mg/l	16984-48-8
MW-4	03/23/2018	pH	7.3	pH UNITS	PH
MW-4	10/26/2018	pH	6.9	pH UNITS	PH
MW-4	03/23/2018	Sulfate as SO4	78.6	mg/l	14808-79-8
MW-4	10/26/2018	Sulfate as SO4	278	mg/l	14808-79-8
MW-4	03/23/2018	Total Dissolved Solids	420	mg/l	TDS
MW-4	10/26/2018	Total Dissolved Solids	1010	mg/l	TDS

Table 4

2018 Background Threshold Values

Appendix III to Part 257

Parameter	Background Threshold Value (BTV)	Units	CAS #
Boron	0.51	mg/l	7440-42-8
Calcium	333.3	mg/l	7440-70-2
Chloride	307.1	mg/l	16887-00-6
Fluoride	0.26	mg/l	15984-48-8
pH	lower 6.6 higher 7.6	pH UNITS	PH
Sulfate as SO4	481	mg/l	14808-79-8
Total Dissolved Solids	1506	mg/l	TDS

Appendix A – Field Data Sheets

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: S/LB Lansing
Project Number: 3501962
Sampling Device: Bladder Pump
Date: 3/23/18
Well ID: MW-1

Tubing Diameter (ID): 2 inches
Depth to Water: 4.93 ft, TOC
Depth to Bottom of Well: 25.6 ft, TOC
Feet of Water in Well: 20.67 ft
Volume of Water in Well: 3.4 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (Umhos/cm)	Temperature (°C)	Purge Rate (L/min)
1	4.95	6.98	1472	5.9	1
15	4.95	6.98	1472	5.9	1
30	4.95	6.98	1472	5.9	1
45	4.95	6.98	1472	5.9	1

Purge Start Time: 12:20 Purge End Time: 13:10 Total Volume Purged: 10.5 gal

Approximate Purge Rate: 1000 mL/L Purged/Sampled by: [illegible]

Weather Conditions: 41 °F mostly cloudy, 10-15 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350162
Sampling Device: Bladder pump
Date: 3/23/18
Well ID: MW-1R-P

Tubing Diameter (ID): 2 inches
Depth to Water: 27.75 ft, TOC
Depth to Bottom of Well: 75.5 ft, TOC
Feet of Water in Well: 47.75 ft
Volume of Water in Well: 8.3 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (umhos/cm)	Temperature (°F) °C	Purge Rate (L/min)
1	27.77	7.64	541	8.9	1
20	27.77	7.62	554	8.9	1
40	27.77	7.41	555	9.0	1
50	27.77	7.41	555	9.0	1

Purge Start Time: 12:20 Purge End Time: 13:15 Total Volume Purged: 25.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 37°F, mostly cloudy, 10-15 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350|962
Sampling Device: Bladder Pump
Date: 3/23/18
Well ID: MW-2R

Tubing Diameter (ID): 2 inches
Depth to Water: 7.67 ft, TOC
Depth to Bottom of Well: 18.35 ft, TOC
Feet of Water in Well: 10.68 ft
Volume of Water in Well: 1.7 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (µmhos/cm)	Temperature (°F) °C	Purge Rate (L/min)
1	8.52	6.9	1504	6.3	1
5	12.45	6.65	1593	6.5	1
10	14.58	6.65	1586	6.6	1
15	16.27	6.65	1588	6.6	1

Purge Start Time: 11:00 Purge End Time: 11:20 Total Volume Purged: 2.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 38°F, mostly cloudy, 5-10 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350 1962
Sampling Device: Bladder Pump
Date: 3/23/18
Well ID: MW-2RD

Tubing Diameter (ID): 2 inches
Depth to Water: 5.64 ft, TOC
Depth to Bottom of Well: 35 ft, TOC
Feet of Water in Well: 25.36 ft
Volume of Water in Well: 4.1 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (umhos/cm)	Temperature (°F) °C	Purge Rate (L/min)
1	9.66	7.04	906	10.0	1
10	9.66	7.03	907	10.0	1
20	9.66	7.03	905	10.1	1
30	9.66	7.02	905	10.1	1

Purge Start Time: 11:20 Purge End Time: 11:55 Total Volume Purged: 12.8 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: MS

Weather Conditions: 38°F, mostly cloudy, 5-10 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 3501962
Sampling Device: Bladder Pump
Date: 3/23/18
Well ID: MW-3

Tubing Diameter (ID): 2 inches
Depth to Water: ______ ft, TOC
Depth to Bottom of Well: ______ ft, TOC
Feet of Water in Well: ______ ft
Volume of Water in Well: 2.1 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (umho/cm)	Temperature (°F) °C	Purge Rate (L/min)
1	7.08	6.74	988	5.3	1
10	7.08	6.73	986	5.0	1
20	7.08	6.72	1012	5.2	1
30	7.08	6.72	1012	5.1	1

Purge Start Time: 8:40 Purge End Time: 9:15 Total Volume Purged: 6.5 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 30°F, partly cloudy, 5-10 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 3501962
Sampling Device: Bladder Pump
Date: 7/23/18
Well ID: MW-32

Tubing Diameter (ID): 2 inches
Depth to Water: 7.60 ft, TOC
Depth to Bottom of Well: 27.5 ft, TOC
Feet of Water in Well: 19.90 ft
Volume of Water in Well: 3.2 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (µmhos/cm)	Temperature (°F)°C	Purge Rate (L/min)
1	7.62	6.62	1260	8.7	1
10	7.62	6.63	1261	8.7	1
20	7.62	6.63	1260	8.7	1
35	7.62	6.63	1260	8.7	1

Purge Start Time: 9:40 Purge End Time: 9:20 Total Volume Purged: 10.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 30°F, partly sunny, 5-10 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350/462
Sampling Device: Bladder Pump
Date: 3/23/18
Well ID: MW-3RP

Tubing Diameter (ID): 2 inches
Depth to Water: 8.85 ft, TOC
Depth to Bottom of Well: 46.25 ft, TOC
Feet of Water in Well: 37.4 ft
Volume of Water in Well: 6.1 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (umhos/cm)	Temperature (°F) °C	Purge Rate (L/min)
1	8.87	7.05	875	9.3	1
10	8.87	7.05	874	9.3	1
20	8.87	7.05	876	9.3	1
30	8.87	7.05	878	9.9	1
40	8.87	7.05	879	9.3	1

Purge Start Time: 9:30 Purge End Time: 10:15 Total Volume Purged: 18.8 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 34°F, mostly cloudy, 5-10 mph E

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site:	SKB Laundry	Tubing Diameter (ID):	2	inches
Project Number:	350/862	Depth to Water:	3.95	ft, TOC
Sampling Device:	Bladder Pump	Depth to Bottom of Well:	18.3	ft, TOC
Date:	3/23/18	Feet of Water in Well:	14.35	ft
Well ID:	MW-4	Volume of Water in Well:	2.3	gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (uS/cm)	Temperature (°C)	Purge Rate (L/min)
1	3.97	7.18	550	3.0	1
5	3.97	7.18	544	2.6	1
10	3.97	7.12	602	2.5	1
15	3.97	7.12	605	2.5	1

Purge Start Time: 7:40 Purge End Time: 8:00 Total Volume Purged: 7.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: NS

Weather Conditions: 30°F, mostly sunny, 5-10 mph E

Comments:

Groundwater & Environmental Services, INC.
FIELD WORK REQUEST FORM

Project No.: 3501972/43/206 (GW) Date Prepared: October 16, 2018

Site: SKB Environmental
52563 243rd St
Austin, MN 55912

Site Contact: Chad (SKB) 612-366-6939 Available Time – 12 hrs
Field Representative: MS (Initial)
Field Work Coordinator: Brian Deering

Tasks:

Field

1. Gauge and sample wells concurrently. Gauging ahead of time is not required as they will all be gauged and sampled in 1 day. Sample in the following Order:
   a. MW-1
   b. MW-1RD
   c. MW-2R
   d. MW-2RD
   e. MW-3
   f. MW-3R
   g. MW-3RD (Collect Duplicate Here)
   h. MW-4

2. Collect all monitoring well samples in the order on the attached sheet
   a. Collect "Duplicate A" from MW 3RD
3. All COC's must be QA'd by a project manager prior to submitting to a laboratory. Ensure all lab-ware is tightly sealed and properly labeled and that the COC matches the containers for each sample location. You can do this by sending a photo of the completed chain to me in email

Ensure all field specific data sheets are filled out in full. Use the previous monitoring event sheets as reference if you have questions on volumes, purge times, etc. These should be used as reference only and are not a steadfast rule for purging etc.

Office

1. scan all field notes into project folders
2. S&R form
3. upload pictures from camera

Date Completed: 10/26/18

Technician: MS (Initial)

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 3501472
Sampling Device: Bladder Pump
Date: 10/26/18
Well ID: MW-1

Tubing Diameter (ID): 2 inches
Depth to Water: 4.60 ft, TOC
Depth to Bottom of Well: 25.6 ft, TOC
Feet of Water in Well: 21.0 ft
Volume of Water in Well: 3.4 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (u Mhos)	Temperature (°F) °C	Purge Rate (L/min)
1	4.60	7.01	938	10.99	1
10	4.61	6.94	919	11.64	1
20	4.62	6.94	933	11.99	1
30	4.62	6.96	966	12.22	1

Purge Start Time: 7:30 Purge End Time: 9:30 Total Volume Purged: 105 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: N.J

Weather Conditions: 38°F, cloudy, Calm mph

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 35019.72
Sampling Device: Bladder Pump
Date: 10/26/18
Well ID: MW-1RD

Tubing Diameter (ID): 2 inches
Depth to Water: 24.29 ft, TOC
Depth to Bottom of Well: 75.5 ft, TOC
Feet of Water in Well: 51.22 ft
Volume of Water in Well: 8.35 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (µ / mos)	Temperature (°K) °C	Purge Rate (L/min)
0	24.28	7.23	631	9.19	1
10	24.29	7.26	624	9.15	1
20	24.30	7.28	629	9.16	1
30	24.30	7.25	627	9.15	1

Purge Start Time: 14:45 Purge End Time: 8:15 Total Volume Purged: 25.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: N. Schlegel

Weather Conditions: 39°F, cloudy, 10 mi/hr mph

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350 1972
Sampling Device: Bladder Pump
Date: 10/20/18
Well ID: MW-22

Tubing Diameter (ID): 2 inches
Depth to Water: 7.76 ft, TOC
Depth to Bottom of Well: 18.35 ft, TOC
Feet of Water in Well: 10.59 ft
Volume of Water in Well: 1.73 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (u mho)	Temperature (°F) °C	Purge Rate (L/min)
1	7.76	6.63	1,530	13.42	1
2	10.12	6.56	1,520	13.70	1
5	13.50	6.54	1,510	13.65	1
7	16.87	6.50	1,540	13.68	1
10	15.76	6.51	1,550	13.66	

Purge Start Time: 9:30 Purge End Time: 9:46 Total Volume Purged: 2.0 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: M. Seibold

Weather Conditions: 41°F, mostly cloud, 0-5 mph S

Comments: slow recharge

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 3501972
Sampling Device: Bladder Pump
Date: 10/26/18
Well ID: MW-22D

Tubing Diameter (ID): 2 inches
Depth to Water: 6.80 ft, TOC
Depth to Bottom of Well: 35 ft, TOC
Feet of Water in Well: 28.2 ft
Volume of Water in Well: 4.6 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (u /mhos)	Temperature (°F) °C	Purge Rate (L/min)
1	6.80	7.06	751	10.26	1
5	6.81	6.88	1,020	10.22	1
10	6.82	6.98	1,020	10.23	1
15	6.82	6.98	1,020	10.23	1

Purge Start Time: 9:30 Purge End Time: 9:45 Total Volume Purged: 14.0 gal

Approximate Purge Rate: 1L/min. Purged/Sampled by: M. Schlagel

Weather Conditions: 46°F, cloudy, S 5 – 10 mph.

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 35019.72
Sampling Device: Bladder Pump
Date: 10/26/18
Well ID: MW-2

Tubing Diameter (ID): 2 inches
Depth to Water: 6.73 ft, TOC
Depth to Bottom of Well: 19.7 ft, TOC
Feet of Water in Well: 12.99 ft
Volume of Water in Well: 2.11 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (µ mhos)	Temperature (°F) °C	Purge Rate (L/min)
1	6.73	6.69	886	11.72	1
10	6.75	6.68	1,160	12.22	1
20	6.75	6.63	1,190	12.23	1
30	6.75	6.64	1,206	12.23	1

Purge Start Time: 10:40 Purge End Time: 11:10 Total Volume Purged: 6.5 gal
Approximate Purge Rate: 1 L/min. Purged/Sampled by: M. Schlegel
Weather Conditions: 46°F, cloudy, 5 mph
Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site: SKB Lansing
Project Number: 350197.2
Sampling Device: Bladder Pump
Date: 10/26/18
Well ID: MW-3R

Tubing Diameter (ID): 2 inches
Depth to Water: 6.89' ft, TOC
Depth to Bottom of Well: 27.5 ft, TOC
Feet of Water in Well: 20.61 ft
Volume of Water in Well: 3.36 gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (µ mhos)	Temperature (°F) °C	Purge Rate (L/min)
1	6.87	6.49	1,420	10.04	1
5	6.85	6.49	1,420	10.02	1
10	6.89	6.49	1,420	10.04	1
15	6.89	6.46	1,420	10.02	1

Purge Start Time: 10:46 Purge End Time: 10:55 Total Volume Purged: 10.0 gal

Approximate Purge Rate: 1 L/min

Purged/Sampled by: M. Schaefer/

Weather Conditions: 46°F, cloudy, 5 – 10 mph S

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site:	SKB Lansing	Tubing Diameter (ID):	2	inches
Project Number:	350197Z	Depth to Water:	6.35	ft, TOC
Sampling Device:	Bladder Pump	Depth to Bottom of Well:	46.25	ft, TOC
Date:	10/26/18	Feet of Water in Well:	39.90	ft
Well ID:	MW-3RD	Volume of Water in Well:	6.50	gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (u /Lhos)	Temperature (°F) °C	Purge Rate (L/min)
1	6.35	6.93	984	9.38	1
10	6.36	6.98	985	9.38	1
20	6.37	6.99	985	9.38	1
30	6.37	6.99	984	9.39	1

Purge Start Time: 10:40 Purge End Time: 11:15 Total Volume Purged: 200 gal

Approximate Purge Rate: 1 L/min Purged/Sampled by: N. Santagal

Weather Conditions: 46 °F, cloudy, SS-10 mph

Comments:

WELL PURGING RECORD
LOW-FLOW SAMPLING METHOD

Site:	SKB Lansing	Tubing Diameter (ID):	2	inches
Project Number:	350197.2	Depth to Water:	4.87	ft, TOC
Sampling Device:	Bladder Pump	Depth to Bottom of Well:	18.3	ft, TOC
Date:	10/26/18	Feet of Water in Well:	13.43	ft
Well ID:	MW-4	Volume of Water in Well:	2.19	gal

Elapsed Time (min)	Depth to Water (ft, TOC)	pH (s.u.)	Specific Conductance (u l/mhos)	Temperature (°F) °C	Purge Rate (L/min)
1	4.87	7.15	9.62	10.37	1
10	4.89	6.73	1,450	11.67	1
20	4.89	6.71	1,510	11.84	1
30	4.89	6.73	1,476	11.89	1

Purge Start Time: 12:56 Purge End Time: 13:20 Total Volume Purged: 6.75 gal

Approximate Purge Rate: 1 L/min. Purged/Sampled by: N. Sandgel

Weather Conditions: 46°F, cloudy, 5 – 10 mph

Comments:

Appendix B – Laboratory Analytical Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-133099-1
Client Project/Site: SKB Lansing - CCR Groundwater
Sampling Event: CCR Groundwater

For:
Waste Connections, Inc.
13425 Courthouse Blvd
Rosemount, Minnesota 55068

Attn: Nathaniel Beinemann

Katelyn Ferguson

Authorized for release by:
4/12/2018 11:15:41 AM
Katelyn Ferguson, Project Management Assistant I
katelyn.ferguson@testamericainc.com

Designee for

Ryan VanDette, Project Manager II
(716)504-9830
ryan.vandette@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

Table of Contents

Definitions/Glossary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Qualifiers

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
H	Sample was prepped or analyzed beyond the specified holding time
F1	MS and/or MSD Recovery is outside acceptance limits.
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-133099-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-133099-1

Comments
No additional comments.

Receipt
The samples were received on 3/24/2018 9:45 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.8º C and 3.0º C.

HPLC/IC
Method(s) 300.0: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-2R (480-133099-2), MW-3RD (480-133099-5), MW-1 (480-133099-7) and DUP-1 (480-133099-9). Elevated reporting limits (RLs) are provided.

Method(s) 300.0: The following samples were diluted due to the nature of the sample matrix based on historical results: MW-2RD (480-133099-3) and MW-4 (480-133099-6). Elevated reporting limits (RLs) are provided.

Method(s) 300.0: The following sample was reported with elevated reporting limits for all analytes: MW-1RD (480-133099-1) and MW-3 (480-133099-8). The sample was analyzed at a dilution based on screening results.

Method(s) 300.0: Due to the high concentration of Chloride, the matrix spike (MS) for analytical batch 480-405985 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
Method(s) 6010D: The Total Boron and Calcium results reported for the following samples do not concur with results previously reported for this site: MW-2R (480-133099-2) and MW-4 (480-133099-6). Reanalysis was performed, and the result(s) confirmed.

Method(s) 6010D: The Total Calcium results reported for the following sample do not concur with results previously reported for this site: MW-1 (480-133099-7). Reanalysis was performed, and the result(s) confirmed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method(s) SM 4500 H+ B: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples has been qualified with the "HF" flag to indicate analysis was performed in the laboratory outside the 15 minute timeframe: MW-1RD (480-133099-1), MW-2R (480-133099-2), MW-2RD (480-133099-3), MW-3R (480-133099-4), MW-3RD (480-133099-5), MW-4 (480-133099-6), MW-1 (480-133099-7), MW-3 (480-133099-8), DUP-1 (480-133099-9), FIELD BLANK (480-133099-10) and EQUIPMENT BLANK (480-133099-11).

Method(s) SM 2540C: The results reported for the following sample do not concur with results previously reported for this site: MW-4 (480-133099-6) and MW-1 (480-133099-7). Reanalysis was performed, and the result(s) confirmed.

Method(s) SM 2540C: Reanalysis of the following samples were performed outside of the analytical holding time due to reanalysis to confirm previous result. : MW-3RD (480-133099-5), MW-4 (480-133099-6), DUP-1 (480-133099-9) and FIELD BLANK (480-133099-10). Both sets of data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-1RD — Lab Sample ID: 480-133099-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	74.6		0.50		mg/L	1		6010D	Total/NA
Chloride	19.1		1.0		mg/L	2		300.0	Total/NA
Fluoride	0.22		0.10		mg/L	2		300.0	Total/NA
Sulfate	43.9		4.0		mg/L	2		300.0	Total/NA
Total Dissolved Solids	345		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	7.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.3	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-2R — Lab Sample ID: 480-133099-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	1.0		0.020		mg/L	1		6010D	Total/NA
Calcium	240		0.50		mg/L	1		6010D	Total/NA
Chloride	142		2.5		mg/L	5		300.0	Total/NA
Sulfate	124		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	1150		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.2	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-2RD — Lab Sample ID: 480-133099-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.051		0.020		mg/L	1		6010D	Total/NA
Calcium	131		0.50		mg/L	1		6010D	Total/NA
Chloride	35.3		2.5		mg/L	5		300.0	Total/NA
Sulfate	68.8		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	612		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	17.8	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3R — Lab Sample ID: 480-133099-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.045		0.020		mg/L	1		6010D	Total/NA
Calcium	199		0.50		mg/L	1		6010D	Total/NA
Chloride	16.8		0.50		mg/L	1		300.0	Total/NA
Fluoride	0.12		0.050		mg/L	1		300.0	Total/NA
Sulfate	8.4		2.0		mg/L	1		300.0	Total/NA
Total Dissolved Solids	834		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	17.6	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3RD — Lab Sample ID: 480-133099-5

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-3RD (Continued) — Lab Sample ID: 480-133099-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.029		0.020		mg/L	1		6010D	Total/NA
Calcium	124		0.50		mg/L	1		6010D	Total/NA
Chloride	29.7		2.5		mg/L	5		300.0	Total/NA
Sulfate	97.7		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	450		10.0		mg/L	1		SM 2540C	Total/NA
Total Dissolved Solids	588	H	10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	17.6	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-4 — Lab Sample ID: 480-133099-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.12		0.020		mg/L	1		6010D	Total/NA
Calcium	80.6		0.50		mg/L	1		6010D	Total/NA
Chloride	24.5		2.5		mg/L	5		300.0	Total/NA
Sulfate	78.6		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	615		10.0		mg/L	1		SM 2540C	Total/NA
Total Dissolved Solids	420	H	10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.8	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-1 — Lab Sample ID: 480-133099-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	181		0.50		mg/L	1		6010D	Total/NA
Chloride	305	F1	2.5		mg/L	5		300.0	Total/NA
Sulfate	66.2		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	820		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.6	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3 — Lab Sample ID: 480-133099-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.30		0.020		mg/L	1		6010D	Total/NA
Calcium	154		0.50		mg/L	1		6010D	Total/NA
Chloride	48.2		2.5		mg/L	5		300.0	Total/NA
Sulfate	44.8		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	701		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.0	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.1	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: DUP-1 — Lab Sample ID: 480-133099-9

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: DUP-1 (Continued) — Lab Sample ID: 480-133099-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.029		0.020		mg/L	1		6010D	Total/NA
Calcium	127		0.50		mg/L	1		6010D	Total/NA
Chloride	29.9		2.5		mg/L	5		300.0	Total/NA
Sulfate	108		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	20.0		10.0		mg/L	1		SM 2540C	Total/NA
Total Dissolved Solids	616	H	10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.3	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.0	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FIELD BLANK — Lab Sample ID: 480-133099-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Dissolved Solids	593		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	6.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.0	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: EQUIPMENT BLANK — Lab Sample ID: 480-133099-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	21.4		0.50		mg/L	1		300.0	Total/NA
Fluoride	0.72		0.050		mg/L	1		300.0	Total/NA
Sulfate	19.2		2.0		mg/L	1		300.0	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	8.2	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	18.3	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-1RD
Date Collected: 03/23/18 13:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-1
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		03/26/18 08:32	03/28/18 21:01	1
Calcium	**74.6**		0.50		mg/L		03/26/18 08:32	03/28/18 21:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.1**		1.0		mg/L			03/27/18 21:04	2
Fluoride	**0.22**		0.10		mg/L			03/27/18 21:04	2
Sulfate	**43.9**		4.0		mg/L			03/27/18 21:04	2
Total Dissolved Solids	**345**		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.6**	**HF**	0.1		SU			03/26/18 13:26	1
Temperature	**18.3**	**HF**	0.001		Degrees C			03/26/18 13:26	1

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-2R
Date Collected: 03/23/18 11:20
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-2
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.0		0.020		mg/L		03/26/18 08:32	03/28/18 21:31	1
Calcium	240		0.50		mg/L		03/26/18 08:32	03/28/18 21:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	142		2.5		mg/L			03/27/18 21:12	5
Fluoride	ND		0.25		mg/L			03/27/18 21:12	5
Sulfate	124		10.0		mg/L			03/27/18 21:12	5
Total Dissolved Solids	1150		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1		SU			03/26/18 13:29	1
Temperature	18.2	HF	0.001		Degrees C			03/26/18 13:29	1

Client Sample ID: MW-2RD

Date Collected: 03/23/18 11:55
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-3

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.051		0.020		mg/L		03/26/18 08:32	03/28/18 21:35	1
Calcium	131		0.50		mg/L		03/26/18 08:32	03/28/18 21:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	35.3		2.5		mg/L			03/27/18 21:20	5
Fluoride	ND		0.25		mg/L			03/27/18 21:20	5
Sulfate	68.8		10.0		mg/L			03/27/18 21:20	5
Total Dissolved Solids	612		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			03/26/18 13:32	1
Temperature	17.8	HF	0.001		Degrees C			03/26/18 13:32	1

Client Sample ID: MW-3R

Date Collected: 03/23/18 09:20
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-4

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.045		0.020		mg/L		03/26/18 08:32	03/28/18 21:39	1
Calcium	199		0.50		mg/L		03/26/18 08:32	03/28/18 21:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16.8		0.50		mg/L			03/29/18 11:25	1
Fluoride	0.12		0.050		mg/L			03/29/18 11:25	1
Sulfate	8.4		2.0		mg/L			03/29/18 11:25	1
Total Dissolved Solids	834		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1		SU			03/26/18 13:34	1
Temperature	17.6	HF	0.001		Degrees C			03/26/18 13:34	1

Client Sample ID: MW-3RD

Date Collected: 03/23/18 10:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-5

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**0.029**		0.020		mg/L		03/26/18 08:32	03/28/18 21:43	1
Calcium	**124**		0.50		mg/L		03/26/18 08:32	03/28/18 21:43	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**29.7**		2.5		mg/L			03/27/18 21:36	5
Fluoride	ND		0.25		mg/L			03/27/18 21:36	5
Sulfate	**97.7**		10.0		mg/L			03/27/18 21:36	5
Total Dissolved Solids	**450**		10.0		mg/L			03/27/18 22:27	1
Total Dissolved Solids	**588**	**H**	10.0		mg/L			04/02/18 23:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.3**	**HF**	0.1		SU			03/26/18 13:37	1
Temperature	**17.6**	**HF**	0.001		Degrees C			03/26/18 13:37	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-4
Date Collected: 03/23/18 08:00
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-6
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.12		0.020		mg/L		03/26/18 08:32	03/28/18 21:47	1
Calcium	80.6		0.50		mg/L		03/26/18 08:32	03/28/18 21:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	24.5		2.5		mg/L			03/27/18 21:44	5
Fluoride	ND		0.25		mg/L			03/27/18 21:44	5
Sulfate	78.6		10.0		mg/L			03/27/18 21:44	5
Total Dissolved Solids	615		10.0		mg/L			03/27/18 22:27	1
Total Dissolved Solids	420	H	10.0		mg/L			04/02/18 23:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			03/26/18 13:46	1
Temperature	18.8	HF	0.001		Degrees C			03/26/18 13:46	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-1
Date Collected: 03/23/18 13:10
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-7
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		03/26/18 08:32	03/28/18 21:50	1
Calcium	**181**		0.50		mg/L		03/26/18 08:32	03/28/18 21:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**305**	**F1**	2.5		mg/L			03/27/18 21:52	5
Fluoride	ND		0.25		mg/L			03/27/18 21:52	5
Sulfate	**66.2**		10.0		mg/L			03/27/18 21:52	5
Total Dissolved Solids	**820**		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.3**	**HF**	0.1		SU			03/26/18 13:49	1
Temperature	**18.6**	**HF**	0.001		Degrees C			03/26/18 13:49	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-3
Date Collected: 03/23/18 09:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-8
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.30		0.020		mg/L		03/26/18 08:32	03/28/18 21:54	1
Calcium	154		0.50		mg/L		03/26/18 08:32	03/28/18 21:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	48.2		2.5		mg/L			03/28/18 18:30	5
Fluoride	ND		0.25		mg/L			03/28/18 18:30	5
Sulfate	44.8		10.0		mg/L			03/28/18 18:30	5
Total Dissolved Solids	701		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.0	HF	0.1		SU			03/26/18 13:52	1
Temperature	18.1	HF	0.001		Degrees C			03/26/18 13:52	1

Client Sample ID: DUP-1

Date Collected: 03/23/18 00:00
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-9

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.029		0.020		mg/L		03/26/18 08:32	03/28/18 22:10	1
Calcium	127		0.50		mg/L		03/26/18 08:32	03/28/18 22:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	29.9		2.5		mg/L			03/28/18 18:45	5
Fluoride	ND		0.25		mg/L			03/28/18 18:45	5
Sulfate	108		10.0		mg/L			03/28/18 18:45	5
Total Dissolved Solids	20.0		10.0		mg/L			03/27/18 22:27	1
Total Dissolved Solids	616	H	10.0		mg/L			04/02/18 23:08	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3	HF	0.1		SU			03/26/18 13:54	1
Temperature	18.0	HF	0.001		Degrees C			03/26/18 13:54	1

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: FIELD BLANK
Date Collected: 03/23/18 13:30
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-10
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		03/26/18 08:32	03/28/18 22:14	1
Calcium	ND		0.50		mg/L		03/26/18 08:32	03/28/18 22:14	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			03/28/18 19:00	1
Fluoride	ND		0.050		mg/L			03/28/18 19:00	1
Sulfate	ND		2.0		mg/L			03/28/18 19:00	1
Total Dissolved Solids	**593**		10.0		mg/L			03/27/18 22:27	1
Total Dissolved Solids	ND	H	10.0		mg/L			04/09/18 06:57	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.2**	**HF**	0.1		SU			03/26/18 13:57	1
Temperature	**18.0**	**HF**	0.001		Degrees C			03/26/18 13:57	1

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: EQUIPMENT BLANK
Date Collected: 03/23/18 13:35
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-11
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		03/26/18 08:32	03/28/18 22:17	1
Calcium	ND		0.50		mg/L		03/26/18 08:32	03/28/18 22:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**21.4**		0.50		mg/L			03/28/18 22:09	1
Fluoride	**0.72**		0.050		mg/L			03/28/18 22:09	1
Sulfate	**19.2**		2.0		mg/L			03/28/18 22:09	1
Total Dissolved Solids	ND		10.0		mg/L			03/27/18 22:27	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**8.2**	**HF**	0.1		SU			03/26/18 14:00	1
Temperature	**18.3**	**HF**	0.001		Degrees C			03/26/18 14:00	1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 480-405634/1-A
Matrix: Water
Analysis Batch: 406338

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 405634

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		03/26/18 08:32	03/28/18 20:53	1
Calcium	ND		0.50		mg/L		03/26/18 08:32	03/28/18 20:53	1

Lab Sample ID: LCS 480-405634/2-A
Matrix: Water
Analysis Batch: 406338

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 405634

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	0.200	0.193		mg/L		97	80 - 120
Calcium	10.0	9.56		mg/L		96	80 - 120

Lab Sample ID: 480-133099-1 MS
Matrix: Water
Analysis Batch: 406338

Client Sample ID: MW-1RD
Prep Type: Total/NA
Prep Batch: 405634

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Boron	ND		0.200	0.203		mg/L		96	75 - 125
Calcium	74.6		10.0	82.16	4	mg/L		75	75 - 125

Lab Sample ID: 480-133099-1 MSD
Matrix: Water
Analysis Batch: 406338

Client Sample ID: MW-1RD
Prep Type: Total/NA
Prep Batch: 405634

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Boron	ND		0.200	0.209		mg/L		99	75 - 125	3	20
Calcium	74.6		10.0	85.15	4	mg/L		105	75 - 125	4	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 480-405985/29
Matrix: Water
Analysis Batch: 405985

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			03/27/18 19:18	1
Fluoride	ND		0.050		mg/L			03/27/18 19:18	1
Sulfate	ND		2.0		mg/L			03/27/18 19:18	1

Lab Sample ID: LCS 480-405985/28
Matrix: Water
Analysis Batch: 405985

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.76		mg/L		104	90 - 110
Fluoride	5.00	5.18		mg/L		104	90 - 110
Sulfate	50.0	46.57		mg/L		93	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 480-133099-7 MS
Matrix: Water
Analysis Batch: 405985

Client Sample ID: MW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	305	F1	250	612.9	E F1	mg/L		123	81 - 120
Fluoride	ND		25.0	28.47		mg/L		114	82 - 120
Sulfate	66.2		250	323.0		mg/L		103	80 - 120

Lab Sample ID: MB 480-406125/29
Matrix: Water
Analysis Batch: 406125

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			03/28/18 17:32	1
Fluoride	ND		0.050		mg/L			03/28/18 17:32	1
Sulfate	ND		2.0		mg/L			03/28/18 17:32	1

Lab Sample ID: LCS 480-406125/28
Matrix: Water
Analysis Batch: 406125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	49.63		mg/L		99	90 - 110
Fluoride	5.00	5.03		mg/L		101	90 - 110
Sulfate	50.0	50.18		mg/L		100	90 - 110

Lab Sample ID: 480-133099-10 MS
Matrix: Water
Analysis Batch: 406125

Client Sample ID: FIELD BLANK
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	ND		50.0	50.82		mg/L		102	81 - 120
Fluoride	ND		5.00	5.19		mg/L		104	82 - 120
Sulfate	ND		50.0	51.55		mg/L		103	80 - 120

Lab Sample ID: 480-133099-10 MSD
Matrix: Water
Analysis Batch: 406125

Client Sample ID: FIELD BLANK
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	ND		50.0	51.32		mg/L		103	81 - 120	1	20
Fluoride	ND		5.00	5.21		mg/L		104	82 - 120	0	20
Sulfate	ND		50.0	52.26		mg/L		105	80 - 120	1	20

Lab Sample ID: 480-133099-11 MS
Matrix: Water
Analysis Batch: 406125

Client Sample ID: EQUIPMENT BLANK
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	21.4		50.0	71.78		mg/L		101	81 - 120
Fluoride	0.72		5.00	5.76		mg/L		101	82 - 120
Sulfate	19.2		50.0	70.06		mg/L		102	80 - 120

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 480-406256/5
Matrix: Water
Analysis Batch: 406256

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			03/29/18 10:44	1
Fluoride	ND		0.050		mg/L			03/29/18 10:44	1
Sulfate	ND		2.0		mg/L			03/29/18 10:44	1

Lab Sample ID: LCS 480-406256/4
Matrix: Water
Analysis Batch: 406256

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	52.32		mg/L		105	90 - 110
Fluoride	5.00	5.35		mg/L		107	90 - 110
Sulfate	50.0	47.31		mg/L		95	90 - 110

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 480-406026/1
Matrix: Water
Analysis Batch: 406026

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0		mg/L			03/27/18 22:27	1

Lab Sample ID: LCS 480-406026/2
Matrix: Water
Analysis Batch: 406026

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	506	508.0		mg/L		100	85 - 115

Lab Sample ID: 480-133099-11 DU
Matrix: Water
Analysis Batch: 406026

Client Sample ID: EQUIPMENT BLANK
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Dissolved Solids	ND		ND		mg/L		NC	10

Lab Sample ID: MB 480-406873/1
Matrix: Water
Analysis Batch: 406873

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0		mg/L			04/02/18 23:08	1

Lab Sample ID: LCS 480-406873/2
Matrix: Water
Analysis Batch: 406873

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	506	511.0		mg/L		101	85 - 115

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 480-133099-9 DU
Matrix: Water
Analysis Batch: 406873

Client Sample ID: DUP-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	616	H		597.0		mg/L				3	10

Lab Sample ID: MB 480-407734/1
Matrix: Water
Analysis Batch: 407734

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0		mg/L			04/09/18 06:57	1

Lab Sample ID: LCS 480-407734/2
Matrix: Water
Analysis Batch: 407734

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			506	533.0		mg/L		105	85 - 115		

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 480-405771/1
Matrix: Water
Analysis Batch: 405771

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH			7.00	7.0		SU		100	99 - 101		

Lab Sample ID: LCS 480-405771/23
Matrix: Water
Analysis Batch: 405771

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH			7.00	7.0		SU		100	99 - 101		

Lab Sample ID: 480-133099-5 DU
Matrix: Water
Analysis Batch: 405771

Client Sample ID: MW-3RD
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	7.3	HF		7.3		SU				0.4	5
Temperature	17.6	HF		17.9		Degrees C				2	10

Metals

Prep Batch: 405634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-1	MW-1RD	Total/NA	Water	3005A	
480-133099-2	MW-2R	Total/NA	Water	3005A	
480-133099-3	MW-2RD	Total/NA	Water	3005A	
480-133099-4	MW-3R	Total/NA	Water	3005A	
480-133099-5	MW-3RD	Total/NA	Water	3005A	
480-133099-6	MW-4	Total/NA	Water	3005A	
480-133099-7	MW-1	Total/NA	Water	3005A	
480-133099-8	MW-3	Total/NA	Water	3005A	
480-133099-9	DUP-1	Total/NA	Water	3005A	
480-133099-10	FIELD BLANK	Total/NA	Water	3005A	
480-133099-11	EQUIPMENT BLANK	Total/NA	Water	3005A	
MB 480-405634/1-A	Method Blank	Total/NA	Water	3005A	
LCS 480-405634/2-A	Lab Control Sample	Total/NA	Water	3005A	
480-133099-1 MS	MW-1RD	Total/NA	Water	3005A	
480-133099-1 MSD	MW-1RD	Total/NA	Water	3005A	

Analysis Batch: 406338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-1	MW-1RD	Total/NA	Water	6010D	405634
480-133099-2	MW-2R	Total/NA	Water	6010D	405634
480-133099-3	MW-2RD	Total/NA	Water	6010D	405634
480-133099-4	MW-3R	Total/NA	Water	6010D	405634
480-133099-5	MW-3RD	Total/NA	Water	6010D	405634
480-133099-6	MW-4	Total/NA	Water	6010D	405634
480-133099-7	MW-1	Total/NA	Water	6010D	405634
480-133099-8	MW-3	Total/NA	Water	6010D	405634
480-133099-9	DUP-1	Total/NA	Water	6010D	405634
480-133099-10	FIELD BLANK	Total/NA	Water	6010D	405634
480-133099-11	EQUIPMENT BLANK	Total/NA	Water	6010D	405634
MB 480-405634/1-A	Method Blank	Total/NA	Water	6010D	405634
LCS 480-405634/2-A	Lab Control Sample	Total/NA	Water	6010D	405634
480-133099-1 MS	MW-1RD	Total/NA	Water	6010D	405634
480-133099-1 MSD	MW-1RD	Total/NA	Water	6010D	405634

General Chemistry

Analysis Batch: 405771

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-1	MW-1RD	Total/NA	Water	SM 4500 H+ B	
480-133099-2	MW-2R	Total/NA	Water	SM 4500 H+ B	
480-133099-3	MW-2RD	Total/NA	Water	SM 4500 H+ B	
480-133099-4	MW-3R	Total/NA	Water	SM 4500 H+ B	
480-133099-5	MW-3RD	Total/NA	Water	SM 4500 H+ B	
480-133099-6	MW-4	Total/NA	Water	SM 4500 H+ B	
480-133099-7	MW-1	Total/NA	Water	SM 4500 H+ B	
480-133099-8	MW-3	Total/NA	Water	SM 4500 H+ B	
480-133099-9	DUP-1	Total/NA	Water	SM 4500 H+ B	
480-133099-10	FIELD BLANK	Total/NA	Water	SM 4500 H+ B	
480-133099-11	EQUIPMENT BLANK	Total/NA	Water	SM 4500 H+ B	
LCS 480-405771/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	

General Chemistry (Continued)

Analysis Batch: 405771 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 480-405771/23	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
480-133099-5 DU	MW-3RD	Total/NA	Water	SM 4500 H+ B	

Analysis Batch: 405985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-1	MW-1RD	Total/NA	Water	300.0	
480-133099-2	MW-2R	Total/NA	Water	300.0	
480-133099-3	MW-2RD	Total/NA	Water	300.0	
480-133099-5	MW-3RD	Total/NA	Water	300.0	
480-133099-6	MW-4	Total/NA	Water	300.0	
480-133099-7	MW-1	Total/NA	Water	300.0	
MB 480-405985/29	Method Blank	Total/NA	Water	300.0	
LCS 480-405985/28	Lab Control Sample	Total/NA	Water	300.0	
480-133099-7 MS	MW-1	Total/NA	Water	300.0	

Analysis Batch: 406026

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-1	MW-1RD	Total/NA	Water	SM 2540C	
480-133099-2	MW-2R	Total/NA	Water	SM 2540C	
480-133099-3	MW-2RD	Total/NA	Water	SM 2540C	
480-133099-4	MW-3R	Total/NA	Water	SM 2540C	
480-133099-5	MW-3RD	Total/NA	Water	SM 2540C	
480-133099-6	MW-4	Total/NA	Water	SM 2540C	
480-133099-7	MW-1	Total/NA	Water	SM 2540C	
480-133099-8	MW-3	Total/NA	Water	SM 2540C	
480-133099-9	DUP-1	Total/NA	Water	SM 2540C	
480-133099-10	FIELD BLANK	Total/NA	Water	SM 2540C	
480-133099-11	EQUIPMENT BLANK	Total/NA	Water	SM 2540C	
MB 480-406026/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 480-406026/2	Lab Control Sample	Total/NA	Water	SM 2540C	
480-133099-11 DU	EQUIPMENT BLANK	Total/NA	Water	SM 2540C	

Analysis Batch: 406125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-8	MW-3	Total/NA	Water	300.0	
480-133099-9	DUP-1	Total/NA	Water	300.0	
480-133099-10	FIELD BLANK	Total/NA	Water	300.0	
480-133099-11	EQUIPMENT BLANK	Total/NA	Water	300.0	
MB 480-406125/29	Method Blank	Total/NA	Water	300.0	
LCS 480-406125/28	Lab Control Sample	Total/NA	Water	300.0	
480-133099-10 MS	FIELD BLANK	Total/NA	Water	300.0	
480-133099-10 MSD	FIELD BLANK	Total/NA	Water	300.0	
480-133099-11 MS	EQUIPMENT BLANK	Total/NA	Water	300.0	

Analysis Batch: 406256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-4	MW-3R	Total/NA	Water	300.0	
MB 480-406256/5	Method Blank	Total/NA	Water	300.0	
LCS 480-406256/4	Lab Control Sample	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 406873

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-5	MW-3RD	Total/NA	Water	SM 2540C	
480-133099-6	MW-4	Total/NA	Water	SM 2540C	
480-133099-9	DUP-1	Total/NA	Water	SM 2540C	
MB 480-406873/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 480-406873/2	Lab Control Sample	Total/NA	Water	SM 2540C	
480-133099-9 DU	DUP-1	Total/NA	Water	SM 2540C	

Analysis Batch: 407734

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-133099-10	FIELD BLANK	Total/NA	Water	SM 2540C	
MB 480-407734/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 480-407734/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-1RD
Date Collected: 03/23/18 13:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:01	LMH	TAL BUF
Total/NA	Analysis	300.0		2	405985	03/27/18 21:04	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:26	DSC	TAL BUF

Client Sample ID: MW-2R
Date Collected: 03/23/18 11:20
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:31	LMH	TAL BUF
Total/NA	Analysis	300.0		5	405985	03/27/18 21:12	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:29	DSC	TAL BUF

Client Sample ID: MW-2RD
Date Collected: 03/23/18 11:55
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:35	LMH	TAL BUF
Total/NA	Analysis	300.0		5	405985	03/27/18 21:20	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:32	DSC	TAL BUF

Client Sample ID: MW-3R
Date Collected: 03/23/18 09:20
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:39	LMH	TAL BUF
Total/NA	Analysis	300.0		1	406256	03/29/18 11:25	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:34	DSC	TAL BUF

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: MW-3RD

Date Collected: 03/23/18 10:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:43	LMH	TAL BUF
Total/NA	Analysis	300.0		5	405985	03/27/18 21:36	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 2540C		1	406873	04/02/18 23:08	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:37	DSC	TAL BUF

Client Sample ID: MW-4

Date Collected: 03/23/18 08:00
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:47	LMH	TAL BUF
Total/NA	Analysis	300.0		5	405985	03/27/18 21:44	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 2540C		1	406873	04/02/18 23:08	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:46	DSC	TAL BUF

Client Sample ID: MW-1

Date Collected: 03/23/18 13:10
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:50	LMH	TAL BUF
Total/NA	Analysis	300.0		5	405985	03/27/18 21:52	RJS	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:49	DSC	TAL BUF

Client Sample ID: MW-3

Date Collected: 03/23/18 09:15
Date Received: 03/24/18 09:45

Lab Sample ID: 480-133099-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 21:54	LMH	TAL BUF
Total/NA	Analysis	300.0		5	406125	03/28/18 18:30	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:52	DSC	TAL BUF

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Client Sample ID: DUP-1

Lab Sample ID: 480-133099-9

Date Collected: 03/23/18 00:00
Matrix: Water
Date Received: 03/24/18 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 22:10	LMH	TAL BUF
Total/NA	Analysis	300.0		5	406125	03/28/18 18:45	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 2540C		1	406873	04/02/18 23:08	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:54	DSC	TAL BUF

Client Sample ID: FIELD BLANK

Lab Sample ID: 480-133099-10

Date Collected: 03/23/18 13:30
Matrix: Water
Date Received: 03/24/18 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 22:14	LMH	TAL BUF
Total/NA	Analysis	300.0		1	406125	03/28/18 19:00	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 2540C		1	407734	04/09/18 06:57	BEV	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 13:57	DSC	TAL BUF

Client Sample ID: EQUIPMENT BLANK

Lab Sample ID: 480-133099-11

Date Collected: 03/23/18 13:35
Matrix: Water
Date Received: 03/24/18 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			405634	03/26/18 08:32	JAK	TAL BUF
Total/NA	Analysis	6010D		1	406338	03/28/18 22:17	LMH	TAL BUF
Total/NA	Analysis	300.0		1	406125	03/28/18 22:09	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	406026	03/27/18 22:27	CDC	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	405771	03/26/18 14:00	DSC	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Minnesota	NELAP	5	036-999-337	12-31-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
SM 4500 H+ B		Water	pH
SM 4500 H+ B		Water	Temperature

Method Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	TAL BUF
300.0	Anions, Ion Chromatography	MCAWW	TAL BUF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL BUF
SM 4500 H+ B	pH	SM	TAL BUF

Protocol 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.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-133099-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-133099-1	MW-1RD	Water	03/23/18 13:15	03/24/18 09:45
480-133099-2	MW-2R	Water	03/23/18 11:20	03/24/18 09:45
480-133099-3	MW-2RD	Water	03/23/18 11:55	03/24/18 09:45
480-133099-4	MW-3R	Water	03/23/18 09:20	03/24/18 09:45
480-133099-5	MW-3RD	Water	03/23/18 10:15	03/24/18 09:45
480-133099-6	MW-4	Water	03/23/18 08:00	03/24/18 09:45
480-133099-7	MW-1	Water	03/23/18 13:10	03/24/18 09:45
480-133099-8	MW-3	Water	03/23/18 09:15	03/24/18 09:45
480-133099-9	DUP-1	Water	03/23/18 00:00	03/24/18 09:45
480-133099-10	FIELD BLANK	Water	03/23/18 13:30	03/24/18 09:45
480-133099-11	EQUIPMENT BLANK	Water	03/23/18 13:35	03/24/18 09:45

TestAmerica Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

TestA
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Regulatory Program: ☐DW ☐NPDES ☐RCRA ☐Other:

TestAmerica 480-133099 COC

Client Contact	Project Manager: Ryan Van Dette	Site Contact: Nathaniel Beineman	Date: 3/23/18	COC No:
SKB Environmental	Tel/Fax:	Lab Contact:	Carrier:	1 of 1 COCs
13425 Courthouse Blvd	Analysis Turnaround Time			Sampler:
Rosemount, MN 55068	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(651) 438-1500 Phone	TAT if different from Below _____			Walk-in Client:
(651) 438-1518 FAX	☑ 2 weeks			Lab Sampling:
Project Name: Lansing 2018 Q2 CCR GW	☐ 1 week			Job / SDG No.:
Site:	☐ 2 days			
PO# 3064-18-00095	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals (totals)* + Mercury	Chloride	Fluoride	Sulfate	TDS	pH	Radium 226 & 228 combined	Boron & Calcium (6010C)	Sample Specific Notes:
MW-1RD	3/23/18	13:15	Grab	Water	4	N		X	X	X	X	X	X	X	X	
MW-2R		11:20	Grab	Water	1			X	X	X	X	X	X	X		
MW-2RD		11:55	Grab	Water	1			X	X	X	X	X	X	X		
MW-3R		9:20	Grab	Water	1			X	X	X	X	X	X	X		
MW-3RD		10:15	Grab	Water	1			X	X	X	X	X	X	X		
MW-4	—	9:00	Grab	Water	1			X	X	X	X	X	X	X		
MW-1		13:10	Grab	Water	1			X	X	X	X	X	X	X		
MW-3		9:15	Grab	Water	1			X	X	X	X	X	X	X		
Duplicate - 1		—	Grab	Water	1			X	X	X	X	X	X	X		
Field Blank		13:30	Grab	Water	1			X	X	X	X	X	X	X		
Equipment Blank		13:35	Grab	water	1				X	X	X	X	X		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

***Metals - Boron, Calcium, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Lithium, Molybdenum, Selenium, Thallium**

pH 2.8, 3.0

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: 6	Corr'd: _____	Therm ID No.: _____
Relinquished by:	Company: GES	Date/Time: 3/23/18 17:00	Received by:	Company: TAB	Date/Time: 3/24/18 0945
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.9, dated 2/2/2016

4/12/2018

Login Sample Receipt Checklist

Client: Waste Connections, Inc.

Job Number: 480-133099-1
SDG Number:

Login Number: 133099
List Number: 1
Creator: Wallace, Cameron

List Source: TestAmerica Buffalo

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	
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.	N/A	
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	GES
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-144289-1
Client Project/Site: SKB Lansing - CCR Groundwater
Sampling Event: CCR Groundwater

For:
Waste Connections, Inc.
13425 Courthouse Blvd
Rosemount, Minnesota 55068

Attn: Nathaniel Beinemann

Authorized for release by:
11/14/2018 2:35:38 PM
Anthony Strollo, Project Management Assistant I
anthony.strollo@testamericainc.com

Designee for

Ryan VanDette, Project Manager II
(716)504-9830
ryan.vandette@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Definitions/Glossary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 480-144289-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-144289-1

Comments
No additional comments.

Receipt
The samples were received on 10/27/2018 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5º C.

HPLC/IC
Method(s) 300.0: The following sample was reported with elevated reporting limits for all analytes: MW-1RD (480-144289-1). The sample was analyzed at a dilution based on screening results.

Method(s) 300.0: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-2R (480-144289-2), MW-2RD (480-144289-3), MW-3RD (480-144289-5), MW-4 (480-144289-6), MW-1 (480-144289-7) and DUPLICATE (480-144289-9). Elevated reporting limits (RLs) are provided.

Method(s) 300.0: The following samples were diluted due to the nature of the sample matrix: MW-3R (480-144289-4) and MW-3 (480-144289-8). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method(s) 9040C, SM 4500 H+ B: This analysis is normally performed in the field and has a method-defined holding time of 15 minutes. The following samples has been qualified with the "HF" flag to indicate analysis was performed in the laboratory outside the 15 minute timeframe: MW-1RD (480-144289-1), MW-2R (480-144289-2), MW-2RD (480-144289-3), MW-3R (480-144289-4), MW-3RD (480-144289-5), MW-4 (480-144289-6), MW-1 (480-144289-7), MW-3 (480-144289-8), DUPLICATE (480-144289-9), FIELD BLANK (480-144289-10) and EQUIPMENT (480-144289-11).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-1RD — Lab Sample ID: 480-144289-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	78.2		0.50		mg/L	1		6010D	Total/NA
Chloride	20.6		2.5		mg/L	5		300.0	Total/NA
Fluoride	0.30		0.25		mg/L	5		300.0	Total/NA
Sulfate	49.0		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	350		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	7.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-2R — Lab Sample ID: 480-144289-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	1.2		0.020		mg/L	1		6010D	Total/NA
Calcium	213		0.50		mg/L	1		6010D	Total/NA
Chloride	80.2		2.5		mg/L	5		300.0	Total/NA
Sulfate	140		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	975		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	6.7	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-2RD — Lab Sample ID: 480-144289-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.059		0.020		mg/L	1		6010D	Total/NA
Calcium	137		0.50		mg/L	1		6010D	Total/NA
Chloride	34.5		2.5		mg/L	5		300.0	Total/NA
Sulfate	86.7		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	573		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.7	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3R — Lab Sample ID: 480-144289-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.052		0.020		mg/L	1		6010D	Total/NA
Calcium	214		0.50		mg/L	1		6010D	Total/NA
Chloride	19.3		2.5		mg/L	5		300.0	Total/NA
Sulfate	22.9		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	806		10.0		mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	6.6	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3RD — Lab Sample ID: 480-144289-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.031		0.020		mg/L	1		6010D	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-3RD (Continued) — Lab Sample ID: 480-144289-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	128		0.50		mg/L	1		6010D	Total/NA
Chloride	29.5		2.5		mg/L	5		300.0	Total/NA
Sulfate	111		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	562		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-4 — Lab Sample ID: 480-144289-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.51		0.020		mg/L	1		6010D	Total/NA
Calcium	221		0.50		mg/L	1		6010D	Total/NA
Chloride	25.4		2.5		mg/L	5		300.0	Total/NA
Sulfate	278		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	1010		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	6.9	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-1 — Lab Sample ID: 480-144289-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	122		0.50		mg/L	1		6010D	Total/NA
Boron	0.073		0.020		mg/L	1		6010D	Total/NA
Chloride	125		2.5		mg/L	5		300.0	Total/NA
Sulfate	48.1		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	556		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.6	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: MW-3 — Lab Sample ID: 480-144289-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	173		0.50		mg/L	1		6010D	Total/NA
Boron	0.50		0.020		mg/L	1		6010D	Total/NA
Chloride	27.7		2.5		mg/L	5		300.0	Total/NA
Fluoride	0.33		0.25		mg/L	5		300.0	Total/NA
Sulfate	30.8		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	693		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	6.8	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: DUPLICATE — Lab Sample ID: 480-144289-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	132		0.50		mg/L	1		6010D	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: DUPLICATE (Continued) — Lab Sample ID: 480-144289-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Boron	0.033		0.020		mg/L	1		6010D	Total/NA
Chloride	29.7		2.5		mg/L	5		300.0	Total/NA
Sulfate	111		10.0		mg/L	5		300.0	Total/NA
Total Dissolved Solids	552		10.0		mg/L	1		SM 2540C	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	7.1	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.5	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: FIELD BLANK — Lab Sample ID: 480-144289-10

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	6.0	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.4	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

Client Sample ID: EQUIPMENT — Lab Sample ID: 480-144289-11

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
pH	6.4	HF	0.1		SU	1		SM 4500 H+ B	Total/NA
Temperature	20.6	HF	0.001		Degrees C	1		SM 4500 H+ B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-1RD
Date Collected: 10/26/18 08:15
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-1
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	ND		0.020		mg/L		11/02/18 09:15	11/03/18 19:49	1
Calcium	**78.2**		0.50		mg/L		11/02/18 09:15	11/03/18 19:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**20.6**		2.5		mg/L			11/10/18 10:38	5
Fluoride	**0.30**		0.25		mg/L			11/10/18 10:38	5
Sulfate	**49.0**		10.0		mg/L			11/10/18 10:38	5
Total Dissolved Solids	**350**		10.0		mg/L			11/01/18 20:04	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.4**	**HF**	0.1		SU			11/01/18 09:15	1
Temperature	**20.5**	**HF**	0.001		Degrees C			11/01/18 09:15	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-2R
Date Collected: 10/26/18 09:40
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-2
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	1.2		0.020		mg/L		11/02/18 09:15	11/03/18 19:52	1
Calcium	213		0.50		mg/L		11/02/18 09:15	11/03/18 19:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	80.2		2.5		mg/L			11/10/18 18:22	5
Fluoride	ND		0.25		mg/L			11/10/18 18:22	5
Sulfate	140		10.0		mg/L			11/10/18 18:22	5
Total Dissolved Solids	975		10.0		mg/L			11/01/18 20:04	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.7	HF	0.1		SU			11/01/18 08:54	1
Temperature	20.4	HF	0.001		Degrees C			11/01/18 08:54	1

Client Sample ID: MW-2RD

Date Collected: 10/26/18 09:45
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-3

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**0.059**		0.020		mg/L		11/02/18 09:15	11/03/18 19:56	1
Calcium	**137**		0.50		mg/L		11/02/18 09:15	11/03/18 19:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**34.5**		2.5		mg/L			11/10/18 18:36	5
Fluoride	ND		0.25		mg/L			11/10/18 18:36	5
Sulfate	**86.7**		10.0		mg/L			11/10/18 18:36	5
Total Dissolved Solids	**573**		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.1**	**HF**	0.1		SU			11/01/18 09:18	1
Temperature	**20.7**	**HF**	0.001		Degrees C			11/01/18 09:18	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-3R
Date Collected: 10/26/18 10:55
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-4
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.052		0.020		mg/L		11/02/18 09:15	11/03/18 20:00	1
Calcium	214		0.50		mg/L		11/02/18 09:15	11/03/18 20:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	19.3		2.5		mg/L			11/10/18 18:51	5
Fluoride	ND		0.25		mg/L			11/10/18 18:51	5
Sulfate	22.9		10.0		mg/L			11/10/18 18:51	5
Total Dissolved Solids	806		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.6	HF	0.1		SU			11/01/18 08:52	1
Temperature	20.4	HF	0.001		Degrees C			11/01/18 08:52	1

Client Sample ID: MW-3RD

Date Collected: 10/26/18 11:15
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-5

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	**0.031**		0.020		mg/L		11/02/18 09:15	11/03/18 20:03	1
Calcium	**128**		0.50		mg/L		11/02/18 09:15	11/03/18 20:03	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**29.5**		2.5		mg/L			11/10/18 19:06	5
Fluoride	ND		0.25		mg/L			11/10/18 19:06	5
Sulfate	**111**		10.0		mg/L			11/10/18 19:06	5
Total Dissolved Solids	**562**		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.1**	**HF**	0.1		SU			11/01/18 08:49	1
Temperature	**20.5**	**HF**	0.001		Degrees C			11/01/18 08:49	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-4
Date Collected: 10/26/18 13:20
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-6
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Boron	0.51		0.020		mg/L		11/02/18 09:15	11/03/18 20:07	1
Calcium	221		0.50		mg/L		11/02/18 09:15	11/03/18 20:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	25.4		2.5		mg/L			11/10/18 19:20	5
Fluoride	ND		0.25		mg/L			11/10/18 19:20	5
Sulfate	278		10.0		mg/L			11/10/18 19:20	5
Total Dissolved Solids	1010		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.9	HF	0.1		SU			11/01/18 09:31	1
Temperature	20.5	HF	0.001		Degrees C			11/01/18 09:31	1

Client Sample ID: MW-1

Date Collected: 10/26/18 08:00
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-7

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	122		0.50		mg/L		11/02/18 09:15	11/03/18 20:21	1
Boron	0.073		0.020		mg/L		11/02/18 09:15	11/03/18 20:21	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	125		2.5		mg/L			11/10/18 19:35	5
Fluoride	ND		0.25		mg/L			11/10/18 19:35	5
Sulfate	48.1		10.0		mg/L			11/10/18 19:35	5
Total Dissolved Solids	556		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1	HF	0.1		SU			11/01/18 09:20	1
Temperature	20.6	HF	0.001		Degrees C			11/01/18 09:20	1

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-3
Date Collected: 10/26/18 11:10
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-8
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	173		0.50		mg/L		11/02/18 09:15	11/03/18 20:25	1
Boron	0.50		0.020		mg/L		11/02/18 09:15	11/03/18 20:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	27.7		2.5		mg/L			11/10/18 19:49	5
Fluoride	0.33		0.25		mg/L			11/10/18 19:49	5
Sulfate	30.8		10.0		mg/L			11/10/18 19:49	5
Total Dissolved Solids	693		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.8	HF	0.1		SU			11/01/18 08:44	1
Temperature	20.4	HF	0.001		Degrees C			11/01/18 08:44	1

Client Sample ID: DUPLICATE

Date Collected: 10/26/18 00:00
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-9

Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	**132**		0.50		mg/L		11/02/18 09:15	11/03/18 20:28	1
Boron	**0.033**		0.020		mg/L		11/02/18 09:15	11/03/18 20:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**29.7**		2.5		mg/L			11/10/18 20:04	5
Fluoride	ND		0.25		mg/L			11/10/18 20:04	5
Sulfate	**111**		10.0		mg/L			11/10/18 20:04	5
Total Dissolved Solids	**552**		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**7.1**	**HF**	0.1		SU			11/01/18 09:23	1
Temperature	**20.5**	**HF**	0.001		Degrees C			11/01/18 09:23	1

Client Sample ID: FIELD BLANK

Date Collected: 10/26/18 13:30
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-10
Matrix: Water

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		11/02/18 09:15	11/03/18 20:32	1
Boron	ND		0.020		mg/L		11/02/18 09:15	11/03/18 20:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			11/10/18 21:31	1
Fluoride	ND		0.050		mg/L			11/10/18 21:31	1
Sulfate	ND		2.0		mg/L			11/10/18 21:31	1
Total Dissolved Solids	ND		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.0**	**HF**	0.1		SU			11/01/18 09:07	1
Temperature	**20.4**	**HF**	0.001		Degrees C			11/01/18 09:07	1

Client Sample Results

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: EQUIPMENT

Lab Sample ID: 480-144289-11

Date Collected: 10/26/18 13:35

Matrix: Water

Date Received: 10/27/18 09:00

Method: 6010D - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		11/02/18 09:15	11/03/18 20:35	1
Boron	ND		0.020		mg/L		11/02/18 09:15	11/03/18 20:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			11/10/18 21:46	1
Fluoride	ND		0.050		mg/L			11/10/18 21:46	1
Sulfate	ND		2.0		mg/L			11/10/18 21:46	1
Total Dissolved Solids	ND		10.0		mg/L			11/02/18 09:14	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
pH	**6.4**	**HF**	0.1		SU			11/01/18 09:47	1
Temperature	**20.6**	**HF**	0.001		Degrees C			11/01/18 09:47	1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 480-443075/1-A
Matrix: Water
Analysis Batch: 443594

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 443075

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		0.50		mg/L		11/02/18 09:15	11/03/18 18:59	1
Boron	ND		0.020		mg/L		11/02/18 09:15	11/03/18 18:59	1

Lab Sample ID: LCS 480-443075/2-A
Matrix: Water
Analysis Batch: 443594

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 443075

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	10.0	10.42		mg/L		104	80 - 120
Boron	0.200	0.213		mg/L		106	80 - 120

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 480-444663/28
Matrix: Water
Analysis Batch: 444663

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			11/10/18 06:01	1
Fluoride	ND		0.050		mg/L			11/10/18 06:01	1
Sulfate	ND		2.0		mg/L			11/10/18 06:01	1

Lab Sample ID: LCS 480-444663/27
Matrix: Water
Analysis Batch: 444663

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	49.63		mg/L		99	90 - 110
Fluoride	5.00	4.83		mg/L		97	90 - 110
Sulfate	50.0	48.16		mg/L		96	90 - 110

Lab Sample ID: 480-144289-1 MS
Matrix: Water
Analysis Batch: 444663

Client Sample ID: MW-1RD
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.6		250	290.1		mg/L		108	81 - 120
Fluoride	0.30		25.0	25.53		mg/L		101	82 - 120
Sulfate	49.0		250	297.6		mg/L		99	80 - 120

Lab Sample ID: MB 480-444669/28
Matrix: Water
Analysis Batch: 444669

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			11/10/18 21:17	1
Fluoride	ND		0.050		mg/L			11/10/18 21:17	1
Sulfate	ND		2.0		mg/L			11/10/18 21:17	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 480-444669/4
Matrix: Water
Analysis Batch: 444669

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50		mg/L			11/10/18 15:27	1
Fluoride	ND		0.050		mg/L			11/10/18 15:27	1
Sulfate	ND		2.0		mg/L			11/10/18 15:27	1

Lab Sample ID: LCS 480-444669/27
Matrix: Water
Analysis Batch: 444669

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	51.68		mg/L		103	90 - 110
Fluoride	5.00	4.89		mg/L		98	90 - 110
Sulfate	50.0	51.30		mg/L		103	90 - 110

Lab Sample ID: LCS 480-444669/3
Matrix: Water
Analysis Batch: 444669

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	50.0	49.41		mg/L		99	90 - 110
Fluoride	5.00	4.88		mg/L		98	90 - 110
Sulfate	50.0	51.97		mg/L		104	90 - 110

Lab Sample ID: 480-144289-9 MS
Matrix: Water
Analysis Batch: 444669

Client Sample ID: DUPLICATE
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	29.7		250	307.1		mg/L		111	81 - 120
Fluoride	ND		25.0	26.06		mg/L		104	82 - 120
Sulfate	111		250	385.0		mg/L		110	80 - 120

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 480-443157/1
Matrix: Water
Analysis Batch: 443157

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0		mg/L			11/01/18 20:04	1

Lab Sample ID: LCS 480-443157/2
Matrix: Water
Analysis Batch: 443157

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Dissolved Solids	500	492.0		mg/L		98	85 - 115

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: MB 480-443265/1
Matrix: Water
Analysis Batch: 443265

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	ND		10.0		mg/L			11/02/18 09:14	1

Lab Sample ID: LCS 480-443265/2
Matrix: Water
Analysis Batch: 443265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Dissolved Solids			500	500.0		mg/L		100	85 - 115		

Lab Sample ID: 480-144289-11 DU
Matrix: Water
Analysis Batch: 443265

Client Sample ID: EQUIPMENT
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Dissolved Solids	ND			ND		mg/L				NC	10

Method: SM 4500 H+ B - pH

Lab Sample ID: LCS 480-443033/1
Matrix: Water
Analysis Batch: 443033

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH			7.00	7.0		SU		100	99 - 101		

Lab Sample ID: LCS 480-443033/23
Matrix: Water
Analysis Batch: 443033

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
pH			7.00	7.0		SU		100	99 - 101		

Lab Sample ID: 480-144289-8 DU
Matrix: Water
Analysis Batch: 443033

Client Sample ID: MW-3
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
pH	6.8	HF		6.8		SU				0.1	5
Temperature	20.4	HF		20.4		Degrees C				0.05	10

Metals

Prep Batch: 443075

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-1	MW-1RD	Total/NA	Water	3005A	
480-144289-2	MW-2R	Total/NA	Water	3005A	
480-144289-3	MW-2RD	Total/NA	Water	3005A	
480-144289-4	MW-3R	Total/NA	Water	3005A	
480-144289-5	MW-3RD	Total/NA	Water	3005A	
480-144289-6	MW-4	Total/NA	Water	3005A	
480-144289-7	MW-1	Total/NA	Water	3005A	
480-144289-8	MW-3	Total/NA	Water	3005A	
480-144289-9	DUPLICATE	Total/NA	Water	3005A	
480-144289-10	FIELD BLANK	Total/NA	Water	3005A	
480-144289-11	EQUIPMENT	Total/NA	Water	3005A	
MB 480-443075/1-A	Method Blank	Total/NA	Water	3005A	
LCS 480-443075/2-A	Lab Control Sample	Total/NA	Water	3005A	

Analysis Batch: 443594

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-1	MW-1RD	Total/NA	Water	6010D	443075
480-144289-2	MW-2R	Total/NA	Water	6010D	443075
480-144289-3	MW-2RD	Total/NA	Water	6010D	443075
480-144289-4	MW-3R	Total/NA	Water	6010D	443075
480-144289-5	MW-3RD	Total/NA	Water	6010D	443075
480-144289-6	MW-4	Total/NA	Water	6010D	443075
480-144289-7	MW-1	Total/NA	Water	6010D	443075
480-144289-8	MW-3	Total/NA	Water	6010D	443075
480-144289-9	DUPLICATE	Total/NA	Water	6010D	443075
480-144289-10	FIELD BLANK	Total/NA	Water	6010D	443075
480-144289-11	EQUIPMENT	Total/NA	Water	6010D	443075
MB 480-443075/1-A	Method Blank	Total/NA	Water	6010D	443075
LCS 480-443075/2-A	Lab Control Sample	Total/NA	Water	6010D	443075

General Chemistry

Analysis Batch: 443033

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-1	MW-1RD	Total/NA	Water	SM 4500 H+ B	
480-144289-2	MW-2R	Total/NA	Water	SM 4500 H+ B	
480-144289-3	MW-2RD	Total/NA	Water	SM 4500 H+ B	
480-144289-4	MW-3R	Total/NA	Water	SM 4500 H+ B	
480-144289-5	MW-3RD	Total/NA	Water	SM 4500 H+ B	
480-144289-6	MW-4	Total/NA	Water	SM 4500 H+ B	
480-144289-7	MW-1	Total/NA	Water	SM 4500 H+ B	
480-144289-8	MW-3	Total/NA	Water	SM 4500 H+ B	
480-144289-9	DUPLICATE	Total/NA	Water	SM 4500 H+ B	
480-144289-10	FIELD BLANK	Total/NA	Water	SM 4500 H+ B	
480-144289-11	EQUIPMENT	Total/NA	Water	SM 4500 H+ B	
LCS 480-443033/1	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
LCS 480-443033/23	Lab Control Sample	Total/NA	Water	SM 4500 H+ B	
480-144289-8 DU	MW-3	Total/NA	Water	SM 4500 H+ B	

General Chemistry (Continued)

Analysis Batch: 443157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-1	MW-1RD	Total/NA	Water	SM 2540C	
480-144289-2	MW-2R	Total/NA	Water	SM 2540C	
MB 480-443157/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 480-443157/2	Lab Control Sample	Total/NA	Water	SM 2540C	

Analysis Batch: 443265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-3	MW-2RD	Total/NA	Water	SM 2540C	
480-144289-4	MW-3R	Total/NA	Water	SM 2540C	
480-144289-5	MW-3RD	Total/NA	Water	SM 2540C	
480-144289-6	MW-4	Total/NA	Water	SM 2540C	
480-144289-7	MW-1	Total/NA	Water	SM 2540C	
480-144289-8	MW-3	Total/NA	Water	SM 2540C	
480-144289-9	DUPLICATE	Total/NA	Water	SM 2540C	
480-144289-10	FIELD BLANK	Total/NA	Water	SM 2540C	
480-144289-11	EQUIPMENT	Total/NA	Water	SM 2540C	
MB 480-443265/1	Method Blank	Total/NA	Water	SM 2540C	
LCS 480-443265/2	Lab Control Sample	Total/NA	Water	SM 2540C	
480-144289-11 DU	EQUIPMENT	Total/NA	Water	SM 2540C	

Analysis Batch: 444663

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-1	MW-1RD	Total/NA	Water	300.0	
MB 480-444663/28	Method Blank	Total/NA	Water	300.0	
LCS 480-444663/27	Lab Control Sample	Total/NA	Water	300.0	
480-144289-1 MS	MW-1RD	Total/NA	Water	300.0	

Analysis Batch: 444669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-144289-2	MW-2R	Total/NA	Water	300.0	
480-144289-3	MW-2RD	Total/NA	Water	300.0	
480-144289-4	MW-3R	Total/NA	Water	300.0	
480-144289-5	MW-3RD	Total/NA	Water	300.0	
480-144289-6	MW-4	Total/NA	Water	300.0	
480-144289-7	MW-1	Total/NA	Water	300.0	
480-144289-8	MW-3	Total/NA	Water	300.0	
480-144289-9	DUPLICATE	Total/NA	Water	300.0	
480-144289-10	FIELD BLANK	Total/NA	Water	300.0	
480-144289-11	EQUIPMENT	Total/NA	Water	300.0	
MB 480-444669/28	Method Blank	Total/NA	Water	300.0	
MB 480-444669/4	Method Blank	Total/NA	Water	300.0	
LCS 480-444669/27	Lab Control Sample	Total/NA	Water	300.0	
LCS 480-444669/3	Lab Control Sample	Total/NA	Water	300.0	
480-144289-9 MS	DUPLICATE	Total/NA	Water	300.0	

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-1RD

Lab Sample ID: 480-144289-1

Date Collected: 10/26/18 08:15

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 19:49	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444663	11/10/18 10:38	CLA	TAL BUF
Total/NA	Analysis	SM 2540C		1	443157	11/01/18 20:04	SMH	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:15	KEB	TAL BUF

Client Sample ID: MW-2R

Lab Sample ID: 480-144289-2

Date Collected: 10/26/18 09:40

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 19:52	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 18:22	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443157	11/01/18 20:04	SMH	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 08:54	KEB	TAL BUF

Client Sample ID: MW-2RD

Lab Sample ID: 480-144289-3

Date Collected: 10/26/18 09:45

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 19:56	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 18:36	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:18	KEB	TAL BUF

Client Sample ID: MW-3R

Lab Sample ID: 480-144289-4

Date Collected: 10/26/18 10:55

Matrix: Water

Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:00	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 18:51	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 08:52	KEB	TAL BUF

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: MW-3RD

Date Collected: 10/26/18 11:15
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:03	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 19:06	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 08:49	KEB	TAL BUF

Client Sample ID: MW-4

Date Collected: 10/26/18 13:20
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:07	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 19:20	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:31	KEB	TAL BUF

Client Sample ID: MW-1

Date Collected: 10/26/18 08:00
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:21	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 19:35	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:20	KEB	TAL BUF

Client Sample ID: MW-3

Date Collected: 10/26/18 11:10
Date Received: 10/27/18 09:00

Lab Sample ID: 480-144289-8

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:25	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 19:49	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 08:44	KEB	TAL BUF

Lab Chronicle

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Client Sample ID: DUPLICATE

Lab Sample ID: 480-144289-9

Date Collected: 10/26/18 00:00
Matrix: Water
Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:28	LMH	TAL BUF
Total/NA	Analysis	300.0		5	444669	11/10/18 20:04	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:23	KEB	TAL BUF

Client Sample ID: FIELD BLANK

Lab Sample ID: 480-144289-10

Date Collected: 10/26/18 13:30
Matrix: Water
Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:32	LMH	TAL BUF
Total/NA	Analysis	300.0		1	444669	11/10/18 21:31	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:07	KEB	TAL BUF

Client Sample ID: EQUIPMENT

Lab Sample ID: 480-144289-11

Date Collected: 10/26/18 13:35
Matrix: Water
Date Received: 10/27/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3005A			443075	11/02/18 09:15	VEG	TAL BUF
Total/NA	Analysis	6010D		1	443594	11/03/18 20:35	LMH	TAL BUF
Total/NA	Analysis	300.0		1	444669	11/10/18 21:46	DMR	TAL BUF
Total/NA	Analysis	SM 2540C		1	443265	11/02/18 09:14	RAF	TAL BUF
Total/NA	Analysis	SM 4500 H+ B		1	443033	11/01/18 09:47	KEB	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Accreditation/Certification Summary

Client: Waste Connections, Inc. TestAmerica Job ID: 480-144289-1
Project/Site: SKB Lansing - CCR Groundwater

Laboratory: TestAmerica Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Minnesota	NELAP	5	036-999-337	12-31-18

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
SM 4500 H+ B		Water	pH
SM 4500 H+ B		Water	Temperature

Method Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	TAL BUF
300.0	Anions, Ion Chromatography	MCAWW	TAL BUF
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL BUF
SM 4500 H+ B	pH	SM	TAL BUF
3005A	Preparation, Total Metals	SW846	TAL BUF

Protocol 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.

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: Waste Connections, Inc.
Project/Site: SKB Lansing - CCR Groundwater

TestAmerica Job ID: 480-144289-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-144289-1	MW-1RD	Water	10/26/18 08:15	10/27/18 09:00
480-144289-2	MW-2R	Water	10/26/18 09:40	10/27/18 09:00
480-144289-3	MW-2RD	Water	10/26/18 09:45	10/27/18 09:00
480-144289-4	MW-3R	Water	10/26/18 10:55	10/27/18 09:00
480-144289-5	MW-3RD	Water	10/26/18 11:15	10/27/18 09:00
480-144289-6	MW-4	Water	10/26/18 13:20	10/27/18 09:00
480-144289-7	MW-1	Water	10/26/18 08:00	10/27/18 09:00
480-144289-8	MW-3	Water	10/26/18 11:10	10/27/18 09:00
480-144289-9	DUPLICATE	Water	10/26/18 00:00	10/27/18 09:00
480-144289-10	FIELD BLANK	Water	10/26/18 13:30	10/27/18 09:00
480-144289-11	EQUIPMENT	Water	10/26/18 13:35	10/27/18 09:00

TestAmerica Buffalo
10 Hazelwood Drive

Amherst, NY 14228-2223
phone 716.691.2600 fax 716.691.7991

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Ryan Van Dette	Site Contact: Nathaniel Beineman	Date: 10/26/18	COC No:
SKB Environmental	Tel/Fax:	Lab Contact:	Carrier:	____ of ____ COCs
13425 Courthouse Blvd	Analysis Turnaround Time			Sampler:
Rosemount, MN 55068	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
(651) 438-1500 Phone	TAT if different from Below ____			Walk-in Client:
(651) 438-1518 FAX	☑ 2 weeks			Lab Sampling:
Project Name: Lansing 2018 Q4 CCR GW	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
PO# 3064-18-00284	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Boron and Calcium	Chloride	Fluoride	Sulfate	TDS	pH	Sample Specific Notes:
MW-1RD	10/24/18	9:15	Grab	Water	4			X	X	X	X	X	X	
MW-2R	10/26/18	9:46	Grab	Water	4			X	X	X	X	X	X	
MW-2RD	10/26/18	9:45	Grab	Water	4			X	X	X	X	X	X	
MW-3R	10/26/18	11:55	Grab	Water	4			X	X	X	X	X	X	
MW-3RD	10/26/18	11:15	Grab	Water	4			X	X	X	X	X	X	
MW-4	10/26/18	13:20	Grab	Water	4			X	X	X	X	X	X	
MW-1	10/26/18	9:00	Grab	Water	4			X	X	X	X	X	X	
MW-3	10/26/18	11:10	Grab	Water	4			X	X	X	X	X	X	
Duplicate	10/26/18	—	Grab	Water	4			X	X	X	X	X	X	
Field Blank	10/26/18	13:30	Grab	Water	4			X	X	X	X	X	X	
Equipment Blank	10/26/18	13:35	Grab	Water	4			X	X	X	X	X	X	

480-144289 COC

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for ____ Months

#125

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: | Corr'd: | Therm ID No.:

	Company	Date/Time		Company	Date/Time
Relinquished by:	CES	10/26/18 15:15	Received by:	TestAmerica	10/26/18 15:45
Relinquished by:	TestAmerica	10-26 1700	Received by:	TAB	10/27/18 0900
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 4.9, dated 2/2/2016

Login Sample Receipt Checklist

Client: Waste Connections, Inc.

Job Number: 480-144289-1
SDG Number:

Login Number: 144289
List Number: 1
Creator: Hulbert, Michael J

List Source: TestAmerica Buffalo

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	
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.	N/A	
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	SKB ENVIRONMENTAL
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	N/A	
Chlorine Residual checked.	N/A	

Appendix C – Statistical Evaluation Data

1				**Background Statistics for Uncensored Full Data Sets**								
2			**User Selected Options**									
3			Date/Time of Computation	1/17/2019 2:00:33 PM								
4			From File	\\Svrrmt70-vm3\blacksburg-01\Projects\SKB Environmental\Lansing Facility\Statistics\20190116_Updated_Lans								
5			Full Precision	OFF								
6			Confidence Coefficient	95%								
7			Coverage	95%								
8			New or Future K Observations	1								
9			Number of Bootstrap Operations	2000								
10												
11	**MW-1|Boron|T^report_result_value**											
12												
13	**General Statistics**											
14						Total Number of Observations	17			Number of Distinct Observations	12		
15										Number of Missing Observations	37		
16						Minimum	0.02			First Quartile	0.02		
17						Second Largest	0.32			Median	0.11		
18						Maximum	0.51			Third Quartile	0.26		
19						Mean	0.157			SD	0.151		
20						Coefficient of Variation	0.961			Skewness	0.78		
21						Mean of logged Data	-2.495			SD of logged Data	1.286		
22													
23						**Critical Values for Background Threshold Values (BTVs)**							
24						Tolerance Factor K (For UTL)	2.486			d2max (for USL)	2.475		
25													
26						**Normal GOF Test**							
27						Shapiro Wilk Test Statistic	0.838			**Shapiro Wilk GOF Test**			
28						5% Shapiro Wilk Critical Value	0.892			Data Not Normal at 5% Significance Level			
29						Lilliefors Test Statistic	0.25			**Lilliefors GOF Test**			
30						5% Lilliefors Critical Value	0.215			Data Not Normal at 5% Significance Level			
31						**Data Not Normal at 5% Significance Level**							
32													
33						**Background Statistics Assuming Normal Distribution**							
34						95% UTL with 95% Coverage	0.532			90% Percentile (z)	0.351		
35						95% UPL (t)	0.428			95% Percentile (z)	0.405		
36						95% USL	0.531			99% Percentile (z)	0.508		
37													
38						**Gamma GOF Test**							
39						A-D Test Statistic	1.297			**Anderson-Darling Gamma GOF Test**			
40						5% A-D Critical Value	0.77			Data Not Gamma Distributed at 5% Significance Level			
41						K-S Test Statistic	0.222			**Kolmogrov-Smirnoff Gamma GOF Test**			
42						5% K-S Critical Value	0.216			Data Not Gamma Distributed at 5% Significance Level			
43						**Data Not Gamma Distributed at 5% Significance Level**							
44													
45						**Gamma Statistics**							
46						k hat (MLE)	0.907			k star (bias corrected MLE)	0.786		
47						Theta hat (MLE)	0.173			Theta star (bias corrected MLE)	0.2		
48						nu hat (MLE)	30.84			nu star (bias corrected)	26.73		
49						MLE Mean (bias corrected)	0.157			MLE Sd (bias corrected)	0.177		
50													
51						**Background Statistics Assuming Gamma Distribution**							
52						95% Wilson Hilferty (WH) Approx. Gamma UPL	0.553			90% Percentile	0.384		
53						95% Hawkins Wixley (HW) Approx. Gamma UPL	0.593			95% Percentile	0.513		

54	95% WH Approx. Gamma UTL with 95% Coverage					0.869	99% Percentile					0.818
55	95% HW Approx. Gamma UTL with 95% Coverage					0.995						
56	95% WH USL					0.863	95% HW USL					0.987
57												
58	**Lognormal GOF Test**											
59	Shapiro Wilk Test Statistic					0.807	**Shapiro Wilk Lognormal GOF Test**					
60	5% Shapiro Wilk Critical Value					0.892	Data Not Lognormal at 5% Significance Level					
61	Lilliefors Test Statistic					0.225	**Lilliefors Lognormal GOF Test**					
62	5% Lilliefors Critical Value					0.215	Data Not Lognormal at 5% Significance Level					
63	**Data Not Lognormal at 5% Significance Level**											
64												
65	**Background Statistics assuming Lognormal Distribution**											
66	95% UTL with 95% Coverage					2.016	90% Percentile (z)					0.429
67	95% UPL (t)					0.831	95% Percentile (z)					0.684
68	95% USL					1.988	99% Percentile (z)					1.642
69												
70	**Nonparametric Distribution Free Background Statistics**											
71	**Data do not follow a Discernible Distribution (0.05)**											
72												
73	**Nonparametric Upper Limits for Background Threshold Values**											
74	Order of Statistic, r					17	95% UTL with 95% Coverage					0.51
75	Approximate f					0.895	Confidence Coefficient (CC) achieved by UTL					0.582
76	95% Percentile Bootstrap UTL with 95% Coverage					0.51	95% BCA Bootstrap UTL with 95% Coverage					0.51
77	95% UPL					0.51	90% Percentile					0.32
78	90% Chebyshev UPL					0.623	95% Percentile					0.358
79	95% Chebyshev UPL					0.834	99% Percentile					0.48
80	95% USL					0.51						
81												
82	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
83	data set free of outliers and consists of observations collected from clean unimpacted locations.											
84	The use of USL tends to provide a balance between false positives and false negatives provided the data											
85	represents a background data set and when many onsite observations need to be compared with the BTV.											
86												

87	**MW-1|Calcium|D^report_result_value**											
88												
89	**General Statistics**											
90						Total Number of Observations	26			Number of Distinct Observations	8	
91										Number of Missing Observations	28	
92						Minimum	0.033			First Quartile	0.5	
93						Second Largest	1.4			Median	0.5	
94						Maximum	74100			Third Quartile	0.5	
95						Mean	2851			SD	14532	
96						Coefficient of Variation	5.098			Skewness	5.099	
97						Mean of logged Data	-0.264			SD of logged Data	2.414	
98												
99						**Critical Values for Background Threshold Values (BTVs)**							
100						Tolerance Factor K (For UTL)	2.275			d2max (for USL)	2.681	
101												
102						**Normal GOF Test**						
103						Shapiro Wilk Test Statistic	0.202			**Shapiro Wilk GOF Test**		
104						5% Shapiro Wilk Critical Value	0.92			Data Not Normal at 5% Significance Level		
105						Lilliefors Test Statistic	0.539			**Lilliefors GOF Test**		
106						5% Lilliefors Critical Value	0.174			Data Not Normal at 5% Significance Level		
107						**Data Not Normal at 5% Significance Level**						
108												
109						**Background Statistics Assuming Normal Distribution**						
110						95% UTL with 95% Coverage	35911			90% Percentile (z)	21474	
111						95% UPL (t)	28146			95% Percentile (z)	26754	
112						95% USL	41810			99% Percentile (z)	36657	
113												
114						**Gamma GOF Test**						
115						A-D Test Statistic	9.946			**Anderson-Darling Gamma GOF Test**		
116						5% A-D Critical Value	0.996			Data Not Gamma Distributed at 5% Significance Level		
117						K-S Test Statistic	0.568			**Kolmogrov-Smirnoff Gamma GOF Test**		
118						5% K-S Critical Value	0.197			Data Not Gamma Distributed at 5% Significance Level		
119						**Data Not Gamma Distributed at 5% Significance Level**						
120												
121						**Gamma Statistics**						
122						k hat (MLE)	0.0989			k star (bias corrected MLE)	0.113	
123						Theta hat (MLE)	28812			Theta star (bias corrected MLE)	25190	
124						nu hat (MLE)	5.145			nu star (bias corrected)	5.884	
125						MLE Mean (bias corrected)	2851			MLE Sd (bias corrected)	8474	
126												
127						**Background Statistics Assuming Gamma Distribution**						
128						95% Wilson Hilferty (WH) Approx. Gamma UPL	4452			90% Percentile	7937	
129						95% Hawkins Wixley (HW) Approx. Gamma UPL	2128			95% Percentile	16378	
130						95% WH Approx. Gamma UTL with 95% Coverage	8958			99% Percentile	42530	
131						95% HW Approx. Gamma UTL with 95% Coverage	5059					
132						95% WH USL	13909			95% HW USL	8782	
133												
134						**Lognormal GOF Test**						
135						Shapiro Wilk Test Statistic	0.333			**Shapiro Wilk Lognormal GOF Test**		
136						5% Shapiro Wilk Critical Value	0.92			Data Not Lognormal at 5% Significance Level		
137						Lilliefors Test Statistic	0.425			**Lilliefors Lognormal GOF Test**		
138						5% Lilliefors Critical Value	0.174			Data Not Lognormal at 5% Significance Level		
139						**Data Not Lognormal at 5% Significance Level**						

140												
141	**Background Statistics assuming Lognormal Distribution**											
142					95% UTL with	95% Coverage	186.5			90% Percentile (z)		16.94
143						95% UPL (t)	51.33			95% Percentile (z)		40.73
144						95% USL	496.8			99% Percentile (z)		211.1
145												
146	**Nonparametric Distribution Free Background Statistics**											
147	**Data do not follow a Discernible Distribution (0.05)**											
148												
149	**Nonparametric Upper Limits for Background Threshold Values**											
150						Order of Statistic, r	26			95% UTL with	95% Coverage	74100
151						Approximate f	1.368			Confidence Coefficient (CC) achieved by UTL		0.736
152					95% Percentile Bootstrap UTL with	95% Coverage	74100			95% BCA Bootstrap UTL with	95% Coverage	74100
153						95% UPL	48165			90% Percentile		0.72
154						90% Chebyshev UPL	47277			95% Percentile		1.24
155						95% Chebyshev UPL	67401			99% Percentile		55575
156						95% USL	74100					
157												
158	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
159	data set free of outliers and consists of observations collected from clean unimpacted locations.											
160	The use of USL tends to provide a balance between false positives and false negatives provided the data											
161	represents a background data set and when many onsite observations need to be compared with the BTV.											
162												

163	**MW-1|Calcium|T^report_result_value**										
164											
165	**General Statistics**										
166						Total Number of Observations	37			Number of Distinct Observations	34	
167										Number of Missing Observations	17	
168						Minimum	68.5			First Quartile	129	
169						Second Largest	265			Median	187	
170						Maximum	271			Third Quartile	210	
171						Mean	172.8			SD	56.61	
172						Coefficient of Variation	0.328			Skewness	-0.298	
173						Mean of logged Data	5.088			SD of logged Data	0.383	
174												
175	**Critical Values for Background Threshold Values (BTVs)**										
176						Tolerance Factor K (For UTL)	2.14			d2max (for USL)	2.835	
177												
178	**Normal GOF Test**										
179						Shapiro Wilk Test Statistic	0.947			**Shapiro Wilk GOF Test**		
180						5% Shapiro Wilk Critical Value	0.936			Data appear Normal at 5% Significance Level		
181						Lilliefors Test Statistic	0.125			**Lilliefors GOF Test**		
182						5% Lilliefors Critical Value	0.146			Data appear Normal at 5% Significance Level		
183	**Data appear Normal at 5% Significance Level**										
184												
185	**Background Statistics Assuming Normal Distribution**										
186						95% UTL with 95% Coverage	293.9			90% Percentile (z)	245.3	
187						95% UPL (t)	269.6			95% Percentile (z)	265.9	
188						95% USL	333.3			99% Percentile (z)	304.5	
189												
190	**Gamma GOF Test**										
191						A-D Test Statistic	1.063			**Anderson-Darling Gamma GOF Test**		
192						5% A-D Critical Value	0.749			Data Not Gamma Distributed at 5% Significance Level		
193						K-S Test Statistic	0.168			**Kolmogrov-Smirnoff Gamma GOF Test**		
194						5% K-S Critical Value	0.145			Data Not Gamma Distributed at 5% Significance Level		
195	**Data Not Gamma Distributed at 5% Significance Level**										
196												
197	**Gamma Statistics**										
198						k hat (MLE)	8.007			k star (bias corrected MLE)	7.375	
199						Theta hat (MLE)	21.58			Theta star (bias corrected MLE)	23.43	
200						nu hat (MLE)	592.5			nu star (bias corrected)	545.8	
201						MLE Mean (bias corrected)	172.8			MLE Sd (bias corrected)	63.63	
202												
203	**Background Statistics Assuming Gamma Distribution**										
204						95% Wilson Hilferty (WH) Approx. Gamma UPL	291.8			90% Percentile	257.7	
205						95% Hawkins Wixley (HW) Approx. Gamma UPL	296			95% Percentile	289	
206						95% WH Approx. Gamma UTL with 95% Coverage	331.1			99% Percentile	354	
207						95% HW Approx. Gamma UTL with 95% Coverage	338.6					
208						95% WH USL	402			95% HW USL	416.9	
209												
210	**Lognormal GOF Test**										
211						Shapiro Wilk Test Statistic	0.894			**Shapiro Wilk Lognormal GOF Test**		
212						5% Shapiro Wilk Critical Value	0.936			Data Not Lognormal at 5% Significance Level		
213						Lilliefors Test Statistic	0.185			**Lilliefors Lognormal GOF Test**		
214						5% Lilliefors Critical Value	0.146			Data Not Lognormal at 5% Significance Level		
215	**Data Not Lognormal at 5% Significance Level**										

216												
217	**Background Statistics assuming Lognormal Distribution**											
218					95% UTL with	95% Coverage	368.1			90% Percentile (z)		264.9
219						95% UPL (t)	312.3			95% Percentile (z)		304.5
220						95% USL	480.5			99% Percentile (z)		395.4
221												
222	**Nonparametric Distribution Free Background Statistics**											
223	**Data appear Normal at 5% Significance Level**											
224												
225	**Nonparametric Upper Limits for Background Threshold Values**											
226						Order of Statistic, r	37			95% UTL with	95% Coverage	271
227						Approximate f	1.947			Confidence Coefficient (CC) achieved by UTL		0.85
228					95% Percentile Bootstrap UTL with	95% Coverage	271			95% BCA Bootstrap UTL with	95% Coverage	271
229						95% UPL	265.6			90% Percentile		240.2
230						90% Chebyshev UPL	344.9			95% Percentile		259.4
231						95% Chebyshev UPL	422.9			99% Percentile		268.8
232						95% USL	271					
233												
234	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
235	data set free of outliers and consists of observations collected from clean unimpacted locations.											
236	The use of USL tends to provide a balance between false positives and false negatives provided the data											
237	represents a background data set and when many onsite observations need to be compared with the BTV.											
238												

239	**MW-1|Chloride|T^report_result_value**										
240											
241	**General Statistics**										
242						Total Number of Observations	43			Number of Distinct Observations	38	
243										Number of Missing Observations	11	
244						Minimum	14.5			First Quartile	19.45	
245						Second Largest	289.7			Median	29.2	
246						Maximum	307.1			Third Quartile	41.35	
247						Mean	47.61			SD	60.94	
248						Coefficient of Variation	1.28			Skewness	3.545	
249						Mean of logged Data	3.516			SD of logged Data	0.708	
250												
251						**Critical Values for Background Threshold Values (BTVs)**						
252						Tolerance Factor K (For UTL)	2.097			d2max (for USL)	2.897	
253												
254						**Normal GOF Test**						
255						Shapiro Wilk Test Statistic	0.505			**Shapiro Wilk GOF Test**		
256						5% Shapiro Wilk Critical Value	0.943			Data Not Normal at 5% Significance Level		
257						Lilliefors Test Statistic	0.312			**Lilliefors GOF Test**		
258						5% Lilliefors Critical Value	0.135			Data Not Normal at 5% Significance Level		
259						**Data Not Normal at 5% Significance Level**						
260												
261						**Background Statistics Assuming Normal Distribution**						
262						95% UTL with 95% Coverage	175.4			90% Percentile (z)	125.7	
263						95% UPL (t)	151.3			95% Percentile (z)	147.9	
264						95% USL	224.2			99% Percentile (z)	189.4	
265												
266						**Gamma GOF Test**						
267						A-D Test Statistic	3.577			**Anderson-Darling Gamma GOF Test**		
268						5% A-D Critical Value	0.766			Data Not Gamma Distributed at 5% Significance Level		
269						K-S Test Statistic	0.224			**Kolmogrov-Smirnoff Gamma GOF Test**		
270						5% K-S Critical Value	0.137			Data Not Gamma Distributed at 5% Significance Level		
271						**Data Not Gamma Distributed at 5% Significance Level**						
272												
273						**Gamma Statistics**						
274						k hat (MLE)	1.586			k star (bias corrected MLE)	1.491	
275						Theta hat (MLE)	30.01			Theta star (bias corrected MLE)	31.93	
276						nu hat (MLE)	136.4			nu star (bias corrected)	128.2	
277						MLE Mean (bias corrected)	47.61			MLE Sd (bias corrected)	38.99	
278												
279						**Background Statistics Assuming Gamma Distribution**						
280						95% Wilson Hilferty (WH) Approx. Gamma UPL	121.3			90% Percentile	99.36	
281						95% Hawkins Wixley (HW) Approx. Gamma UPL	118.6			95% Percentile	124.3	
282						95% WH Approx. Gamma UTL with 95% Coverage	151.2			99% Percentile	180.6	
283						95% HW Approx. Gamma UTL with 95% Coverage	149.6					
284						95% WH USL	225.9			95% HW USL	230.7	
285												
286						**Lognormal GOF Test**						
287						Shapiro Wilk Test Statistic	0.848			**Shapiro Wilk Lognormal GOF Test**		
288						5% Shapiro Wilk Critical Value	0.943			Data Not Lognormal at 5% Significance Level		
289						Lilliefors Test Statistic	0.151			**Lilliefors Lognormal GOF Test**		
290						5% Lilliefors Critical Value	0.135			Data Not Lognormal at 5% Significance Level		
291						**Data Not Lognormal at 5% Significance Level**						

292												
293	**Background Statistics assuming Lognormal Distribution**											
294					95% UTL with	95% Coverage	148.7			90% Percentile (z)		83.42
295						95% UPL (t)	112.3			95% Percentile (z)		107.9
296						95% USL	262			99% Percentile (z)		174.9
297												
298	**Nonparametric Distribution Free Background Statistics**											
299	**Data do not follow a Discernible Distribution (0.05)**											
300												
301	**Nonparametric Upper Limits for Background Threshold Values**											
302						Order of Statistic, r	43			95% UTL with	95% Coverage	307.1
303						Approximate f	2.263			Confidence Coefficient (CC) achieved by UTL		0.89
304					95% Percentile Bootstrap UTL with	95% Coverage	305.4			95% BCA Bootstrap UTL with	95% Coverage	290.6
305						95% UPL	260.2			90% Percentile		77.8
306						90% Chebyshev UPL	232.6			95% Percentile		136.4
307						95% Chebyshev UPL	316.3			99% Percentile		299.8
308						95% USL	307.1					
309												
310	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
311	data set free of outliers and consists of observations collected from clean unimpacted locations.											
312	The use of USL tends to provide a balance between false positives and false negatives provided the data											
313	represents a background data set and when many onsite observations need to be compared with the BTV.											
314												

315	**MW-1|Fluoride|T^report_result_value**										
316											
317	**General Statistics**										
318					Total Number of Observations	36			Number of Distinct Observations	4	
319									Number of Missing Observations	18	
320					Minimum	0.19			First Quartile	0.25	
321					Second Largest	0.26			Median	0.25	
322					Maximum	0.26			Third Quartile	0.25	
323					Mean	0.246			SD	0.0163	
324					Coefficient of Variation	0.0662			Skewness	-3.061	
325					Mean of logged Data	-1.406			SD of logged Data	0.0737	
326											
327					**Critical Values for Background Threshold Values (BTVs)**						
328					Tolerance Factor K (For UTL)	2.148			d2max (for USL)	2.824	
329											
330					**Normal GOF Test**						
331					Shapiro Wilk Test Statistic	0.391			**Shapiro Wilk GOF Test**		
332					5% Shapiro Wilk Critical Value	0.935			Data Not Normal at 5% Significance Level		
333					Lilliefors Test Statistic	0.518			**Lilliefors GOF Test**		
334					5% Lilliefors Critical Value	0.148			Data Not Normal at 5% Significance Level		
335					**Data Not Normal at 5% Significance Level**						
336											
337					**Background Statistics Assuming Normal Distribution**						
338					95% UTL with 95% Coverage	0.281			90% Percentile (z)	0.267	
339					95% UPL (t)	0.274			95% Percentile (z)	0.273	
340					95% USL	0.292			99% Percentile (z)	0.284	
341											
342					**Gamma GOF Test**						
343					A-D Test Statistic	10.82			**Anderson-Darling Gamma GOF Test**		
344					5% A-D Critical Value	0.746			Data Not Gamma Distributed at 5% Significance Level		
345					K-S Test Statistic	0.521			**Kolmogrov-Smirnoff Gamma GOF Test**		
346					5% K-S Critical Value	0.146			Data Not Gamma Distributed at 5% Significance Level		
347					**Data Not Gamma Distributed at 5% Significance Level**						
348											
349					**Gamma Statistics**						
350					k hat (MLE)	203.5			k star (bias corrected MLE)	186.6	
351					Theta hat (MLE)	0.00121			Theta star (bias corrected MLE)	0.00132	
352					nu hat (MLE)	14653			nu star (bias corrected)	13433	
353					MLE Mean (bias corrected)	0.246			MLE Sd (bias corrected)	0.018	
354											
355					**Background Statistics Assuming Gamma Distribution**						
356					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.277			90% Percentile	0.269	
357					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.277			95% Percentile	0.276	
358					95% WH Approx. Gamma UTL with 95% Coverage	0.285			99% Percentile	0.29	
359					95% HW Approx. Gamma UTL with 95% Coverage	0.285					
360					95% WH USL	0.298			95% HW USL	0.299	
361											

362	**Lognormal GOF Test**											
363					Shapiro Wilk Test Statistic	0.383	**Shapiro Wilk Lognormal GOF Test**					
364					5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level					
365					Lilliefors Test Statistic	0.52	**Lilliefors Lognormal GOF Test**					
366					5% Lilliefors Critical Value	0.148	Data Not Lognormal at 5% Significance Level					
367	**Data Not Lognormal at 5% Significance Level**											
368												
369	**Background Statistics assuming Lognormal Distribution**											
370				95% UTL with	95% Coverage	0.287	90% Percentile (z)	0.27				
371					95% UPL (t)	0.278	95% Percentile (z)	0.277				
372					95% USL	0.302	99% Percentile (z)	0.291				
373												
374	**Nonparametric Distribution Free Background Statistics**											
375	**Data do not follow a Discernible Distribution (0.05)**											
376												
377	**Nonparametric Upper Limits for Background Threshold Values**											
378					Order of Statistic, r	36	95% UTL with	95% Coverage	0.26			
379					Approximate f	1.895	Confidence Coefficient (CC) achieved by UTL		0.842			
380			95% Percentile Bootstrap UTL with		95% Coverage	0.26	95% BCA Bootstrap UTL with	95% Coverage	0.26			
381					95% UPL	0.26	90% Percentile		0.25			
382					90% Chebyshev UPL	0.295	95% Percentile		0.253			
383					95% Chebyshev UPL	0.318	99% Percentile		0.26			
384					95% USL	0.26						
385												
386	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
387	data set free of outliers and consists of observations collected from clean unimpacted locations.											
388	The use of USL tends to provide a balance between false positives and false negatives provided the data											
389	represents a background data set and when many onsite observations need to be compared with the BTV.											
390												

	A	B	C	D	E	F	G	H	I	J	K	L
391	**MW-1|ph|T^report_result_value**											
392												
393	**General Statistics**											
394					Total Number of Observations	12			Number of Distinct Observations	6		
395									Number of Missing Observations	42		
396					Minimum	6.7			First Quartile	6.9		
397					Second Largest	7.3			Median	7.1		
398					Maximum	7.5			Third Quartile	7.15		
399					Mean	7.058			SD	0.239		
400					Coefficient of Variation	0.0339			Skewness	0.116		
401					Mean of logged Data	1.954			SD of logged Data	0.0339		
402												
403					**Critical Values for Background Threshold Values (BTVs)**							
404					Tolerance Factor K (For UTL)	2.736			d2max (for USL)	2.285		
405												
406					**Normal GOF Test**							
407					Shapiro Wilk Test Statistic	0.948			**Shapiro Wilk GOF Test**			
408					5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level			
409					Lilliefors Test Statistic	0.181			**Lilliefors GOF Test**			
410					5% Lilliefors Critical Value	0.256			Data appear Normal at 5% Significance Level			
411					**Data appear Normal at 5% Significance Level**							
412												
413					**Background Statistics Assuming Normal Distribution**							
414					95% UTL with 95% Coverage	7.713			90% Percentile (z)	7.365		
415					95% UPL (t)	7.505			95% Percentile (z)	7.452		
416					95% USL	7.605			99% Percentile (z)	7.615		
417												
418					**Gamma GOF Test**							
419					A-D Test Statistic	0.342			**Anderson-Darling Gamma GOF Test**			
420					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
421					K-S Test Statistic	0.174			**Kolmogrov-Smirnoff Gamma GOF Test**			
422					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
423					**Detected data appear Gamma Distributed at 5% Significance Level**							
424												
425					**Gamma Statistics**							
426					k hat (MLE)	951.3			k star (bias corrected MLE)	713.5		
427					Theta hat (MLE)	0.00742			Theta star (bias corrected MLE)	0.00989		
428					nu hat (MLE)	22830			nu star (bias corrected)	17124		
429					MLE Mean (bias corrected)	7.058			MLE Sd (bias corrected)	0.264		
430												
431					**Background Statistics Assuming Gamma Distribution**							
432					95% Wilson Hilferty (WH) Approx. Gamma UPL	7.512			90% Percentile	7.399		
433					95% Hawkins Wixley (HW) Approx. Gamma UPL	7.513			95% Percentile	7.499		
434					95% WH Approx. Gamma UTL with 95% Coverage	7.73			99% Percentile	7.688		
435					95% HW Approx. Gamma UTL with 95% Coverage	7.732						
436					95% WH USL	7.616			95% HW USL	7.618		
437												
438					**Lognormal GOF Test**							
439					Shapiro Wilk Test Statistic	0.948			**Shapiro Wilk Lognormal GOF Test**			
440					5% Shapiro Wilk Critical Value	0.859			Data appear Lognormal at 5% Significance Level			
441					Lilliefors Test Statistic	0.175			**Lilliefors Lognormal GOF Test**			
442					5% Lilliefors Critical Value	0.256			Data appear Lognormal at 5% Significance Level			
443					**Data appear Lognormal at 5% Significance Level**							

444												
445	**Background Statistics assuming Lognormal Distribution**											
446					95% UTL with	95% Coverage	7.739			90% Percentile (z)		7.368
447						95% UPL (t)	7.516			95% Percentile (z)		7.459
448						95% USL	7.622			99% Percentile (z)		7.633
449												
450	**Nonparametric Distribution Free Background Statistics**											
451	**Data appear Normal at 5% Significance Level**											
452												
453	**Nonparametric Upper Limits for Background Threshold Values**											
454						Order of Statistic, r	12			95% UTL with	95% Coverage	7.5
455						Approximate f	0.632			Confidence Coefficient (CC) achieved by UTL		0.46
456					95% Percentile Bootstrap UTL with	95% Coverage	7.5			95% BCA Bootstrap UTL with	95% Coverage	7.5
457						95% UPL	7.5			90% Percentile		7.3
458						90% Chebyshev UPL	7.805			95% Percentile		7.39
459						95% Chebyshev UPL	8.143			99% Percentile		7.478
460						95% USL	7.5					
461												
462	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
463	data set free of outliers and consists of observations collected from clean unimpacted locations.											
464	The use of USL tends to provide a balance between false positives and false negatives provided the data											
465	represents a background data set and when many onsite observations need to be compared with the BTV.											
466												

467	**MW-1|sulfate as SO4|T^report_result_value**											
468												
469	**General Statistics**											
470						Total Number of Observations	45				Number of Distinct Observations	42	
471											Number of Missing Observations	9
472						Minimum	8.7				First Quartile	29.4
473						Second Largest	425				Median	99.8
474						Maximum	481				Third Quartile	146
475						Mean	128				SD	130.4
476						Coefficient of Variation	1.018				Skewness	1.297
477						Mean of logged Data	4.314				SD of logged Data	1.095
478												
479						**Critical Values for Background Threshold Values (BTVs)**							
480						Tolerance Factor K (For UTL)	2.085				d2max (for USL)	2.915
481												
482						**Normal GOF Test**						
483						Shapiro Wilk Test Statistic	0.797				**Shapiro Wilk GOF Test**	
484						5% Shapiro Wilk Critical Value	0.945				Data Not Normal at 5% Significance Level	
485						Lilliefors Test Statistic	0.201				**Lilliefors GOF Test**	
486						5% Lilliefors Critical Value	0.132				Data Not Normal at 5% Significance Level	
487						**Data Not Normal at 5% Significance Level**						
488												
489						**Background Statistics Assuming Normal Distribution**						
490						95% UTL with 95% Coverage	399.8				90% Percentile (z)	295.1
491						95% UPL (t)	349.5				95% Percentile (z)	342.4
492						95% USL	508.1				99% Percentile (z)	431.3
493												
494						**Gamma GOF Test**						
495						A-D Test Statistic	1.195				**Anderson-Darling Gamma GOF Test**	
496						5% A-D Critical Value	0.776				Data Not Gamma Distributed at 5% Significance Level	
497						K-S Test Statistic	0.183				**Kolmogrov-Smirnoff Gamma GOF Test**	
498						5% K-S Critical Value	0.135				Data Not Gamma Distributed at 5% Significance Level	
499						**Data Not Gamma Distributed at 5% Significance Level**						
500												
501						**Gamma Statistics**						
502						k hat (MLE)	1.065				k star (bias corrected MLE)	1.009
503						Theta hat (MLE)	120.2				Theta star (bias corrected MLE)	126.9
504						nu hat (MLE)	95.88				nu star (bias corrected)	90.82
505						MLE Mean (bias corrected)	128				MLE Sd (bias corrected)	127.4
506												
507						**Background Statistics Assuming Gamma Distribution**						
508						95% Wilson Hilferty (WH) Approx. Gamma UPL	384.2				90% Percentile	294.1
509						95% Hawkins Wixley (HW) Approx. Gamma UPL	398.1				95% Percentile	382.3
510						95% WH Approx. Gamma UTL with 95% Coverage	493.1				99% Percentile	586.8
511						95% HW Approx. Gamma UTL with 95% Coverage	526.1					
512						95% WH USL	793.3				95% HW USL	903
513												
514						**Lognormal GOF Test**						
515						Shapiro Wilk Test Statistic	0.939				**Shapiro Wilk Lognormal GOF Test**	
516						5% Shapiro Wilk Critical Value	0.945				Data Not Lognormal at 5% Significance Level	
517						Lilliefors Test Statistic	0.151				**Lilliefors Lognormal GOF Test**	
518						5% Lilliefors Critical Value	0.132				Data Not Lognormal at 5% Significance Level	
519						**Data Not Lognormal at 5% Significance Level**						

520												
521	**Background Statistics assuming Lognormal Distribution**											
522					95% UTL with	95% Coverage	733.3			90% Percentile (z)		304.2
523						95% UPL (t)	480.4			95% Percentile (z)		452.8
524						95% USL	1820			99% Percentile (z)		955.1
525												
526	**Nonparametric Distribution Free Background Statistics**											
527	**Data do not follow a Discernible Distribution (0.05)**											
528												
529	**Nonparametric Upper Limits for Background Threshold Values**											
530						Order of Statistic, r	44			95% UTL with	95% Coverage	425
531						Approximate f	1.158			Confidence Coefficient (CC) achieved by UTL		0.665
532					95% Percentile Bootstrap UTL with	95% Coverage	469.8			95% BCA Bootstrap UTL with	95% Coverage	466.6
533						95% UPL	420.2			90% Percentile		347
534						90% Chebyshev UPL	523.4			95% Percentile		404.2
535						95% Chebyshev UPL	702.5			99% Percentile		456.4
536						95% USL	481					
537												
538	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
539	data set free of outliers and consists of observations collected from clean unimpacted locations.											
540	The use of USL tends to provide a balance between false positives and false negatives provided the data											
541	represents a background data set and when many onsite observations need to be compared with the BTV.											
542												

543	**MW-1|Total dissolved solids|T^report_result_value**											
544												
545	**General Statistics**											
546						Total Number of Observations	38				Number of Distinct Observations	37	
547											Number of Missing Observations	16
548						Minimum	305				First Quartile	571.5
549						Second Largest	1300				Median	801
550						Maximum	1380				Third Quartile	858.5
551						Mean	763.2				SD	260.9
552						Coefficient of Variation	0.342				Skewness	0.331
553						Mean of logged Data	6.575				SD of logged Data	0.373
554												
555						**Critical Values for Background Threshold Values (BTVs)**							
556						Tolerance Factor K (For UTL)	2.132				d2max (for USL)	2.846
557												
558						**Normal GOF Test**						
559						Shapiro Wilk Test Statistic	0.956				**Shapiro Wilk GOF Test**	
560						5% Shapiro Wilk Critical Value	0.938				Data appear Normal at 5% Significance Level	
561						Lilliefors Test Statistic	0.139				**Lilliefors GOF Test**	
562						5% Lilliefors Critical Value	0.144				Data appear Normal at 5% Significance Level	
563						**Data appear Normal at 5% Significance Level**						
564												
565						**Background Statistics Assuming Normal Distribution**						
566						95% UTL with 95% Coverage	1319				90% Percentile (z)	1097
567						95% UPL (t)	1209				95% Percentile (z)	1192
568						95% USL	1506				99% Percentile (z)	1370
569												
570						**Gamma GOF Test**						
571						A-D Test Statistic	0.665				**Anderson-Darling Gamma GOF Test**	
572						5% A-D Critical Value	0.749				Detected data appear Gamma Distributed at 5% Significance Level	
573						K-S Test Statistic	0.14				**Kolmogrov-Smirnoff Gamma GOF Test**	
574						5% K-S Critical Value	0.143				Detected data appear Gamma Distributed at 5% Significance Level	
575						**Detected data appear Gamma Distributed at 5% Significance Level**						
576												
577						**Gamma Statistics**						
578						k hat (MLE)	8.127				k star (bias corrected MLE)	7.503
579						Theta hat (MLE)	93.9				Theta star (bias corrected MLE)	101.7
580						nu hat (MLE)	617.7				nu star (bias corrected)	570.2
581						MLE Mean (bias corrected)	763.2				MLE Sd (bias corrected)	278.6
582												
583						**Background Statistics Assuming Gamma Distribution**						
584						95% Wilson Hilferty (WH) Approx. Gamma UPL	1283				90% Percentile	1135
585						95% Hawkins Wixley (HW) Approx. Gamma UPL	1298				95% Percentile	1272
586						95% WH Approx. Gamma UTL with 95% Coverage	1452				99% Percentile	1556
587						95% HW Approx. Gamma UTL with 95% Coverage	1479					
588						95% WH USL	1770				95% HW USL	1828
589												
590						**Lognormal GOF Test**						
591						Shapiro Wilk Test Statistic	0.935				**Shapiro Wilk Lognormal GOF Test**	
592						5% Shapiro Wilk Critical Value	0.938				Data Not Lognormal at 5% Significance Level	
593						Lilliefors Test Statistic	0.157				**Lilliefors Lognormal GOF Test**	
594						5% Lilliefors Critical Value	0.144				Data Not Lognormal at 5% Significance Level	
595						**Data Not Lognormal at 5% Significance Level**						

596												
597	**Background Statistics assuming Lognormal Distribution**											
598					95% UTL with	95% Coverage	1588			90% Percentile (z)		1156
599						95% UPL (t)	1356			95% Percentile (z)		1324
600						95% USL	2074			99% Percentile (z)		1708
601												
602	**Nonparametric Distribution Free Background Statistics**											
603	**Data appear Normal at 5% Significance Level**											
604												
605	**Nonparametric Upper Limits for Background Threshold Values**											
606						Order of Statistic, r	38			95% UTL with	95% Coverage	1380
607						Approximate f	2			Confidence Coefficient (CC) achieved by UTL		0.858
608					95% Percentile Bootstrap UTL with	95% Coverage	1380			95% BCA Bootstrap UTL with	95% Coverage	1380
609						95% UPL	1304			90% Percentile		1100
610						90% Chebyshev UPL	1556			95% Percentile		1249
611						95% Chebyshev UPL	1915			99% Percentile		1350
612						95% USL	1380					
613												
614	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
615	data set free of outliers and consists of observations collected from clean unimpacted locations.											
616	The use of USL tends to provide a balance between false positives and false negatives provided the data											
617	represents a background data set and when many onsite observations need to be compared with the BTV.											
618												

Outlier Tests for Selected Uncensored Variables

User Selected Options

Date/Time of Computation	1/17/2019 1:48:13 PM
From File	20190116_Updated_Lansing sourrce file_GKS.xls
Full Precision	OFF

Dixon's Outlier Test for MW-1|Boron|T^report_result_value

Number of Observations = 18

10% critical value: 0.424

5% critical value: 0.475

1% critical value: 0.561

1. Observation Value 1.2 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.746

For 10% significance level, 1.2 is an outlier.

For 5% significance level, 1.2 is an outlier.

For 1% significance level, 1.2 is an outlier.

2. Observation Value 0.02 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.000

For 10% significance level, 0.02 is not an outlier.

For 5% significance level, 0.02 is not an outlier.

For 1% significance level, 0.02 is not an outlier.

Rosner's Outlier Test for MW-1|Calcium|D^report_result_value

Mean	**2851**
Standard Deviation	**14532**
Number of data	**26**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	2851	14250	74100	1	5	2.84	3.16

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 74100

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 74100

Rosner's Outlier Test for MW-1|Calcium|T^report_result_value

Mean	**172.8**
Standard Deviation	**56.61**
Number of data	**37**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	172.8	55.84	68.5	1	1.868	3	3.34

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

Rosner's Outlier Test for MW-1|Chloride|T^report_result_value

Mean	**47.61**
Standard Deviation	**60.94**
Number of data	**43**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	47.61	60.23	307.1	41	4.308	3.07	3.41

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 307.1

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 307.1

Rosner's Outlier Test for MW-1|Fluoride|T^report_result_value

Mean	**0.944**
Standard Deviation	**4.244**
Number of data	**37**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	0.944	4.186	26.06	37	6	3	3.34

For 5% Significance Level, there is 1 Potential Outlier

Potential outliers is: 26.06

For 1% Significance Level, there is 1 Potential Outlier

Potential outliers is: 26.06

Dixon's Outlier Test for MW-1|ph|T^report_result_value

Number of Observations = 12

10% critical value: 0.49

5% critical value: 0.546

1% critical value: 0.642

1. Observation Value 7.5 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.250

For 10% significance level, 7.5 is not an outlier.

For 5% significance level, 7.5 is not an outlier.

For 1% significance level, 7.5 is not an outlier.

2. Observation Value 6.7 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.333

For 10% significance level, 6.7 is not an outlier.

For 5% significance level, 6.7 is not an outlier.

For 1% significance level, 6.7 is not an outlier.

Rosner's Outlier Test for MW-1|sulfate as SO4|T^report_result_value

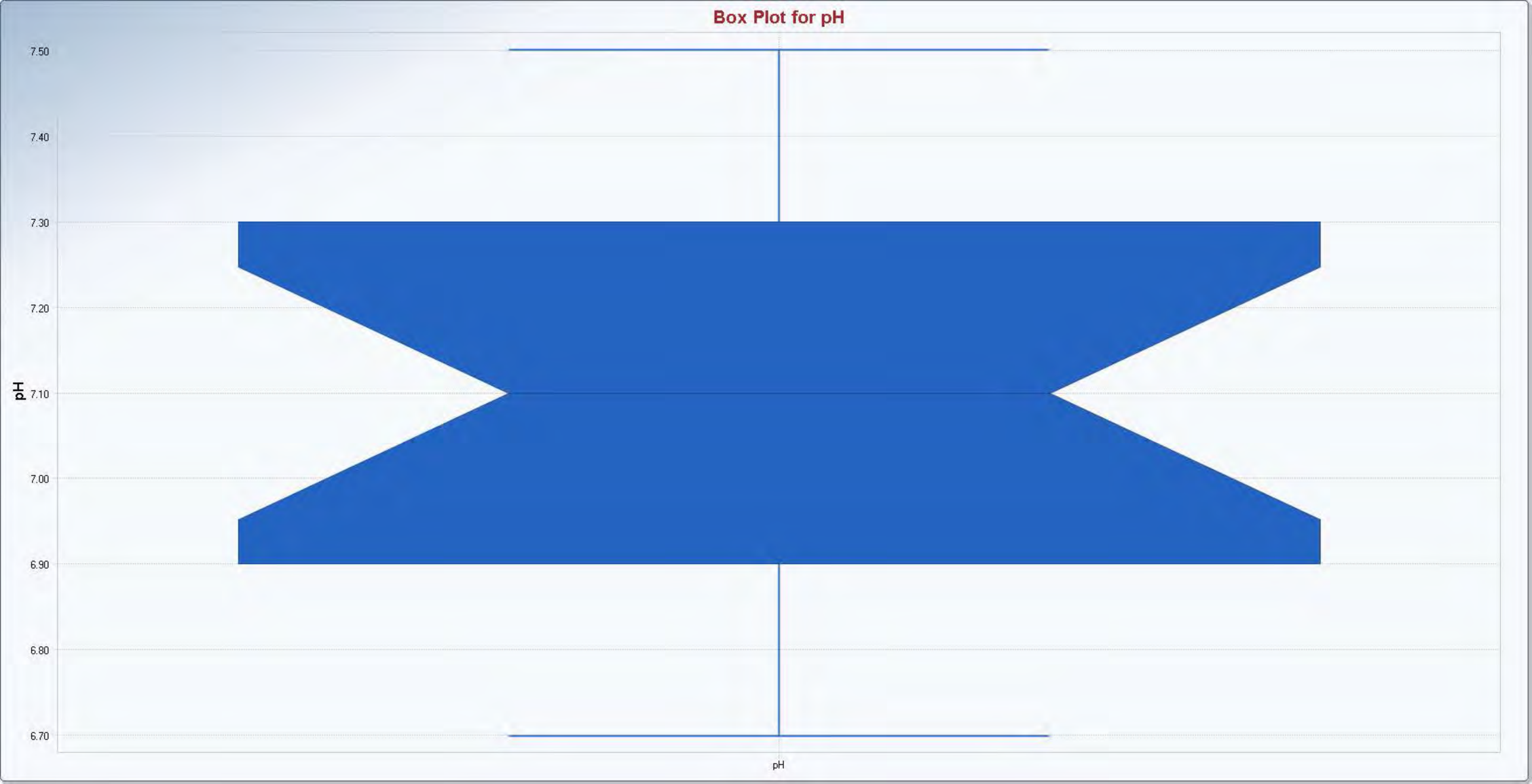
Mean	**128**
Standard Deviation	**130.4**
Number of data	**45**
Number of suspected outliers	**1**

#	Mean	sd	Potential outlier	Obs. Number	Test value	Critical value (5%)	Critical value (1%)
1	128	128.9	481	33	2.738	3.09	3.44

For 5% Significance Level, there is no Potential Outlier

For 1% Significance Level, there is no Potential Outlier

	A	B	C	D	E	F	G	H	I	J	K	L
147	**Rosner's Outlier Test for MW-1|Total dissolved solids|T^report_result_value**											
148												
149												
150				**Mean**	**766.1**							
151				**Standard Deviation**	**269.9**							
152				**Number of data**	**35**							
153				**Number of suspected outliers**	**1**							
154												
155				Potential	Obs.	Test	Critical	Critical				
156	#	Mean	sd	outlier	Number	value	value (5%)	value (1%)				
157	1	766.1	266	1380	29	2.308	2.98	3.32				
158												
159	For 5% Significance Level, there is no Potential Outlier											
160												
161	For 1% Significance Level, there is no Potential Outlier											
162												


Box Plot for pH
7.50
7.40
7.30
7.20
7.10
7.00
6.90
6.80
6.70
pH
pH