LCSWMA

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June 25, 2020

Ms. Kelly Lee Kinkaid PG; Licensed Professional Geologist

Pennsylvania Department of Environmental Protection
Bureau of Waste Management
909 Elmerton Avenue
Harrisburg, PA 17110-8200

REF: 1st Quarter 2020 Form 19, 50 and 52 Submittal
Frey Farm Landfill; BWM Permit #101389

Dear Ms. Kinkaid:

In accordance with the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues the above-referenced monitoring program.

LCSWMA provided the 1st Quarter 2020 data on April 8, 2020 to ARM Group and then ARM Group has provided an analysis for the groundwater, leachate, and contiguous landowners data. ARM Group's report is attached to this submittal.

Groundwater:

In accordance with the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues the above-referenced monitoring program.

Attached are the Forms 19, laboratory reports, and data export excel file for uploading the data into your LandLinks Access database.

Leachate:

In accordance with both the Pennsylvania Municipal Waste Management and the Federal Subtitle D Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) continues to complete the above referenced monitoring program. Enclosed is the Department's Form 50 - "Municipal Waste Landfill Leachate Analysis" for the quarterly monitoring period.

- LCSWMA continues to monitor the Form 50 parameters from location FFLEINFS. This location is the leachate collection system for the Frey Farm Landfill and represents "raw" leachate characteristics for the facility, as collected from the six (6) landfill cells.

- As indicated on the Form 50, the primary leachate collection and secondary detection systems encompass approximately 93 acres of drainage area.

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- At DEP's request, we have included analyses of the four (4) secondary individual detection zone discharges with an individual Form 50 for each.

- Included on the CD are files which contains the FFLEINFS data in a compatible format for your LandLinks software. The CD also contains a pdf file of the laboratory results and the Form 50.

In accordance with Section 273.255(d)(1)(2) and (3) of the Municipal Waste Management Regulations, the Lancaster County Solid Waste Management Authority (LCSWMA) is providing this secondary flow report.

The 1st Quarter 2020 Frey Farm Landfill (FFLF) secondary flow was noted at 3.37 gallons per day per acre (gpdpa); which is below the regulatory limit of 100 gpdpa. The 1st Quarter 2020 secondary flow was 1.09% of the primary flow, which is below the regulatory 10% (maximum). Table 1 indicates this quarter's weekly flow information for the six (6) operational cells at the FFLF, cells 2 and 4 continue to indicate no secondary flow present.

- Consistent with all previous monitoring events, LCSWMA remains well below the secondary leachate flow threshold (100-gpdpa)

Contiguous Landowners:

Attached are the Forms 52, laboratory reports, and a data export excel file for uploading the data into your LandLinks Access database.

Please do not hesitate in contacting me if you have any questions or concerns at dbrown@lcswma.org.

Respectfully submitted,

Daniel A. Brown
Environmental Compliance Manager

Enclosures

Cc: LCSWMA: Environmental, John Ridinger, Aaron Rice
PA DEP: Ed Rawski, Randy Weiss

ARM Group LLC
Engineers and Scientists

June 15, 2020

Mr. Daniel Brown
Environmental Compliance Manager
Lancaster County Solid Waste
Management Authority
1299 Harrisburg Pike
PO Box 4425
Lancaster, PA 17604

Re: LCSWMA Frey Farm Landfill
Permit No. 101389
Manor Township
Lancaster County, Pennsylvania
First Quarter 2020 Water Quality Data Review
ARM Project 190783

Dear Mr. Brown:

ARM Group LLC (ARM) has prepared this assessment at the request of the Lancaster County Solid Waste Management Authority (LCSWMA) to evaluate the First Quarter 2020 water quality monitoring results for Frey Farm Landfill (FFLF). As part of this evaluation, ARM reviewed the historic and First Quarter 2020 laboratory analytical results for the sampled upgradient and downgradient Form 19 groundwater monitoring wells, Form 50 leachate collection and detection zones, and Form 52 contiguous private wells.

The groundwater and leachate samples collected by LCSWMA during the First Quarter 2020 were analyzed for quarterly Form 19, Form 50, and Form 52 parameters, as applicable. The following narrative provides a summary of noteworthy observations of the results for the First Quarter of 2020, as well as a general discussion of recent data trends.

Background/Upgradient Parameter Concentrations

To determine if the concentration of a given parameter at each groundwater monitoring location is elevated compared to the background/upgradient concentration, ARM calculated the 95% upper prediction limits (UPLs) using historical data from the upgradient well, FFMP002W (MP-2), using laboratory analytical results provided by LCSWMA from the First Quarter 2009 through the most recent quarter (First Quarter 2020).

The UPL approach is used to predict the upper limit of possible future values based on a background data set. A 95% UPL established from background data represents the upper limit which will predict if an independently obtained future sample result exceeds background levels with 95% confidence. If the concentration of a given parameter in a downgradient well exceeds its established UPL, this represents a statistically significant exceedance of background groundwater quality.

To calculate the UPLs, ARM first applied the Dixon's and Rosner's Tests for outliers in ChemStat® statistical analysis software (version 6.3.0.2, Starpoint Software, Inc., ©1996-2013) to identify potential historical anomalous concentrations in MP-2. The Dixon's Test applies to populations of 3-25 values, and the Rosner's Test is valid for populations of more than 25 values. ARM identified 44 statistical outliers at a 95% significance level in the historical dataset which did not appear to be part of a long-term concentration trend. No outliers were identified from the First Quarter 2020 analytical results.

The most appropriate method of calculating a UPL varies according to the distribution of each dataset. After removing outliers, ARM assessed the remaining historical MP-2 concentration data for each parameter to determine the best fitting statistical distribution (i.e., normal, lognormal, gamma or no distribution) at a 95% significance level using the EPA's ProUCL statistical analysis software (version 5.1.002, EPA, 2015). ARM then used ProUCL to calculate the 95% UPLs for each parameter, which are summarized in the enclosed **Attachment 1**. The exported ProUCL statistical calculation sheets are included in the enclosed **Attachment 2**.

For pH, a one-sided UPL is not appropriate because of the double-sided nature of this parameter. ARM assessed the downgradient pH data by investigating time-series concentration plots for identifiable trends and comparing the First Quarter 2020 results to the historical range of concentrations in both the sampled well and the upgradient well.

The Interstate Technology and Regulatory Council (ITRC) recommends that a UPL should only be applied for background populations of at least 8-10 observations. Use of smaller populations containing either fewer measurements or multiple non-detections can result in skewed datasets and statistically flawed UPL calculations.

The background population is less than 8 for all volatile organic compounds (VOCs), chemical oxygen demand (COD), and total phenolics because of a historical lack of detections in MP-2. A background level could therefore not be accurately calculated for these parameters, which are labeled with asterisks in the enclosed **Attachment 1**. ARM substituted the laboratory reporting detection limit for the statistical background standard when assessing these parameters in the downgradient wells due to their historical absence in the upgradient groundwater.

The attached **Table 1** summarizes the background exceedances in the downgradient Form 19 wells during the First Quarter 2020. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the First Quarter 2020. Background exceedances shown in **Tables 1 and 2** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-2. Close attention should be paid to results from the monitoring locations with noted water quality changes during future

sampling events to evaluate the presence of any positive or negative trends for the parameters of concern.

Individual Form 19 Well Summary

- MP-2 – No parameters are above the statistical background level in this upgradient well for the First Quarter 2020, indicating that groundwater quality appears relatively stable upgradient of the site. Concentrations of several parameters increased rapidly in 2012 to historical high levels. All these concentrations have returned to apparently stable, long-term trends in line with historical average levels since 2014. pH has fluctuated over a range of approximately 1.0 unit over the past several years but appears to have a steady long-term trend. All other Form 19 analytical parameters appear to be stable and within historical concentration ranges.

- MP-5 – Parameters above background in this well include calcium, chloride, magnesium, sodium, SpC, sulfate, TDS, and total organic carbon (TOC). Concentrations of most of these parameters historically appeared stable until an increase in 2018. These concentrations decreased during 2019 and now generally appear in line with the historical averages. Sulfate appears to be slowly increasing over time with minor fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average, while fluctuating over a slightly wider range.

- MP-15 – Iron, magnesium, and turbidity were observed above background in this well. Iron and turbidity levels do not appear to have a consistent trend and fluctuate between values above background level and below lab detection limits with no discernible pattern. Magnesium concentrations appear to be increasing since early 2018. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average, while fluctuating over a slightly wider range.

- MP-16 – Ammonia-N, chloride, magnesium, sodium, sulfate, and TOC levels were observed above background in this well. Concentrations of these parameters appear to have a long-term stable trend with short-term fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.7 unit higher than background, on average.

- MP-17 – Parameters observed above background in this well include calcium, chloride, magnesium, manganese, sodium, SpC, sulfate, TDS, and TOC. Concentrations of most of these parameters appear to be increasing over time. Two instances of apparent rapid increases in concentration occurred during 2012 and 2016. After both events, these parameter levels have generally appeared to stabilize. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.7 unit higher than background.

- MP-18 – Parameters observed above background in this well include chloride, magnesium, and sodium. Concentrations of these parameters appeared to spike during the First Quarter 2018 sampling event but have since returned to historical levels. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.4 unit higher, on average.

- MP-19 – Chloride and TOC were observed above background in this well and appear to be increasing slowly in concentration over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.4 units higher, on average.

- MP-25 – Chloride, magnesium, sodium, and TOC levels were observed above background in this well. Concentrations of these parameters appear to be fluctuating rapidly over time with a long-term, slowly increasing trend. pH appears to be increasing slowly since 2016 and is currently approximately 1.7 units higher than background.

- MP-28 – Parameters observed above background in this well include chloride, magnesium, and sodium. Chloride and sodium concentrations appear to be elevated yet stable over time. Magnesium concentrations appear to be decreasing as a long-term trend with occasional fluctuations. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average, while fluctuating over a slightly wider range.

- MP-29 – Chloride and sodium levels were observed above background in this well. Chloride appears to fluctuate between 20-160 mg/L in a seasonal pattern, but there does not appear to be a long-term increasing or decreasing trend. Sodium levels appear to mimic the chloride fluctuation pattern between approximately 8-45 mg/L. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.4 unit higher, on average.

- MP-2DW – Parameters observed above background in this well include calcium, chloride, iron, magnesium, manganese, sodium, SpC, TDS, and turbidity. These parameter concentrations appear to be increasing between the Third Quarter 2017 and Fourth Quarter 2018 sampling events. They generally appear to have stabilized, apart from minor fluctuations, during the last several quarters. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.0 units higher, on average.

- MP-2SW – Parameters observed above background in this well include chloride, iron, sodium, TOC, and turbidity. Chloride and sodium levels appear to be decreasing over time. Iron, TOC, and turbidity appear to be fluctuating over relatively wide concentration ranges with an apparent slowly increasing long-term trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average.

- MP-31 – Iron and turbidity were observed above background in this well. These parameter concentrations appear to be increasing slowly since the First Quarter 2018 sampling event. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.0 units higher, on average, while fluctuating over a wider range.

- MP-32 – Parameters observed above background in this well include ammonia-N, iron, manganese, and turbidity. Ammonia-N appears to be decreasing over time with occasional concentration fluctuations. Iron, manganese, and turbidity appear to be fluctuating rapidly but do not appear to show a long-term increasing or decreasing trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.7 units higher, on average, while fluctuating over a wider range.

- MP-33 – Parameters observed above background in this well include ammonia-N, chloride, iron, manganese, and turbidity. Chloride appears to be fluctuating seasonally with a long-term, slowly increasing trend. The other noted parameter concentrations appear to be fluctuating but do not appear to show a long-term increasing or decreasing trend. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.8 unit higher, on average.

- MP-3A – Magnesium levels were observed above background in this well but appear to be steady long-term. pH appears to be increasing slowly over time and is currently approximately 1.0 unit higher than background.

- MP-4A – Parameters observed above background in this well include alkalinity (bicarbonate and total), calcium, chloride, magnesium, sodium, SpC, and TDS. All these parameter concentrations appear to be either stable over time or decreasing. Calcium and TDS levels appear to be fluctuating within their long-term trends. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.8 units higher, on average, while fluctuating over a slightly wider range.

- MP-26R – Parameters observed above background in this well include calcium, chloride, magnesium, manganese, potassium, sodium, SpC, sulfate, TDS, and TOC. Most of these parameters appear to be increasing slowly since 2014. Sulfate and TOC appear to be fluctuating but not increasing long-term. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.3 unit higher, on average.

- MP-30R – Parameters observed above background in this well include chloride, magnesium, manganese, sodium, SpC, and TDS. These parameter concentrations appear to be fluctuating across a relatively wide range of values with no apparent long-term trends. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average, while fluctuating over a wider range.

Parameters not noted above are either at or below background levels. Overall, the groundwater quality at FFLF appears to be stable. Most parameters noted as being elevated above background levels do not appear to be increasing over time. Several parameters appear to be fluctuating but do not show an apparent long-term increasing or decreasing trend. ARM will continue to closely assess the noted parameters with increasing trends to see if any changes to the trends occur over time.

Form 50 Leachate Zone Summary

ARM reviewed the historic and First Quarter 2020 laboratory analytical results for sample location FFLEINFS (grab samples collected from the combined flow from FFLF's primary leachate collection lines) and four (4) manholes which represent the secondary leachate detection zones (FFMH01SS, FFMH03SS, FFMH05SS, and FFMH06SS).

Leachate flows in the primary and secondary zones appear to be generally stable over time apart from occasional fluctuations. Flows from the secondary zones appear to fluctuate seasonally, with the highest flows generally occurring in the first quarter and the lowest flows generally occurring in the third quarter.

Form 50 VOC Detections and Apparent Trends

2-butanone (MEK) and acetone were observed in FFLEINS in the First Quarter 2020 and have been historically present in the primary leachate samples. These VOC concentrations do not appear to be increasing over time.

1,1-dichloroethane, 1,4-dichlorobenzene, acetone, ethylbenzene, and xylenes were observed in FFMH01SS and have historically been present at low levels. 1,4-dichlorobenzene levels appear to be very slowly increasing over time, and the other noted VOC concentrations appear to be stable or decreasing.

Acetone was observed in FFMH03SS and has historically been present at levels between approximately 10-30 µg/l, although concentrations do not appear to be increasing over time.

Other Form 50 Detections and Apparent Trends

Ammonia-N, barium, chloride, iron, pH, potassium, sodium, and TOC levels appear to be increasing long-term at FFLEINFS and FFMH01SS. COD, nitrate-N, SpC, sulfate, TDS, and TOC appear to be decreasing at FFMH05SS. Alkalinity, calcium, magnesium, and manganese concentrations fluctuate across a wide range of values in the historical leachate results, but no long-term trends are apparent for these parameters. ARM will continue to closely assess the noted parameters with increasing trends to see if any changes to the trends occur over time.

Form 50 MCL Exceedances and Form 19 Subtitle D Parameter Analysis

Form 19 groundwater monitoring wells are subject to additional analysis of Subtitle D parameters at the next scheduled annual sampling event if secondary leachate samples collected from an upgradient cell are found to exceed the primary maximum contaminant limit (MCL) of a regulated compound. For the First Quarter 2020, the analyses for the secondary leachate samples collected from FFMH03SS and FFMH05SS resulted in MCL exceedances for nitrate-N. All downgradient wells should therefore be sampled for Subtitle D Form 19 parameters at the next annual sampling event.

Form 52 Contiguous Private Wells Summary

ARM reviewed the historic and First Quarter 2020 groundwater monitoring results for ten (10) contiguous privately-owned wells. Samples collected from these wells were analyzed for Form 52 parameters. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the First Quarter 2020. Background exceedances shown in **Table 2** denote a statistically significant increase of concentrations relative to those observed historically in the upgradient well MP-2.

- 3044RIVERRD – Parameters observed above background in this well include ammonia-N, total and dissolved magnesium, and dissolved potassium. Ammonia-N has been detected sporadically in this well since 2014 but does not appear to be increasing consistently over time. Magnesium and potassium levels appear to be stable and not increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.6 unit higher, on average, while fluctuating over a slightly wider range.

  Methylene chloride was detected at 1.2 µg/L in this well during the Fourth Quarter 2019 sampling event. Because this was the first historical detection at 3044RIVERRD and this parameter was not detected in First Quarter 2020 sampling results, ARM suspects that the Fourth Quarter 2019 detection was anomalous.

- 3052RIVERRD – No parameters were observed above background in this well. pH appears to be slowly increasing since 2017 and is currently approximately 0.6 unit higher than background.

- 3056RIVERRD – Parameters observed above background in this well include total and dissolved magnesium and dissolved potassium. Concentrations of both parameters appear to be stable and not increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.1 unit higher, on average, while fluctuating over a slightly wider range.

- 3060RIVERRD – Dissolved potassium was observed above background in this well but appears to be stable long-term. Turbidity was also slightly above background, but this does not appear to be a historically consistent issue in this well. pH appears to mimic the trend observed in the upgradient well at nearly identical levels, on average, while fluctuating over a slightly wider range.

- 3076RIVERRD – Parameters above background in this well include chloride, dissolved potassium, and total and dissolved sodium. Chloride and sodium levels appear to be stable and not increasing over time. Potassium levels appear to be trending toward an increase since the First Quarter 2019. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.3 unit higher, on average.

- 3079RIVERRD – Parameters above background in this well include chloride and dissolved potassium. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be trending toward an increase over time. Potassium levels appear to be trending toward an

increase since the First Quarter 2019. pH appears to be slowly increasing since 2017 and is currently approximately 1.2 units higher than background.

- 3088RIVERRD – Parameters observed above background in this well include total and bicarbonate alkalinity, chloride, dissolved potassium, total and dissolved sodium, SpC, and TDS. ARM understands that the property owner at this location installed a water treatment system in 2013 which coincides with several significant changes in parameter concentrations and trends. Notably, alkalinity, chloride, sodium, SpC, and TDS levels increased rapidly, and calcium, magnesium, potassium, and sulfate levels decreased rapidly during 2013. Nitrate-N concentrations initially decreased by about 50% during 2013 but have returned to historical average levels, fluctuating between approximately 7-14 mg/L. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.6 units higher, on average, while fluctuating over a slightly wider range.

- 3100RIVERRD – Chloride was observed above background in this well, but concentrations appear to be stable and not increasing over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average.

- 3106RIVERRD – Chloride, magnesium, and sodium were observed above background in this well. Concentrations of all these parameters appear to be trending toward an increase since the First Quarter 2019. Since late 2015, pH appears to mimic the trend observed in the upgradient well at levels approximately 1.1 units higher, on average.

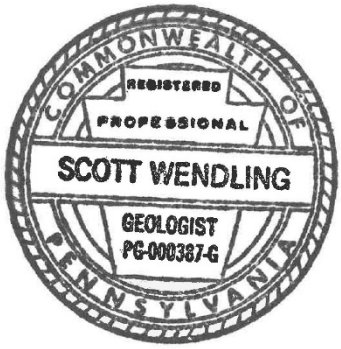
- 3125RIVERRD – Parameters observed above background in this well include total and bicarbonate alkalinity, chloride, dissolved potassium, total and dissolved sodium, SpC, and TDS. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be trending toward an increase over time. Sodium, SpC, and TDS levels appear to be decreasing since the Second Quarter 2018. Total and bicarbonate alkalinity and potassium levels began to increase during the Second, Third, and Fourth Quarters 2018 and remain elevated above background levels. pH also appears to be increasing since early 2018 and is currently approximately 2.2 units higher than background.

Form 52 parameters not noted above are either at or below background levels. ARM will continue to assess the noted apparent trends in the Form 52 results to see if any changes in the trends develop.

Closing

If you have any questions regarding this water quality data evaluation, please contact the undersigned at 717-533-8600. ARM sincerely appreciates the opportunity to assist LCSWMA with its assessment of quarterly water quality data collected at FFLF.

Sincerely,
ARM Group LLC



Ryan Brandon
Project Hydrogeologist II

Scott Wendling, P.G.
Vice President, Sr. Project Manager

Enclosed: Tables 1-2
Attachments 1-2

TABLES

Table 1. LCSWMA Frey Farm Landfill Form 19 Groundwater Monitoring Well Background Standard Comparisons - 1st Quarter 2020

Parameter	Background Standard	Units	FFMP002W	FFMP005W	FFMP015W	FFMP016W	FFMP017W	FFMP018W	FFMP019W	FFMP025W	FFMP028W	FFMP029W	FFMP02DW	FFMP02SW	FFMP031W	FFMP032W	FFMP033W	FFMP03AW	FFMP04AW	FFMP26RW	FFMP30RW
1,1,1-TRICHLOROETHANE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-DICHLOROETHANE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-DICHLOROETHENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-DIBROMOETHANE (EDB) (ETHYLENE DIBROMIDE)	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-DICHLOROETHANE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
ALKALINITY	143.8	mg/L	< 5	54	20	38	70	22	64	36	27	13	119	14	64	68	45	18	196	65	28
AMMONIA-NITROGEN	0.308	mg/L	< 0.10	< 0.10	0.18	0.31	0.25	0.13	< 0.10	0.26	< 0.10	< 0.10	< 0.10	0.10	0.10	0.51	0.68	0.19	< 0.10	< 0.10	0.10
BENZENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
BICARBONATE	137.8	mg/L	< 5	54	20	38	70	22	64	36	27	13	119	14	64	68	45	18	196	65	28
CALCIUM, TOTAL	73.1	mg/L	20.8	83.4	19.6	41.8	114	33.9	60.2	40.6	38.9	14.7	118	16.9	40.6	15.5	25.6	19.2	157	75.3	33.3
CHLORIDE	30.81	mg/L	22.5	203	23.7	101	387	106	82.8	96.4	88.3	66.7	299	55.8	24.6	22.7	40.8	27.3	306	127	163
cis 1,2-DICHLOROETHENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
COD (CHEMICAL OXYGEN DEMAND)	15*	mg/L	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15	< 15
ETHYLBENZENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
FLUORIDE	0.5	mg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
IRON, TOTAL	0.181	mg/L	0.090	< 0.060	0.46	0.14	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	< 0.060	0.94	1.1	4.2	17.5	6.1	< 0.060	< 0.060	< 0.060	< 0.060
MAGNESIUM, TOTAL	10.13	mg/L	8.6	20.8	18.9	18.1	42.2	15.4	5.7	19.5	17.8	9.8	18.7	6.6	3.9	5.3	9.4	13.4	26.2	14.8	15.8
MANGANESE, TOTAL	0.329	mg/L	0.25	0.090	0.050	0.0062	1.1	0.24	< 0.0056	< 0.0056	0.0080	0.030	0.48	0.010	0.30	0.65	0.49	0.28	0.30	1.0	2.0
METHYLENE CHLORIDE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
NITRATE-NITROGEN	28.7	mg/L	21.3	2.0	27.8	2.7	1.5	4.5	0.22	3.0	17.1	3.9	10.2	15.1	< 0.20	< 0.20	11.5	21.1	0.42	2.3	5.1
POTASSIUM, TOTAL	10.28	mg/L	1.4	3.5	2.5	3.3	10.0	5.7	0.98	3.3	2.4	2.3	2.0	5.9	1.4	1.3	1.8	1.5	2.5	10.6	4.8
SODIUM, TOTAL	22.2	mg/L	14.7	59.7	19.8	33.9	105	32.4	10.7	34.5	28.2	23.3	111	49.6	11.2	14	14.5	12.8	88.7	48.6	79.8
SPEC. COND., LAB	568.5	µmho/cm	270	954	382	550	1,540	517	444	536	543	295	1,270	409	282	184	332	294	1,420	789	713
SULFATE	59.1	mg/L	12.0	84.7	30.0	62.5	98.2	41.8	15.4	57.0	26.2	7.0	31.1	28.9	40.8	< 2.0	6.8	3.3	46.5	119	25.8
TDS (TOTAL DISSOLVED SOLIDS)	335.4	mg/L	224	640	210	252	760	314	252	290	294	144	866	108	328	78	86	222	944	500	696
TETRACHLOROETHENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TOC (TOTAL ORGANIC CARBON)	1.056	mg/L	< 0.50	1.9	1.0	2.0	3.3	0.97	1.4	1.7	0.87	< 0.50	0.68	2.9	< 0.50	0.53	< 0.50	< 0.50	0.80	2.5	0.76
TOLUENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TOTAL PHENOLICS	0.005*	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
trans 1,2-DICHLOROETHENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TRICHLOROETHENE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TURBIDITY	1.704	NTU	< 0.10	< 0.10	2.3	1.43	0.26	< 0.10	< 0.10	0.12	0.13	0.3	8.69	25.9	19.1	118	13.7	< 0.10	0.51	0.32	0.75
VINYL CHLORIDE	1*	µg/L	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
XYLENES (TOTAL)	3*	µg/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0

Notes:
Gray text indicates a parameter non-detection.
Shaded text indicates a background standard exceedance.
* Reporting limit substituted for background standard due to lack of historical detections in the upgradient well.

Table 2. LCSWMA Frey Farm Landfill Form 52 Groundwater Monitoring Well Background Standard Comparisons - 1st Quarter 2020

Parameter	FFLF Background Standard	Units	3044 RIVER RD	3052 RIVER RD	3056 RIVER RD	3060 RIVER RD	3076 RIVER RD	3079 RIVER RD	3088 RIVER RD	3100 RIVER RD	3106 RIVER RD	3125 RIVER RD
ALKALINITY	**145.8**	mg/L	8	8		13	10	36	152	15	16	167
AMMONIA-NITROGEN	**0.313**	mg/L	0.67	0.12			0.1	0.1		0.1	0.12	
BICARBONATE ALKALINITY	**143.2**	mg/L	8	8		13	10	36	152	15	16	167
CALCIUM, DISSOLVED	**28.22**	mg/L	16.0	16.3	11.3	10.7	16.0	10.6	0.3	18.9	18.0	15.00
CALCIUM, TOTAL	**73.74**	mg/L	14.2	17.0	10.9	9.4	14.0	9.2	0.10	20.1	24.4	19.50
CHLORIDE	**30.97**	mg/L	23.6	23.3	25.4	22.3	48.5	33.4	243	50.8	122	120
IRON, TOTAL	**0.185**	mg/L				0.030					0.060	
MAGNESIUM, DISSOLVED	**10.84**	mg/L	12.5	9.0	12.2	10.8	9.3	6.0	0.12	7.2	6.8	3.0
MAGNESIUM, TOTAL	**10.13**	mg/L	11	9.5	12.1	10.1	8.5	5.2	0.06	7.6	16.2	2.7
MANGANESE, DISSOLVED	**0.531**	mg/L	0.030	0.030	0.070	0.100	0.180	0.160		0.0088	0.0081	0.010
MANGANESE, TOTAL	**0.329**	mg/L	0.030	0.030	0.070	0.110	0.160	0.150		0.0090	0.040	0.010
NITRATE-NITROGEN	**28.7**	mg/L	19.3	18.3	18.8	15.3	10.1		6.6	4.2	14.2	5.9
pH-LAB	**NA**	S.U.	6.19	6.36	5.40	5.89	6.35	6.90	7.75	6.48	6.54	7.84
POTASSIUM, DISSOLVED	**1.685**	mg/L	2.0	1.5	3.4	4.1	3.5	1.7	2.6	1.1	0.9	24.6
POTASSIUM, TOTAL	**10.28**	mg/L	1.6	1.6	1.6	2.0	3.1	1.6	2.5	1.3	2.1	36.9
SODIUM, DISSOLVED	**21.81**	mg/L	10.5	7.6	8.1	8.3	25.3	14	224	16.7	16.4	117
SODIUM, TOTAL	**22.2**	mg/L	9.7	8.1	7.6	7.2	24.1	14	255	18.5	58	133
SPEC. COND., LAB	**568.5**	µmhos/cm	223	222	237	229	278	187	1,090	253	537	757
SULFATE	**59.1**	mg/L		2.0		10.6	12.7	11.9		10.7	6.2	16.6
TDS (TOT. DISSOLVED SOLIDS)	**335.4**	mg/L	90	106	152	130	202	56	502	162	304	420
TOC (TOTAL ORGANIC CARBON)	**1.056**	mg/L										0.66
TURBIDITY	**1.704**	NTU		0.19		1.78	0.25				1.12	

Notes:
Blank cells indicate parameter not detected by laboratory.
Shaded text indicates exceedance of a FFLF statistical background standard.

ATTACHMENT 1

BACKGROUND UPPER PREDICTION LIMITS

LCSWMA Frey Farm Landfill 1st Quarter 2020 - Background Upper Prediction Limits (MP-2)			
Parameter	**Distribution**	**Upper Prediction Limit**	**Unit**
1,1,1-Trichloroethane	NA	1*	µg/L
1,1-Dichloroethane	NA	1*	µg/L
1,1-Dichloroethene	NA	1*	µg/L
1,2-Dibromoethane	NA	1*	µg/L
1,2-Dichloroethane	NA	1*	µg/L
Alkalinity	No Distribution	143.8	mg/L
Ammonia-Nitrogen	Normal	0.308	mg/L
Benzene	NA	1*	µg/L
Bicarbonate Alkalinity	No Distribution	137.8	mg/L
Calcium, Total	No Distribution	73.1	mg/L
Chloride	Normal	30.81	mg/L
Cis 1,2-Dichloroethene	NA	1*	µg/L
Chemical Oxygen Demand	NA	15*	mg/L
Ethylbenzene	NA	1*	µg/L
Fluoride	No Distribution	0.50	mg/L
Iron, Total	Lognormal	0.181	mg/L
Magnesium, Total	Normal	10.13	mg/L
Manganese, Total	Lognormal	0.329	mg/L
Methylene Chloride	NA	1*	µg/L
Nitrate-Nitrogen	No Distribution	28.7	mg/L
pH-Lab	NA	None**	S.U.
Potassium, Total	No Distribution	10.28	mg/L
Sodium, Total	No Distribution	22.2	mg/L
Spec. Cond., Lab	No Distribution	568.5	µmhos/cm
Sulfate	No Distribution	59.1	mg/L
Total Dissolved Solids	Normal	335.4	mg/L
Tetrachloroethene	NA	1*	µg/L
Total Organic Carbon	Normal	1.056	mg/L
Toluene	NA	1*	µg/L
Total Phenolics	NA	0.005*	mg/L
Trans 1,2-Dichloroethene	NA	1*	µg/L
Trichloroethene	NA	1*	µg/L
Turbidity	Lognormal	1.704	NTU
Vinyl Chloride	NA	1*	µg/L
Total Xylenes	NA	3*	µg/L

Notes:

"NA" denotes parameter not detected or not enough detections in MP-2 over course of historical data to develop tolerance limits.

* Reporting limit substituted for background standard due to lack of historical detections.

** One-sided background standards are not appropriate for pH. Other analysis used in report.

ATTACHMENT 2

STATISTICAL CALCULATION SHEETS

	Background Statistics for Data Sets with Non-Detects	
User Selected Options		
Date/Time of Computation	ProUCL 5.16/3/2020 10:56:06 AM	
From File	MP-2 ProUCL Entry 20Q1.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Coverage	95%	
Different or Future K Observations	1	
Number of Bootstrap Operations	2000	

1,1,1-TRICHLOROETHANE (ug/L)

General Statistics

Total Number of Observations	45	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	45
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	1
Maximum Detect	N/A	Maximum Non-Detect	1
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,1,1-TRICHLOROETHANE (ug/L) was not processed!

1,1-DICHLOROETHANE (ug/L)

General Statistics

Total Number of Observations	45	Number of Missing Observations	0
Number of Distinct Observations	1		
Number of Detects	0	Number of Non-Detects	45
Number of Distinct Detects	0	Number of Distinct Non-Detects	1
Minimum Detect	N/A	Minimum Non-Detect	1
Maximum Detect	N/A	Maximum Non-Detect	1
Variance Detected	N/A	Percent Non-Detects	100%
Mean Detected	N/A	SD Detected	N/A
Mean of Detected Logged Data	N/A	SD of Detected Logged Data	N/A

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,1-DICHLOROETHANE (ug/L) was not processed!

	A	B	C	D	E	F	G	H	I	J	K	L
51	**1,1-DICHLOROETHENE (ug/L)**											
52												
53	**General Statistics**											
54	Total Number of Observations					45	Number of Missing Observations					0
55	Number of Distinct Observations					1						
56	Number of Detects					0	Number of Non-Detects					45
57	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
58	Minimum Detect					N/A	Minimum Non-Detect					1
59	Maximum Detect					N/A	Maximum Non-Detect					1
60	Variance Detected					N/A	Percent Non-Detects					100%
61	Mean Detected					N/A	SD Detected					N/A
62	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
63												
64	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
65	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
66	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
67												
68	**The data set for variable 1,1-DICHLOROETHENE (ug/L) was not processed!**											
69												
70												
71	**1,2-DIBROMOETHANE (ug/L)**											
72												
73	**General Statistics**											
74	Total Number of Observations					45	Number of Missing Observations					0
75	Number of Distinct Observations					1						
76	Number of Detects					0	Number of Non-Detects					45
77	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
78	Minimum Detect					N/A	Minimum Non-Detect					1
79	Maximum Detect					N/A	Maximum Non-Detect					1
80	Variance Detected					N/A	Percent Non-Detects					100%
81	Mean Detected					N/A	SD Detected					N/A
82	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
83												
84	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
85	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
86	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
87												
88	**The data set for variable 1,2-DIBROMOETHANE (ug/L) was not processed!**											
89												
90												
91	**1,2-DICHLOROETHANE**											
92												
93	**General Statistics**											
94	Total Number of Observations					45	Number of Missing Observations					0
95	Number of Distinct Observations					1						
96	Number of Detects					0	Number of Non-Detects					45
97	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
98	Minimum Detect					N/A	Minimum Non-Detect					1
99	Maximum Detect					N/A	Maximum Non-Detect					1
100	Variance Detected					N/A	Percent Non-Detects					100%

101					Mean Detected	N/A					SD Detected	N/A
102					Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A
103												
104	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
105	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
106	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
107												
108	The data set for variable 1,2-DICHLOROETHANE was not processed!											
109												
110												
111	ALKALINITY (mg/L)											
112												
113	General Statistics											
114					Total Number of Observations	44					Number of Missing Observations	0
115					Number of Distinct Observations	14						
116					Number of Detects	20					Number of Non-Detects	24
117					Number of Distinct Detects	14					Number of Distinct Non-Detects	1
118					Minimum Detect	5					Minimum Non-Detect	5
119					Maximum Detect	182					Maximum Non-Detect	5
120					Variance Detected	3029					Percent Non-Detects	54.55%
121					Mean Detected	42.2					SD Detected	55.03
122					Mean of Detected Logged Data	2.904					SD of Detected Logged Data	1.329
123												
124	Critical Values for Background Threshold Values (BTVs)											
125					Tolerance Factor K (For UTL)	2.091					d2max (for USL)	2.906
126												
127	Normal GOF Test on Detects Only											
128					Shapiro Wilk Test Statistic	0.725					Shapiro Wilk GOF Test	
129					5% Shapiro Wilk Critical Value	0.905					Data Not Normal at 5% Significance Level	
130					Lilliefors Test Statistic	0.283					Lilliefors GOF Test	
131					5% Lilliefors Critical Value	0.192					Data Not Normal at 5% Significance Level	
132	Data Not Normal at 5% Significance Level											
133												
134	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
135					KM Mean	21.91					KM SD	40.63
136					95% UTL95% Coverage	106.9					95% KM UPL (t)	90.98
137					90% KM Percentile (z)	73.98					95% KM Percentile (z)	88.74
138					99% KM Percentile (z)	116.4					95% KM USL	140
139												
140	DL/2 Substitution Background Statistics Assuming Normal Distribution											
141					Mean	20.55					SD	41.69
142					95% UTL95% Coverage	107.7					95% UPL (t)	91.42
143					90% Percentile (z)	73.97					95% Percentile (z)	89.12
144					99% Percentile (z)	117.5					95% USL	141.7
145	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
146												
147	Gamma GOF Tests on Detected Observations Only											
148					A-D Test Statistic	1.479					Anderson-Darling GOF Test	
149					5% A-D Critical Value	0.782					Data Not Gamma Distributed at 5% Significance Level	
150					K-S Test Statistic	0.263					Kolmogorov-Smirnov GOF	

151				5% K-S Critical Value	0.202	Data Not Gamma Distributed at 5% Significance Level						
152	Data Not Gamma Distributed at 5% Significance Level											
153												
154	**Gamma Statistics on Detected Data Only**											
155				k hat (MLE)	0.718	k star (bias corrected MLE)					0.644	
156				Theta hat (MLE)	58.77	Theta star (bias corrected MLE)					65.56	
157				nu hat (MLE)	28.72	nu star (bias corrected)					25.75	
158				MLE Mean (bias corrected)	42.2							
159				MLE Sd (bias corrected)	52.6	95% Percentile of Chisquare (2kstar)					4.516	
160												
161	**Gamma ROS Statistics using Imputed Non-Detects**											
162	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
163	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
164	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
165	This is especially true when the sample size is small.											
166	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
167				Minimum	0.01	Mean					19.19	
168				Maximum	182	Median					0.01	
169				SD	42.31	CV					2.205	
170				k hat (MLE)	0.18	k star (bias corrected MLE)					0.183	
171				Theta hat (MLE)	106.4	Theta star (bias corrected MLE)					104.7	
172				nu hat (MLE)	15.87	nu star (bias corrected)					16.12	
173				MLE Mean (bias corrected)	19.19	MLE Sd (bias corrected)					44.83	
174				95% Percentile of Chisquare (2kstar)	1.93	90% Percentile					57.91	
175				95% Percentile	101.1	99% Percentile					221.7	
176	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
177	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
178					WH	HW				WH	HW	
179				95% Approx. Gamma UTL with 95% Coverage	114.6	134.2	95% Approx. Gamma UPL			75.03	79.41	
180				95% Gamma USL	237.2	334.6						
181												
182	**Estimates of Gamma Parameters using KM Estimates**											
183				Mean (KM)	21.91	SD (KM)					40.63	
184				Variance (KM)	1651	SE of Mean (KM)					6.285	
185				k hat (KM)	0.291	k star (KM)					0.286	
186				nu hat (KM)	25.59	nu star (KM)					25.18	
187				theta hat (KM)	75.35	theta star (KM)					76.58	
188				80% gamma percentile (KM)	33.19	90% gamma percentile (KM)					64.97	
189				95% gamma percentile (KM)	101.8	99% gamma percentile (KM)					197.9	
190												
191	**The following statistics are computed using gamma distribution and KM estimates**											
192	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
193					WH	HW				WH	HW	
194				95% Approx. Gamma UTL with 95% Coverage	92.34	90.75	95% Approx. Gamma UPL			68.72	65.74	
195				95% KM Gamma Percentile	65.75	62.67	95% Gamma USL			157.8	165.2	
196												
197	**Lognormal GOF Test on Detected Observations Only**											
198				Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**						
199				5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level						
200				Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**						

201	5% Lilliefors Critical Value					0.192	Data Not Lognormal at 5% Significance Level					
202	Data Not Lognormal at 5% Significance Level											
203												
204	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
205	Mean in Original Scale					19.61	Mean in Log Scale					0.813
206	SD in Original Scale					42.12	SD in Log Scale					2.359
207	95% UTL95% Coverage					312.7	95% BCA UTL95% Coverage					171.7
208	95% Bootstrap (%) UTL95% Coverage					177.8	95% UPL (t)					124.3
209	90% Percentile (z)					46.34	95% Percentile (z)					109.2
210	99% Percentile (z)					544.8	95% USL					2139
211												
212	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
213	KM Mean of Logged Data					2.198	95% KM UTL (Lognormal)95% Coverage					87.1
214	KM SD of Logged Data					1.085	95% KM UPL (Lognormal)					56.99
215	95% KM Percentile Lognormal (z)					53.67	95% KM USL (Lognormal)					211
216												
217	**Background DL/2 Statistics Assuming Lognormal Distribution**											
218	Mean in Original Scale					20.55	Mean in Log Scale					1.82
219	SD in Original Scale					41.69	SD in Log Scale					1.335
220	95% UTL95% Coverage					100.6	95% UPL (t)					59.7
221	90% Percentile (z)					34.14	95% Percentile (z)					55.46
222	99% Percentile (z)					137.8	95% USL					298.8
223	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
224												
225	**Nonparametric Distribution Free Background Statistics**											
226	Data do not follow a Discernible Distribution (0.05)											
227												
228	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
229	Order of Statistic, r					44	95% UTL with95% Coverage					182
230	Approx, f used to compute achieved CC					2.316	Approximate Actual Confidence Coefficient achieved by UTL					0.895
231	Approximate Sample Size needed to achieve specified CC					59	95% UPL					143.8
232	95% USL					182	95% KM Chebyshev UPL					201
233												
234	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
235	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
236	and consists of observations collected from clean unimpacted locations.											
237	The use of USL tends to provide a balance between false positives and false negatives provided the data											
238	represents a background data set and when many onsite observations need to be compared with the BTV.											
239												
240	**AMMONIA-NITROGEN (mg/L)**											
241												
242	**General Statistics**											
243	Total Number of Observations					45	Number of Missing Observations					0
244	Number of Distinct Observations					7						
245	Number of Detects					7	Number of Non-Detects					38
246	Number of Distinct Detects					7	Number of Distinct Non-Detects					1
247	Minimum Detect					0.1	Minimum Non-Detect					0.1
248	Maximum Detect					0.63	Maximum Non-Detect					0.1
249	Variance Detected					0.0395	Percent Non-Detects					84.44%
250	Mean Detected					0.304	SD Detected					0.199

	A	B	C	D	E	F	G	H	I	J	K	L
251					Mean of Detected Logged Data	-1.389				SD of Detected Logged Data		0.699
252												
253					**Critical Values for Background Threshold Values (BTVs)**							
254					Tolerance Factor K (For UTL)	2.085				d2max (for USL)		2.915
255												
256					**Normal GOF Test on Detects Only**							
257					Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**					
258					5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level					
259					Lilliefors Test Statistic	0.254	**Lilliefors GOF Test**					
260					5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level					
261					**Detected Data appear Normal at 5% Significance Level**							
262												
263					**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**							
264					KM Mean	0.132				KM SD		0.104
265					95% UTL95% Coverage	0.348				95% KM UPL (t)		0.308
266					90% KM Percentile (z)	0.265				95% KM Percentile (z)		0.302
267					99% KM Percentile (z)	0.373				95% KM USL		0.434
268												
269					**DL/2 Substitution Background Statistics Assuming Normal Distribution**							
270					Mean	0.0896				SD		0.119
271					95% UTL95% Coverage	0.337				95% UPL (t)		0.291
272					90% Percentile (z)	0.242				95% Percentile (z)		0.285
273					99% Percentile (z)	0.366				95% USL		0.435
274					**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**							
275												
276					**Gamma GOF Tests on Detected Observations Only**							
277					A-D Test Statistic	0.319	**Anderson-Darling GOF Test**					
278					5% A-D Critical Value	0.713	Detected data appear Gamma Distributed at 5% Significance Level					
279					K-S Test Statistic	0.212	**Kolmogorov-Smirnov GOF**					
280					5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level					
281					**Detected data appear Gamma Distributed at 5% Significance Level**							
282												
283					**Gamma Statistics on Detected Data Only**							
284					k hat (MLE)	2.665				k star (bias corrected MLE)		1.618
285					Theta hat (MLE)	0.114				Theta star (bias corrected MLE)		0.188
286					nu hat (MLE)	37.3				nu star (bias corrected)		22.65
287					MLE Mean (bias corrected)	0.304						
288					MLE Sd (bias corrected)	0.239				95% Percentile of Chisquare (2kstar)		8.22
289												
290					**Gamma ROS Statistics using Imputed Non-Detects**							
291					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
292					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
293					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
294					This is especially true when the sample size is small.							
295					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
296					Minimum	0.01				Mean		0.0558
297					Maximum	0.63				Median		0.01
298					SD	0.13				CV		2.339
299					k hat (MLE)	0.518				k star (bias corrected MLE)		0.499
300					Theta hat (MLE)	0.108				Theta star (bias corrected MLE)		0.112

	A	B	C	D	E	F	G	H	I	J	K	L
301					nu hat (MLE)	46.65				nu star (bias corrected)		44.88
302					MLE Mean (bias corrected)	0.0558				MLE Sd (bias corrected)		0.079
303					95% Percentile of Chisquare (2kstar)	3.835				90% Percentile		0.151
304					95% Percentile	0.214				99% Percentile		0.371
305	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
306	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
307					WH	HW					WH	HW
308	95% Approx. Gamma UTL with 95% Coverage				0.249	0.238	95% Approx. Gamma UPL				0.18	0.167
309	95% Gamma USL				0.452	0.465						
310												
311	**Estimates of Gamma Parameters using KM Estimates**											
312					Mean (KM)	0.132				SD (KM)		0.104
313					Variance (KM)	0.0107				SE of Mean (KM)		0.0167
314					k hat (KM)	1.616				k star (KM)		1.523
315					nu hat (KM)	145.4				nu star (KM)		137.1
316					theta hat (KM)	0.0816				theta star (KM)		0.0865
317					80% gamma percentile (KM)	0.204				90% gamma percentile (KM)		0.274
318					95% gamma percentile (KM)	0.342				99% gamma percentile (KM)		0.495
319												
320	**The following statistics are computed using gamma distribution and KM estimates**											
321	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
322					WH	HW					WH	HW
323	95% Approx. Gamma UTL with 95% Coverage				0.3	0.293	95% Approx. Gamma UPL				0.258	0.252
324	95% KM Gamma Percentile				0.252	0.246	95% Gamma USL				0.404	0.401
325												
326	**Lognormal GOF Test on Detected Observations Only**											
327					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**					
328					5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level					
329					Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**					
330					5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level					
331	Detected Data appear Lognormal at 5% Significance Level											
332												
333	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
334					Mean in Original Scale	0.0624	Mean in Log Scale					-4.304
335					SD in Original Scale	0.13	SD in Log Scale					1.874
336					95% UTL95% Coverage	0.672	95% BCA UTL95% Coverage					0.586
337					95% Bootstrap (%) UTL95% Coverage	0.596	95% UPL (t)					0.326
338					90% Percentile (z)	0.149	95% Percentile (z)					0.295
339					99% Percentile (z)	1.056	95% USL					3.185
340												
341	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
342					KM Mean of Logged Data	-2.16	95% KM UTL (Lognormal)95% Coverage					0.276
343					KM SD of Logged Data	0.418	95% KM UPL (Lognormal)					0.234
344					95% KM Percentile Lognormal (z)	0.229	95% KM USL (Lognormal)					0.39
345												
346	**Background DL/2 Statistics Assuming Lognormal Distribution**											
347					Mean in Original Scale	0.0896	Mean in Log Scale					-2.746
348					SD in Original Scale	0.119	SD in Log Scale					0.643
349					95% UTL95% Coverage	0.245	95% UPL (t)					0.191
350					90% Percentile (z)	0.146	95% Percentile (z)					0.185

351					99% Percentile (z)	0.286					95% USL	0.418
352	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
353												
354	Nonparametric Distribution Free Background Statistics											
355	Data appear to follow a Discernible Distribution at 5% Significance Level											
356												
357	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
358					Order of Statistic, r	44					95% UTL with95% Coverage	0.46
359					Approx, f used to compute achieved CC	1.158					Approximate Actual Confidence Coefficient achieved by UTL	0.665
360					Approximate Sample Size needed to achieve specified CC	93					95% UPL	0.445
361					95% USL	0.63					95% KM Chebyshev UPL	0.589
362												
363	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
364	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
365	and consists of observations collected from clean unimpacted locations.											
366	The use of USL tends to provide a balance between false positives and false negatives provided the data											
367	represents a background data set and when many onsite observations need to be compared with the BTV.											
368												
369	BENZENE (ug/L)											
370												
371	General Statistics											
372					Total Number of Observations	45					Number of Missing Observations	0
373					Number of Distinct Observations	1						
374					Number of Detects	0					Number of Non-Detects	45
375					Number of Distinct Detects	0					Number of Distinct Non-Detects	1
376					Minimum Detect	N/A					Minimum Non-Detect	1
377					Maximum Detect	N/A					Maximum Non-Detect	1
378					Variance Detected	N/A					Percent Non-Detects	100%
379					Mean Detected	N/A					SD Detected	N/A
380					Mean of Detected Logged Data	N/A					SD of Detected Logged Data	N/A
381												
382	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
383	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
384	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
385												
386	The data set for variable BENZENE (ug/L) was not processed!											
387												
388												
389	BICARBONATE ALKALINITY (mg/L)											
390												
391	General Statistics											
392					Total Number of Observations	45					Number of Missing Observations	0
393					Number of Distinct Observations	14						
394					Number of Detects	20					Number of Non-Detects	25
395					Number of Distinct Detects	14					Number of Distinct Non-Detects	1
396					Minimum Detect	5					Minimum Non-Detect	5
397					Maximum Detect	182					Maximum Non-Detect	5
398					Variance Detected	2624					Percent Non-Detects	55.56%
399					Mean Detected	36.65					SD Detected	51.23
400					Mean of Detected Logged Data	2.823					SD of Detected Logged Data	1.241

401												
402	**Critical Values for Background Threshold Values (BTVs)**											
403					Tolerance Factor K (For UTL)	2.085			d2max (for USL)	2.915		
404												
405	**Normal GOF Test on Detects Only**											
406					Shapiro Wilk Test Statistic	0.673	**Shapiro Wilk GOF Test**					
407					5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level					
408					Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**					
409					5% Lilliefors Critical Value	0.192	Data Not Normal at 5% Significance Level					
410	Data Not Normal at 5% Significance Level											
411												
412	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
413					KM Mean	19.07			KM SD	36.81		
414					95% UTL95% Coverage	95.83			95% KM UPL (t)	81.61		
415					90% KM Percentile (z)	66.25			95% KM Percentile (z)	79.62		
416					99% KM Percentile (z)	104.7			95% KM USL	126.4		
417												
418	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
419					Mean	17.68			SD	37.78		
420					95% UTL95% Coverage	96.46			95% UPL (t)	81.87		
421					90% Percentile (z)	66.1			95% Percentile (z)	79.83		
422					99% Percentile (z)	105.6			95% USL	127.8		
423	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
424												
425	**Gamma GOF Tests on Detected Observations Only**											
426					A-D Test Statistic	1.343	**Anderson-Darling GOF Test**					
427					5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level					
428					K-S Test Statistic	0.251	**Kolmogorov-Smirnov GOF**					
429					5% K-S Critical Value	0.201	Data Not Gamma Distributed at 5% Significance Level					
430	Data Not Gamma Distributed at 5% Significance Level											
431												
432	**Gamma Statistics on Detected Data Only**											
433					k hat (MLE)	0.767			k star (bias corrected MLE)	0.685		
434					Theta hat (MLE)	47.81			Theta star (bias corrected MLE)	53.51		
435					nu hat (MLE)	30.66			nu star (bias corrected)	27.4		
436					MLE Mean (bias corrected)	36.65						
437					MLE Sd (bias corrected)	44.28			95% Percentile of Chisquare (2kstar)	4.699		
438												
439	**Gamma ROS Statistics using Imputed Non-Detects**											
440	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
441	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
442	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
443	This is especially true when the sample size is small.											
444	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
445					Minimum	0.01			Mean	16.29		
446					Maximum	182			Median	0.01		
447					SD	38.37			CV	2.355		
448					k hat (MLE)	0.182			k star (bias corrected MLE)	0.185		
449					Theta hat (MLE)	89.37			Theta star (bias corrected MLE)	88.09		
450					nu hat (MLE)	16.41			nu star (bias corrected)	16.65		

	A	B	C	D	E	F	G	H	I	J	K	L
451				MLE Mean (bias corrected)		16.29				MLE Sd (bias corrected)		37.89
452				95% Percentile of Chisquare (2kstar)		1.944				90% Percentile		49.2
453				95% Percentile		85.63				99% Percentile		187.3
454	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
455	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
456					WH	HW					WH	HW
457	95% Approx. Gamma UTL with 95% Coverage				95.87	111.8	95% Approx. Gamma UPL				63.1	66.63
458				95% Gamma USL	200.9	282.8						
459												
460	**Estimates of Gamma Parameters using KM Estimates**											
461				Mean (KM)		19.07				SD (KM)		36.81
462				Variance (KM)		1355				SE of Mean (KM)		5.631
463				k hat (KM)		0.268				k star (KM)		0.265
464				nu hat (KM)		24.14				nu star (KM)		23.86
465				theta hat (KM)		71.08				theta star (KM)		71.9
466				80% gamma percentile (KM)		28.24				90% gamma percentile (KM)		56.96
467				95% gamma percentile (KM)		90.66				99% gamma percentile (KM)		179.7
468												
469	**The following statistics are computed using gamma distribution and KM estimates**											
470	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
471					WH	HW					WH	HW
472	95% Approx. Gamma UTL with 95% Coverage				76.72	74.73	95% Approx. Gamma UPL				57.87	55.09
473	95% KM Gamma Percentile				55.51	52.69	95% Gamma USL				130.2	134.3
474												
475	**Lognormal GOF Test on Detected Observations Only**											
476				Shapiro Wilk Test Statistic		0.864	**Shapiro Wilk GOF Test**					
477				5% Shapiro Wilk Critical Value		0.905	Data Not Lognormal at 5% Significance Level					
478				Lilliefors Test Statistic		0.212	**Lilliefors GOF Test**					
479				5% Lilliefors Critical Value		0.192	Data Not Lognormal at 5% Significance Level					
480	Data Not Lognormal at 5% Significance Level											
481												
482	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
483				Mean in Original Scale		16.74	Mean in Log Scale					0.79
484				SD in Original Scale		38.18	SD in Log Scale					2.246
485				95% UTL95% Coverage		238.3	95% BCA UTL95% Coverage					154
486				95% Bootstrap (%) UTL95% Coverage		176.4	95% UPL (t)					100.1
487				90% Percentile (z)		39.21	95% Percentile (z)					88.67
488				99% Percentile (z)		409.8	95% USL					1538
489												
490	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
491				KM Mean of Logged Data		2.149	95% KM UTL (Lognormal)95% Coverage					69.98
492				KM SD of Logged Data		1.007	95% KM UPL (Lognormal)					47.43
493				95% KM Percentile Lognormal (z)		44.92	95% KM USL (Lognormal)					161.5
494												
495	**Background DL/2 Statistics Assuming Lognormal Distribution**											
496				Mean in Original Scale		17.68	Mean in Log Scale					1.764
497				SD in Original Scale		37.78	SD in Log Scale					1.258
498				95% UTL95% Coverage		80.4	95% UPL (t)					49.45
499				90% Percentile (z)		29.26	95% Percentile (z)					46.21
500				99% Percentile (z)		108.9	95% USL					228.5

DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.

Nonparametric Distribution Free Background Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)

Order of Statistic, r	44	95% UTL with95% Coverage	154
Approx, f used to compute achieved CC	1.158	Approximate Actual Confidence Coefficient achieved by UTL	0.665
Approximate Sample Size needed to achieve specified CC	93	95% UPL	137.8
95% USL	182	95% KM Chebyshev UPL	181.3

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

CALCIUM, TOTAL (mg/L)

General Statistics

Total Number of Observations	44	Number of Distinct Observations	38
Minimum	18.9	First Quartile	21.05
Second Largest	74.7	Median	23.1
Maximum	93	Third Quartile	25.08
Mean	27.87	SD	15.25
Coefficient of Variation	0.547	Skewness	3.114
Mean of logged Data	3.245	SD of logged Data	0.357

Critical Values for Background Threshold Values (BTVs)

Tolerance Factor K (For UTL)	2.091	d2max (for USL)	2.906

Normal GOF Test

Shapiro Wilk Test Statistic	0.531	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Background Statistics Assuming Normal Distribution

95% UTL with 95% Coverage	59.75	90% Percentile (z)	47.41
95% UPL (t)	53.79	95% Percentile (z)	52.95
95% USL	72.18	99% Percentile (z)	63.34

Gamma GOF Test

A-D Test Statistic	6.362	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.314	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.134	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

551	**Gamma Statistics**											
552					k hat (MLE)	6.236			k star (bias corrected MLE)	5.826		
553					Theta hat (MLE)	4.47			Theta star (bias corrected MLE)	4.784		
554					nu hat (MLE)	548.8			nu star (bias corrected)	512.7		
555					MLE Mean (bias corrected)	27.87			MLE Sd (bias corrected)	11.55		
556												
557	**Background Statistics Assuming Gamma Distribution**											
558					95% Wilson Hilferty (WH) Approx. Gamma UPL	49.21			90% Percentile	43.31		
559					95% Hawkins Wixley (HW) Approx. Gamma UPL	48.66			95% Percentile	49.18		
560					95% WH Approx. Gamma UTL with 95% Coverage	55.9			99% Percentile	61.48		
561					95% HW Approx. Gamma UTL with 95% Coverage	55.45						
562					95% WH USL	71.76			95% HW USL	71.85		
563												
564	**Lognormal GOF Test**											
565					Shapiro Wilk Test Statistic	0.671			**Shapiro Wilk Lognormal GOF Test**			
566					5% Shapiro Wilk Critical Value	0.944			Data Not Lognormal at 5% Significance Level			
567					Lilliefors Test Statistic	0.284			**Lilliefors Lognormal GOF Test**			
568					5% Lilliefors Critical Value	0.132			Data Not Lognormal at 5% Significance Level			
569	Data Not Lognormal at 5% Significance Level											
570												
571	**Background Statistics assuming Lognormal Distribution**											
572					95% UTL with 95% Coverage	54.16			90% Percentile (z)	40.56		
573					95% UPL (t)	47.1			95% Percentile (z)	46.18		
574					95% USL	72.45			99% Percentile (z)	58.9		
575												
576	**Nonparametric Distribution Free Background Statistics**											
577	Data do not follow a Discernible Distribution (0.05)											
578												
579	**Nonparametric Upper Limits for Background Threshold Values**											
580					Order of Statistic, r	44			95% UTL with 95% Coverage	93		
581					Approx, f used to compute achieved CC	2.316			Approximate Actual Confidence Coefficient achieved by UTL	0.895		
582									Approximate Sample Size needed to achieve specified CC	59		
583					95% Percentile Bootstrap UTL with 95% Coverage	90.26			95% BCA Bootstrap UTL with 95% Coverage	89.3		
584					95% UPL	73.1			90% Percentile	34.63		
585					90% Chebyshev UPL	74.13			95% Percentile	65.96		
586					95% Chebyshev UPL	95.08			99% Percentile	85.13		
587					95% USL	93						
588												
589	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
590	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
591	and consists of observations collected from clean unimpacted locations.											
592	The use of USL tends to provide a balance between false positives and false negatives provided the data											
593	represents a background data set and when many onsite observations need to be compared with the BTV.											
594												
595	**CHLORIDE (mg/L)**											
596												
597	**General Statistics**											
598					Total Number of Observations	45			Number of Distinct Observations	39		
599					Minimum	19.6			First Quartile	22.3		
600					Second Largest	34.3			Median	25.1		

601					Maximum	34.5					Third Quartile	26.5
602					Mean	25.01					SD	3.413
603					Coefficient of Variation	0.136					Skewness	0.978
604					Mean of logged Data	3.211					SD of logged Data	0.131
605												
606					**Critical Values for Background Threshold Values (BTVs)**							
607					Tolerance Factor K (For UTL)	2.085					d2max (for USL)	2.915
608												
609					**Normal GOF Test**							
610					Shapiro Wilk Test Statistic	0.923					**Shapiro Wilk GOF Test**	
611					5% Shapiro Wilk Critical Value	0.945					Data Not Normal at 5% Significance Level	
612					Lilliefors Test Statistic	0.112					**Lilliefors GOF Test**	
613					5% Lilliefors Critical Value	0.131					Data appear Normal at 5% Significance Level	
614					**Data appear Approximate Normal at 5% Significance Level**							
615												
616					**Background Statistics Assuming Normal Distribution**							
617					95% UTL with 95% Coverage	32.13					90% Percentile (z)	29.38
618					95% UPL (t)	30.81					95% Percentile (z)	30.62
619					95% USL	34.96					99% Percentile (z)	32.95
620												
621					**Gamma GOF Test**							
622					A-D Test Statistic	0.553					**Anderson-Darling Gamma GOF Test**	
623					5% A-D Critical Value	0.747					Detected data appear Gamma Distributed at 5% Significance Level	
624					K-S Test Statistic	0.0942					**Kolmogorov-Smirnov Gamma GOF Test**	
625					5% K-S Critical Value	0.131					Detected data appear Gamma Distributed at 5% Significance Level	
626					**Detected data appear Gamma Distributed at 5% Significance Level**							
627												
628					**Gamma Statistics**							
629					k hat (MLE)	58.28					k star (bias corrected MLE)	54.41
630					Theta hat (MLE)	0.429					Theta star (bias corrected MLE)	0.46
631					nu hat (MLE)	5245					nu star (bias corrected)	4897
632					MLE Mean (bias corrected)	25.01					MLE Sd (bias corrected)	3.391
633												
634					**Background Statistics Assuming Gamma Distribution**							
635					95% Wilson Hilferty (WH) Approx. Gamma UPL	30.9					90% Percentile	29.44
636					95% Hawkins Wixley (HW) Approx. Gamma UPL	30.92					95% Percentile	30.83
637					95% WH Approx. Gamma UTL with 95% Coverage	32.4					99% Percentile	33.56
638					95% HW Approx. Gamma UTL with 95% Coverage	32.44						
639					95% WH USL	35.78					95% HW USL	35.91
640												
641					**Lognormal GOF Test**							
642					Shapiro Wilk Test Statistic	0.954					**Shapiro Wilk Lognormal GOF Test**	
643					5% Shapiro Wilk Critical Value	0.945					Data appear Lognormal at 5% Significance Level	
644					Lilliefors Test Statistic	0.0892					**Lilliefors Lognormal GOF Test**	
645					5% Lilliefors Critical Value	0.131					Data appear Lognormal at 5% Significance Level	
646					**Data appear Lognormal at 5% Significance Level**							
647												
648					**Background Statistics assuming Lognormal Distribution**							
649					95% UTL with 95% Coverage	32.59					90% Percentile (z)	29.33
650					95% UPL (t)	30.98					95% Percentile (z)	30.76

651					95% USL	36.33				99% Percentile (z)		33.63
652												
653					Nonparametric Distribution Free Background Statistics							
654					Data appear Approximate Normal at 5% Significance Level							
655												
656					Nonparametric Upper Limits for Background Threshold Values							
657					Order of Statistic, r	44				95% UTL with 95% Coverage		34.3
658					Approx, f used to compute achieved CC	1.158				Approximate Actual Confidence Coefficient achieved by UTL		0.665
659										Approximate Sample Size needed to achieve specified CC		93
660					95% Percentile Bootstrap UTL with 95% Coverage	34.46				95% BCA Bootstrap UTL with 95% Coverage		34.3
661					95% UPL	33.79				90% Percentile		28.48
662					90% Chebyshev UPL	35.36				95% Percentile		32.1
663					95% Chebyshev UPL	40.05				99% Percentile		34.41
664					95% USL	34.5						
665												
666					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
667					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
668					and consists of observations collected from clean unimpacted locations.							
669					The use of USL tends to provide a balance between false positives and false negatives provided the data							
670					represents a background data set and when many onsite observations need to be compared with the BTV.							
671												
672	CIS 1,2-DICHLOROETHENE (ug/L)											
673												
674					General Statistics							
675					Total Number of Observations	45				Number of Missing Observations		0
676					Number of Distinct Observations	1						
677					Number of Detects	0				Number of Non-Detects		45
678					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
679					Minimum Detect	N/A				Minimum Non-Detect		1
680					Maximum Detect	N/A				Maximum Non-Detect		1
681					Variance Detected	N/A				Percent Non-Detects		100%
682					Mean Detected	N/A				SD Detected		N/A
683					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
684												
685					Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
686					Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
687					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
688												
689					The data set for variable CIS 1,2-DICHLOROETHENE (ug/L) was not processed!							
690												
691												
692	Chemical Oxygen Demand (mg/L)											
693												
694					General Statistics							
695					Total Number of Observations	44				Number of Missing Observations		0
696					Number of Distinct Observations	3						
697					Number of Detects	0				Number of Non-Detects		44
698					Number of Distinct Detects	0				Number of Distinct Non-Detects		3
699					Minimum Detect	N/A				Minimum Non-Detect		5
700					Maximum Detect	N/A				Maximum Non-Detect		15

701					Variance Detected	N/A				Percent Non-Detects		100%
702					Mean Detected	N/A				SD Detected		N/A
703					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
704												
705	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
706	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
707	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
708												
709	The data set for variable Chemical Oxygen Demand (mg/L) was not processed!											
710												
711												
712	**ETHYLBENZENE (mg/L)**											
713												
714	**General Statistics**											
715					Total Number of Observations	45				Number of Missing Observations		0
716					Number of Distinct Observations	1						
717					Number of Detects	0				Number of Non-Detects		45
718					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
719					Minimum Detect	N/A				Minimum Non-Detect		1
720					Maximum Detect	N/A				Maximum Non-Detect		1
721					Variance Detected	N/A				Percent Non-Detects		100%
722					Mean Detected	N/A				SD Detected		N/A
723					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
724												
725	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
726	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
727	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
728												
729	The data set for variable ETHYLBENZENE (mg/L) was not processed!											
730												
731												
732	**FLUORIDE (mg/L)**											
733												
734	**General Statistics**											
735					Total Number of Observations	44				Number of Missing Observations		0
736					Number of Distinct Observations	7						
737					Number of Detects	15				Number of Non-Detects		29
738					Number of Distinct Detects	6				Number of Distinct Non-Detects		2
739					Minimum Detect	0.12				Minimum Non-Detect		0.2
740					Maximum Detect	0.24				Maximum Non-Detect		0.5
741					Variance Detected	0.00157				Percent Non-Detects		65.91%
742					Mean Detected	0.157				SD Detected		0.0396
743					Mean of Detected Logged Data	-1.881				SD of Detected Logged Data		0.237
744												
745	**Critical Values for Background Threshold Values (BTVs)**											
746					Tolerance Factor K (For UTL)	2.091				d2max (for USL)		2.906
747												
748	**Normal GOF Test on Detects Only**											
749					Shapiro Wilk Test Statistic	0.807				**Shapiro Wilk GOF Test**		
750					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		

751					Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**					
752					5% Lilliefors Critical Value	0.22	Data Not Normal at 5% Significance Level					
753					Data Not Normal at 5% Significance Level							
754												
755					**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**							
756					KM Mean	0.143	KM SD	0.0299				
757					95% UTL95% Coverage	0.206	95% KM UPL (t)	0.194				
758					90% KM Percentile (z)	0.181	95% KM Percentile (z)	0.192				
759					99% KM Percentile (z)	0.213	95% KM USL	0.23				
760												
761					**DL/2 Substitution Background Statistics Assuming Normal Distribution**							
762					Mean	0.16	SD	0.0648				
763					95% UTL95% Coverage	0.296	95% UPL (t)	0.27				
764					90% Percentile (z)	0.243	95% Percentile (z)	0.267				
765					99% Percentile (z)	0.311	95% USL	0.349				
766					DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons							
767												
768					**Gamma GOF Tests on Detected Observations Only**							
769					A-D Test Statistic	1.282	**Anderson-Darling GOF Test**					
770					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
771					K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**					
772					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
773					Data Not Gamma Distributed at 5% Significance Level							
774												
775					**Gamma Statistics on Detected Data Only**							
776					k hat (MLE)	18.4	k star (bias corrected MLE)	14.76				
777					Theta hat (MLE)	0.00852	Theta star (bias corrected MLE)	0.0106				
778					nu hat (MLE)	551.9	nu star (bias corrected)	442.9				
779					MLE Mean (bias corrected)	0.157						
780					MLE Sd (bias corrected)	0.0408	95% Percentile of Chisquare (2kstar)	43.19				
781												
782					**Gamma ROS Statistics using Imputed Non-Detects**							
783					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
784					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
785					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
786					This is especially true when the sample size is small.							
787					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
788					Minimum	0.0917	Mean	0.145				
789					Maximum	0.24	Median	0.139				
790					SD	0.0321	CV	0.221				
791					k hat (MLE)	22.39	k star (bias corrected MLE)	20.88				
792					Theta hat (MLE)	0.00647	Theta star (bias corrected MLE)	0.00694				
793					nu hat (MLE)	1971	nu star (bias corrected)	1838				
794					MLE Mean (bias corrected)	0.145	MLE Sd (bias corrected)	0.0317				
795					95% Percentile of Chisquare (2kstar)	57.85	90% Percentile	0.187				
796					95% Percentile	0.201	99% Percentile	0.229				
797					**The following statistics are computed using Gamma ROS Statistics on Imputed Data**							
798					**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**							
799						WH	HW				WH	HW
800					95% Approx. Gamma UTL with 95% Coverage	0.217	0.218	95% Approx. Gamma UPL			0.201	0.202

	A	B	C	D	E	F	G	H	I	J	K	L
801				95% Gamma USL	0.252	0.254						
802												
803	**Estimates of Gamma Parameters using KM Estimates**											
804				Mean (KM)	0.143				SD (KM)		0.0299	
805				Variance (KM)	8.9675E-4				SE of Mean (KM)		0.00586	
806				k hat (KM)	22.81				k star (KM)		21.27	
807				nu hat (KM)	2008				nu star (KM)		1872	
808				theta hat (KM)	0.00627				theta star (KM)		0.00672	
809				80% gamma percentile (KM)	0.168				90% gamma percentile (KM)		0.184	
810				95% gamma percentile (KM)	0.198				99% gamma percentile (KM)		0.225	
811												
812	**The following statistics are computed using gamma distribution and KM estimates**											
813	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
814					WH	HW					WH	HW
815				95% Approx. Gamma UTL with 95% Coverage	0.205	0.206			95% Approx. Gamma UPL		0.192	0.192
816				95% KM Gamma Percentile	0.19	0.19			95% Gamma USL		0.235	0.236
817												
818	**Lognormal GOF Test on Detected Observations Only**											
819				Shapiro Wilk Test Statistic	0.828		**Shapiro Wilk GOF Test**					
820				5% Shapiro Wilk Critical Value	0.881		Data Not Lognormal at 5% Significance Level					
821				Lilliefors Test Statistic	0.24		**Lilliefors GOF Test**					
822				5% Lilliefors Critical Value	0.22		Data Not Lognormal at 5% Significance Level					
823	Data Not Lognormal at 5% Significance Level											
824												
825	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
826				Mean in Original Scale	0.145				Mean in Log Scale		-1.95	
827				SD in Original Scale	0.0306				SD in Log Scale		0.198	
828				95% UTL95% Coverage	0.215				95% BCA UTL95% Coverage		0.2	
829				95% Bootstrap (%) UTL95% Coverage	0.234				95% UPL (t)		0.199	
830				90% Percentile (z)	0.183				95% Percentile (z)		0.197	
831				99% Percentile (z)	0.226				95% USL		0.253	
832												
833	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
834				KM Mean of Logged Data	-1.963				95% KM UTL (Lognormal)95% Coverage		0.206	
835				KM SD of Logged Data	0.182				95% KM UPL (Lognormal)		0.191	
836				95% KM Percentile Lognormal (z)	0.19				95% KM USL (Lognormal)		0.239	
837												
838	**Background DL/2 Statistics Assuming Lognormal Distribution**											
839				Mean in Original Scale	0.16				Mean in Log Scale		-1.909	
840				SD in Original Scale	0.0648				SD in Log Scale		0.395	
841				95% UTL95% Coverage	0.339				95% UPL (t)		0.29	
842				90% Percentile (z)	0.246				95% Percentile (z)		0.284	
843				99% Percentile (z)	0.372				95% USL		0.467	
844	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
845												
846	**Nonparametric Distribution Free Background Statistics**											
847	Data do not follow a Discernible Distribution (0.05)											
848												
849	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
850				Order of Statistic, r	44				95% UTL with95% Coverage		0.5	

851	Approx, f used to compute achieved CC					2.316	Approximate Actual Confidence Coefficient achieved by UTL					0.895
852	Approximate Sample Size needed to achieve specified CC					59	95% UPL					0.5
853	95% USL					0.5	95% KM Chebyshev UPL					0.275
854												
855	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
856	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
857	and consists of observations collected from clean unimpacted locations.											
858	The use of USL tends to provide a balance between false positives and false negatives provided the data											
859	represents a background data set and when many onsite observations need to be compared with the BTV.											
860												
861	**IRON, TOTAL (mg/L)**											
862												
863	**General Statistics**											
864	Total Number of Observations					43	Number of Missing Observations					0
865	Number of Distinct Observations					11						
866	Number of Detects					14	Number of Non-Detects					29
867	Number of Distinct Detects					10	Number of Distinct Non-Detects					1
868	Minimum Detect					0.07	Minimum Non-Detect					0.06
869	Maximum Detect					0.37	Maximum Non-Detect					0.06
870	Variance Detected					0.00841	Percent Non-Detects					67.44%
871	Mean Detected					0.161	SD Detected					0.0917
872	Mean of Detected Logged Data					-1.947	SD of Detected Logged Data					0.482
873												
874	**Critical Values for Background Threshold Values (BTVs)**											
875	Tolerance Factor K (For UTL)					2.097	d2max (for USL)					2.897
876												
877	**Normal GOF Test on Detects Only**											
878	Shapiro Wilk Test Statistic					0.773	**Shapiro Wilk GOF Test**					
879	5% Shapiro Wilk Critical Value					0.874	Data Not Normal at 5% Significance Level					
880	Lilliefors Test Statistic					0.304	**Lilliefors GOF Test**					
881	5% Lilliefors Critical Value					0.226	Data Not Normal at 5% Significance Level					
882	Data Not Normal at 5% Significance Level											
883												
884	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
885	KM Mean					0.0928	KM SD					0.0691
886	95% UTL95% Coverage					0.238	95% KM UPL (t)					0.21
887	90% KM Percentile (z)					0.181	95% KM Percentile (z)					0.206
888	99% KM Percentile (z)					0.253	95% KM USL					0.293
889												
890	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
891	Mean					0.0726	SD					0.0803
892	95% UTL95% Coverage					0.241	95% UPL (t)					0.209
893	90% Percentile (z)					0.175	95% Percentile (z)					0.205
894	99% Percentile (z)					0.259	95% USL					0.305
895	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
896												
897	**Gamma GOF Tests on Detected Observations Only**											
898	A-D Test Statistic					0.765	**Anderson-Darling GOF Test**					
899	5% A-D Critical Value					0.739	Data Not Gamma Distributed at 5% Significance Level					
900	K-S Test Statistic					0.262	**Kolmogorov-Smirnov GOF**					

901				5% K-S Critical Value		0.23		Data Not Gamma Distributed at 5% Significance Level				
902	Data Not Gamma Distributed at 5% Significance Level											
903												
904	**Gamma Statistics on Detected Data Only**											
905				k hat (MLE)		4.354		k star (bias corrected MLE)				3.469
906				Theta hat (MLE)		0.0369		Theta star (bias corrected MLE)				0.0463
907				nu hat (MLE)		121.9		nu star (bias corrected)				97.12
908				MLE Mean (bias corrected)		0.161						
909				MLE Sd (bias corrected)		0.0863		95% Percentile of Chisquare (2kstar)				13.98
910												
911	**Gamma ROS Statistics using Imputed Non-Detects**											
912	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
913	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
914	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
915	This is especially true when the sample size is small.											
916	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
917				Minimum		0.01		Mean				0.0607
918				Maximum		0.37		Median				0.01
919				SD		0.0871		CV				1.434
920				k hat (MLE)		0.709		k star (bias corrected MLE)				0.675
921				Theta hat (MLE)		0.0856		Theta star (bias corrected MLE)				0.0899
922				nu hat (MLE)		61.01		nu star (bias corrected)				58.08
923				MLE Mean (bias corrected)		0.0607		MLE Sd (bias corrected)				0.0739
924				95% Percentile of Chisquare (2kstar)		4.657		90% Percentile				0.154
925				95% Percentile		0.209		99% Percentile				0.343
926	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
927	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
928					WH	HW				WH	HW	
929				95% Approx. Gamma UTL with 95% Coverage	0.272	0.286		95% Approx. Gamma UPL		0.203		0.205
930				95% Gamma USL	0.459	0.519						
931												
932	**Estimates of Gamma Parameters using KM Estimates**											
933				Mean (KM)		0.0928		SD (KM)				0.0691
934				Variance (KM)		0.00477		SE of Mean (KM)				0.0109
935				k hat (KM)		1.805		k star (KM)				1.695
936				nu hat (KM)		155.3		nu star (KM)				145.8
937				theta hat (KM)		0.0514		theta star (KM)				0.0547
938				80% gamma percentile (KM)		0.142		90% gamma percentile (KM)				0.188
939				95% gamma percentile (KM)		0.232		99% gamma percentile (KM)				0.332
940												
941	**The following statistics are computed using gamma distribution and KM estimates**											
942	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
943					WH	HW				WH	HW	
944				95% Approx. Gamma UTL with 95% Coverage	0.223	0.222		95% Approx. Gamma UPL		0.19		0.187
945				95% KM Gamma Percentile	0.185	0.183		95% Gamma USL		0.303		0.307
946												
947	**Lognormal GOF Test on Detected Observations Only**											
948				Shapiro Wilk Test Statistic		0.917		**Shapiro Wilk GOF Test**				
949				5% Shapiro Wilk Critical Value		0.874		Detected Data appear Lognormal at 5% Significance Level				
950				Lilliefors Test Statistic		0.23		**Lilliefors GOF Test**				

951	5% Lilliefors Critical Value					0.226	Data Not Lognormal at 5% Significance Level					
952	Detected Data appear Approximate Lognormal at 5% Significance Level											
953												
954	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
955	Mean in Original Scale					0.0745	Mean in Log Scale					-3.062
956	SD in Original Scale					0.0806	SD in Log Scale					0.99
957	95% UTL95% Coverage					0.373	95% BCA UTL95% Coverage					0.353
958	95% Bootstrap (%) UTL95% Coverage					0.368	95% UPL (t)					0.252
959	90% Percentile (z)					0.166	95% Percentile (z)					0.238
960	99% Percentile (z)					0.468	95% USL					0.824
961												
962	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
963	KM Mean of Logged Data					-2.531	95% KM UTL (Lognormal)95% Coverage					0.22
964	KM SD of Logged Data					0.485	95% KM UPL (Lognormal)					0.181
965	95% KM Percentile Lognormal (z)					0.177	95% KM USL (Lognormal)					0.324
966												
967	Background DL/2 Statistics Assuming Lognormal Distribution											
968	Mean in Original Scale					0.0726	Mean in Log Scale					-2.999
969	SD in Original Scale					0.0803	SD in Log Scale					0.786
970	95% UTL95% Coverage					0.259	95% UPL (t)					0.19
971	90% Percentile (z)					0.137	95% Percentile (z)					0.182
972	99% Percentile (z)					0.31	95% USL					0.486
973	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
974												
975	Nonparametric Distribution Free Background Statistics											
976	Data appear to follow a Discernible Distribution at 5% Significance Level											
977												
978	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
979	Order of Statistic, r					43	95% UTL with95% Coverage					0.37
980	Approx, f used to compute achieved CC					2.263	Approximate Actual Confidence Coefficient achieved by UTL					0.89
981	Approximate Sample Size needed to achieve specified CC					59	95% UPL					0.32
982	95% USL					0.37	95% KM Chebyshev UPL					0.397
983												
984	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
985	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
986	and consists of observations collected from clean unimpacted locations.											
987	The use of USL tends to provide a balance between false positives and false negatives provided the data											
988	represents a background data set and when many onsite observations need to be compared with the BTV.											
989												
990	MAGNESIUM, TOTAL (mg/L)											
991												
992	General Statistics											
993	Total Number of Observations					42	Number of Distinct Observations					22
994	Minimum					7.6	First Quartile					8.5
995	Second Largest					10.4	Median					9
996	Maximum					10.6	Third Quartile					9.5
997	Mean					8.988	SD					0.673
998	Coefficient of Variation					0.0749	Skewness					0.202
999	Mean of logged Data					2.193	SD of logged Data					0.0748
1000												

	A	B	C	D	E	F	G	H	I	J	K	L
1001	**Critical Values for Background Threshold Values (BTVs)**											
1002					Tolerance Factor K (For UTL)	2.104				d2max (for USL)		2.887
1003												
1004	**Normal GOF Test**											
1005					Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**					
1006					5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level					
1007					Lilliefors Test Statistic	0.0882	**Lilliefors GOF Test**					
1008					5% Lilliefors Critical Value	0.135	Data appear Normal at 5% Significance Level					
1009	**Data appear Approximate Normal at 5% Significance Level**											
1010												
1011	**Background Statistics Assuming Normal Distribution**											
1012				95% UTL with	95% Coverage	10.4				90% Percentile (z)		9.85
1013					95% UPL (t)	10.13				95% Percentile (z)		10.09
1014					95% USL	10.93				99% Percentile (z)		10.55
1015												
1016	**Gamma GOF Test**											
1017					A-D Test Statistic	0.235	**Anderson-Darling Gamma GOF Test**					
1018					5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level					
1019					K-S Test Statistic	0.0783	**Kolmogorov-Smirnov Gamma GOF Test**					
1020					5% K-S Critical Value	0.136	Detected data appear Gamma Distributed at 5% Significance Level					
1021	**Detected data appear Gamma Distributed at 5% Significance Level**											
1022												
1023	**Gamma Statistics**											
1024					k hat (MLE)	183.3				k star (bias corrected MLE)		170.3
1025					Theta hat (MLE)	0.049				Theta star (bias corrected MLE)		0.0528
1026					nu hat (MLE)	15400				nu star (bias corrected)		14301
1027					MLE Mean (bias corrected)	8.988				MLE Sd (bias corrected)		0.689
1028												
1029	**Background Statistics Assuming Gamma Distribution**											
1030					95% Wilson Hilferty (WH) Approx. Gamma UPL	10.16				90% Percentile		9.881
1031					95% Hawkins Wixley (HW) Approx. Gamma UPL	10.17				95% Percentile		10.15
1032				95% WH Approx. Gamma UTL with	95% Coverage	10.46				99% Percentile		10.67
1033				95% HW Approx. Gamma UTL with	95% Coverage	10.47						
1034					95% WH USL	11.05				95% HW USL		11.07
1035												
1036	**Lognormal GOF Test**											
1037					Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk Lognormal GOF Test**					
1038					5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level					
1039					Lilliefors Test Statistic	0.0736	**Lilliefors Lognormal GOF Test**					
1040					5% Lilliefors Critical Value	0.135	Data appear Lognormal at 5% Significance Level					
1041	**Data appear Approximate Lognormal at 5% Significance Level**											
1042												
1043	**Background Statistics assuming Lognormal Distribution**											
1044				95% UTL with	95% Coverage	10.49				90% Percentile (z)		9.865
1045					95% UPL (t)	10.18				95% Percentile (z)		10.14
1046					95% USL	11.12				99% Percentile (z)		10.67
1047												
1048	**Nonparametric Distribution Free Background Statistics**											
1049	**Data appear Approximate Normal at 5% Significance Level**											
1050												

1051	**Nonparametric Upper Limits for Background Threshold Values**											
1052					Order of Statistic, r	42				95% UTL with 95% Coverage	10.6	
1053					Approx, f used to compute achieved CC	2.211				Approximate Actual Confidence Coefficient achieved by UTL	0.884	
1054										Approximate Sample Size needed to achieve specified CC	59	
1055					95% Percentile Bootstrap UTL with 95% Coverage	10.59				95% BCA Bootstrap UTL with 95% Coverage	10.57	
1056					95% UPL	10.34				90% Percentile	9.7	
1057					90% Chebyshev UPL	11.03				95% Percentile	9.99	
1058					95% Chebyshev UPL	11.96				99% Percentile	10.52	
1059					95% USL	10.6						
1060												
1061	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1062	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1063	and consists of observations collected from clean unimpacted locations.											
1064	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1065	represents a background data set and when many onsite observations need to be compared with the BTV.											
1066												
1067	**MANGANESE, TOTAL (mg/L)**											
1068												
1069	**General Statistics**											
1070					Total Number of Observations	36				Number of Distinct Observations	11	
1071					Minimum	0.23				First Quartile	0.26	
1072					Second Largest	0.33				Median	0.27	
1073					Maximum	0.34				Third Quartile	0.29	
1074					Mean	0.277				SD	0.0293	
1075					Coefficient of Variation	0.106				Skewness	0.642	
1076					Mean of logged Data	-1.288				SD of logged Data	0.104	
1077												
1078	**Critical Values for Background Threshold Values (BTVs)**											
1079					Tolerance Factor K (For UTL)	2.148				d2max (for USL)	2.824	
1080												
1081	**Normal GOF Test**											
1082					Shapiro Wilk Test Statistic	0.919				**Shapiro Wilk GOF Test**		
1083					5% Shapiro Wilk Critical Value	0.935				Data Not Normal at 5% Significance Level		
1084					Lilliefors Test Statistic	0.166				**Lilliefors GOF Test**		
1085					5% Lilliefors Critical Value	0.145				Data Not Normal at 5% Significance Level		
1086	Data Not Normal at 5% Significance Level											
1087												
1088	**Background Statistics Assuming Normal Distribution**											
1089					95% UTL with 95% Coverage	0.34				90% Percentile (z)	0.315	
1090					95% UPL (t)	0.327				95% Percentile (z)	0.325	
1091					95% USL	0.36				99% Percentile (z)	0.345	
1092												
1093	**Gamma GOF Test**											
1094					A-D Test Statistic	0.925				**Anderson-Darling Gamma GOF Test**		
1095					5% A-D Critical Value	0.746				Data Not Gamma Distributed at 5% Significance Level		
1096					K-S Test Statistic	0.165				**Kolmogorov-Smirnov Gamma GOF Test**		
1097					5% K-S Critical Value	0.146				Data Not Gamma Distributed at 5% Significance Level		
1098	Data Not Gamma Distributed at 5% Significance Level											
1099												
1100	**Gamma Statistics**											

1101					k hat (MLE)	94.85				k star (bias corrected MLE)		86.96
1102					Theta hat (MLE)	0.00292				Theta star (bias corrected MLE)		0.00319
1103					nu hat (MLE)	6829				nu star (bias corrected)		6261
1104					MLE Mean (bias corrected)	0.277				MLE Sd (bias corrected)		0.0297
1105												
1106					**Background Statistics Assuming Gamma Distribution**							
1107					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.329				90% Percentile		0.316
1108					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.329				95% Percentile		0.328
1109					95% WH Approx. Gamma UTL with 95% Coverage	0.343				99% Percentile		0.351
1110					95% HW Approx. Gamma UTL with 95% Coverage	0.343						
1111					95% WH USL	0.366				95% HW USL		0.367
1112												
1113					**Lognormal GOF Test**							
1114					Shapiro Wilk Test Statistic	0.935				**Shapiro Wilk Lognormal GOF Test**		
1115					5% Shapiro Wilk Critical Value	0.935				Data appear Lognormal at 5% Significance Level		
1116					Lilliefors Test Statistic	0.16				**Lilliefors Lognormal GOF Test**		
1117					5% Lilliefors Critical Value	0.145				Data Not Lognormal at 5% Significance Level		
1118					**Data appear Approximate Lognormal at 5% Significance Level**							
1119												
1120					**Background Statistics assuming Lognormal Distribution**							
1121					95% UTL with 95% Coverage	0.344				90% Percentile (z)		0.315
1122					95% UPL (t)	0.329				95% Percentile (z)		0.327
1123					95% USL	0.369				99% Percentile (z)		0.351
1124												
1125					**Nonparametric Distribution Free Background Statistics**							
1126					**Data appear Approximate Lognormal at 5% Significance Level**							
1127												
1128					**Nonparametric Upper Limits for Background Threshold Values**							
1129					Order of Statistic, r	36				95% UTL with 95% Coverage		0.34
1130					Approx, f used to compute achieved CC	1.895				Approximate Actual Confidence Coefficient achieved by UTL		0.842
1131										Approximate Sample Size needed to achieve specified CC		59
1132					95% Percentile Bootstrap UTL with 95% Coverage	0.34				95% BCA Bootstrap UTL with 95% Coverage		0.33
1133					95% UPL	0.332				90% Percentile		0.33
1134					90% Chebyshev UPL	0.366				95% Percentile		0.33
1135					95% Chebyshev UPL	0.407				99% Percentile		0.337
1136					95% USL	0.34						
1137												
1138					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
1139					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
1140					and consists of observations collected from clean unimpacted locations.							
1141					The use of USL tends to provide a balance between false positives and false negatives provided the data							
1142					represents a background data set and when many onsite observations need to be compared with the BTV.							
1143												
1144	**METHYLENE CHLORIDE (ug/L)**											
1145												
1146					**General Statistics**							
1147					Total Number of Observations	45				Number of Missing Observations		0
1148					Number of Distinct Observations	1						
1149					Number of Detects	0				Number of Non-Detects		45
1150					Number of Distinct Detects	0				Number of Distinct Non-Detects		1

	A	B	C	D	E	F	G	H	I	J	K	L
1151					Minimum Detect	N/A				Minimum Non-Detect		1
1152					Maximum Detect	N/A				Maximum Non-Detect		1
1153					Variance Detected	N/A				Percent Non-Detects		100%
1154					Mean Detected	N/A				SD Detected		N/A
1155					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
1156												
1157	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
1158	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
1159	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1160												
1161	The data set for variable METHYLENE CHLORIDE (ug/L) was not processed!											
1162												
1163												
1164	**NITRATE-NITROGEN (mg/L)**											
1165												
1166	**General Statistics**											
1167					Total Number of Observations	44				Number of Distinct Observations		36
1168					Minimum	4.9				First Quartile		19.8
1169					Second Largest	29				Median		22.5
1170					Maximum	31.7				Third Quartile		25.9
1171					Mean	21.1				SD		6.402
1172					Coefficient of Variation	0.303				Skewness		-1.006
1173					Mean of logged Data	2.982				SD of logged Data		0.416
1174												
1175	**Critical Values for Background Threshold Values (BTVs)**											
1176					Tolerance Factor K (For UTL)	2.091				d2max (for USL)		2.906
1177												
1178	**Normal GOF Test**											
1179					Shapiro Wilk Test Statistic	0.891				**Shapiro Wilk GOF Test**		
1180					5% Shapiro Wilk Critical Value	0.944				Data Not Normal at 5% Significance Level		
1181					Lilliefors Test Statistic	0.182				**Lilliefors GOF Test**		
1182					5% Lilliefors Critical Value	0.132				Data Not Normal at 5% Significance Level		
1183	Data Not Normal at 5% Significance Level											
1184												
1185	**Background Statistics Assuming Normal Distribution**											
1186					95% UTL with 95% Coverage	34.48				90% Percentile (z)		29.3
1187					95% UPL (t)	31.98				95% Percentile (z)		31.63
1188					95% USL	39.7				99% Percentile (z)		35.99
1189												
1190	**Gamma GOF Test**											
1191					A-D Test Statistic	3.014				**Anderson-Darling Gamma GOF Test**		
1192					5% A-D Critical Value	0.751				Data Not Gamma Distributed at 5% Significance Level		
1193					K-S Test Statistic	0.24				**Kolmogorov-Smirnov Gamma GOF Test**		
1194					5% K-S Critical Value	0.133				Data Not Gamma Distributed at 5% Significance Level		
1195	Data Not Gamma Distributed at 5% Significance Level											
1196												
1197	**Gamma Statistics**											
1198					k hat (MLE)	7.602				k star (bias corrected MLE)		7.099
1199					Theta hat (MLE)	2.775				Theta star (bias corrected MLE)		2.972
1200					nu hat (MLE)	669				nu star (bias corrected)		624.7

1201	MLE Mean (bias corrected)					21.1	MLE Sd (bias corrected)					7.919
1202												
1203	**Background Statistics Assuming Gamma Distribution**											
1204	95% Wilson Hilferty (WH) Approx. Gamma UPL					35.86	90% Percentile					31.67
1205	95% Hawkins Wixley (HW) Approx. Gamma UPL					36.68	95% Percentile					35.58
1206	95% WH Approx. Gamma UTL with 95% Coverage					40.33	99% Percentile					43.73
1207	95% HW Approx. Gamma UTL with 95% Coverage					41.61						
1208	95% WH USL					50.81	95% HW USL					53.48
1209												
1210	**Lognormal GOF Test**											
1211	Shapiro Wilk Test Statistic					0.781	**Shapiro Wilk Lognormal GOF Test**					
1212	5% Shapiro Wilk Critical Value					0.944	Data Not Lognormal at 5% Significance Level					
1213	Lilliefors Test Statistic					0.263	**Lilliefors Lognormal GOF Test**					
1214	5% Lilliefors Critical Value					0.132	Data Not Lognormal at 5% Significance Level					
1215	Data Not Lognormal at 5% Significance Level											
1216												
1217	**Background Statistics assuming Lognormal Distribution**											
1218	95% UTL with 95% Coverage					47.03	90% Percentile (z)					33.6
1219	95% UPL (t)					39.98	95% Percentile (z)					39.07
1220	95% USL					66	99% Percentile (z)					51.86
1221												
1222	**Nonparametric Distribution Free Background Statistics**											
1223	Data do not follow a Discernible Distribution (0.05)											
1224												
1225	**Nonparametric Upper Limits for Background Threshold Values**											
1226	Order of Statistic, r					44	95% UTL with 95% Coverage					31.7
1227	Approx, f used to compute achieved CC					2.316	Approximate Actual Confidence Coefficient achieved by UTL					0.895
1228							Approximate Sample Size needed to achieve specified CC					59
1229	95% Percentile Bootstrap UTL with 95% Coverage					31.3	95% BCA Bootstrap UTL with 95% Coverage					31.12
1230	95% UPL					28.7	90% Percentile					26.7
1231	90% Chebyshev UPL					40.52	95% Percentile					27.7
1232	95% Chebyshev UPL					49.32	99% Percentile					30.54
1233	95% USL					31.7						
1234												
1235	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1236	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1237	and consists of observations collected from clean unimpacted locations.											
1238	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1239	represents a background data set and when many onsite observations need to be compared with the BTV.											
1240												
1241	**pH-FIELD (SU)**											
1242												
1243	**General Statistics**											
1244	Total Number of Observations					43	Number of Distinct Observations					37
1245	Minimum					3.91	First Quartile					4.55
1246	Second Largest					6.38	Median					4.66
1247	Maximum					6.55	Third Quartile					5.135
1248	Mean					4.927	SD					0.567
1249	Coefficient of Variation					0.115	Skewness					1.169
1250	Mean of logged Data					1.589	SD of logged Data					0.11

	A	B	C	D	E	F	G	H	I	J	K	L
1251												
1252	**Critical Values for Background Threshold Values (BTVs)**											
1253					Tolerance Factor K (For UTL)	2.097				d2max (for USL)		2.897
1254												
1255	**Normal GOF Test**											
1256					Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**					
1257					5% Shapiro Wilk Critical Value	0.943	Data Not Normal at 5% Significance Level					
1258					Lilliefors Test Statistic	0.193	**Lilliefors GOF Test**					
1259					5% Lilliefors Critical Value	0.134	Data Not Normal at 5% Significance Level					
1260	Data Not Normal at 5% Significance Level											
1261												
1262	**Background Statistics Assuming Normal Distribution**											
1263					95% UTL with 95% Coverage	6.115				90% Percentile (z)		5.653
1264					95% UPL (t)	5.891				95% Percentile (z)		5.859
1265					95% USL	6.568				99% Percentile (z)		6.245
1266												
1267	**Gamma GOF Test**											
1268					A-D Test Statistic	1.849	**Anderson-Darling Gamma GOF Test**					
1269					5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level					
1270					K-S Test Statistic	0.191	**Kolmogorov-Smirnov Gamma GOF Test**					
1271					5% K-S Critical Value	0.134	Data Not Gamma Distributed at 5% Significance Level					
1272	Data Not Gamma Distributed at 5% Significance Level											
1273												
1274	**Gamma Statistics**											
1275					k hat (MLE)	82.89				k star (bias corrected MLE)		77.13
1276					Theta hat (MLE)	0.0594				Theta star (bias corrected MLE)		0.0639
1277					nu hat (MLE)	7129				nu star (bias corrected)		6633
1278					MLE Mean (bias corrected)	4.927				MLE Sd (bias corrected)		0.561
1279												
1280	**Background Statistics Assuming Gamma Distribution**											
1281					95% Wilson Hilferty (WH) Approx. Gamma UPL	5.895				90% Percentile		5.658
1282					95% Hawkins Wixley (HW) Approx. Gamma UPL	5.896				95% Percentile		5.884
1283					95% WH Approx. Gamma UTL with 95% Coverage	6.143				99% Percentile		6.325
1284					95% HW Approx. Gamma UTL with 95% Coverage	6.147						
1285					95% WH USL	6.664				95% HW USL		6.679
1286												
1287	**Lognormal GOF Test**											
1288					Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk Lognormal GOF Test**					
1289					5% Shapiro Wilk Critical Value	0.943	Data Not Lognormal at 5% Significance Level					
1290					Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**					
1291					5% Lilliefors Critical Value	0.134	Data Not Lognormal at 5% Significance Level					
1292	Data Not Lognormal at 5% Significance Level											
1293												
1294	**Background Statistics assuming Lognormal Distribution**											
1295					95% UTL with 95% Coverage	6.161				90% Percentile (z)		5.635
1296					95% UPL (t)	5.9				95% Percentile (z)		5.863
1297					95% USL	6.725				99% Percentile (z)		6.318
1298												
1299	**Nonparametric Distribution Free Background Statistics**											
1300	Data do not follow a Discernible Distribution (0.05)											

	A	B	C	D	E	F	G	H	I	J	K	L
1301												
1302	**Nonparametric Upper Limits for Background Threshold Values**											
1303					Order of Statistic, r	43			95% UTL with 95% Coverage			6.55
1304					Approx, f used to compute achieved CC	2.263			Approximate Actual Confidence Coefficient achieved by UTL			0.89
1305									Approximate Sample Size needed to achieve specified CC			59
1306					95% Percentile Bootstrap UTL with 95% Coverage	6.533			95% BCA Bootstrap UTL with 95% Coverage			6.49
1307					95% UPL	6.294			90% Percentile			5.772
1308					90% Chebyshev UPL	6.646			95% Percentile			5.936
1309					95% Chebyshev UPL	7.425			99% Percentile			6.479
1310					95% USL	6.55						
1311												
1312	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1313	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1314	and consists of observations collected from clean unimpacted locations.											
1315	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1316	represents a background data set and when many onsite observations need to be compared with the BTV.											
1317												
1318	**pH-LAB (SU)**											
1319												
1320	**General Statistics**											
1321					Total Number of Observations	42			Number of Distinct Observations			37
1322					Minimum	4.81			First Quartile			5.395
1323					Second Largest	7.24			Median			5.57
1324					Maximum	7.81			Third Quartile			5.73
1325					Mean	5.675			SD			0.612
1326					Coefficient of Variation	0.108			Skewness			1.72
1327					Mean of logged Data	1.731			SD of logged Data			0.101
1328												
1329	**Critical Values for Background Threshold Values (BTVs)**											
1330					Tolerance Factor K (For UTL)	2.104			d2max (for USL)			2.887
1331												
1332	**Normal GOF Test**											
1333					Shapiro Wilk Test Statistic	0.808			**Shapiro Wilk GOF Test**			
1334					5% Shapiro Wilk Critical Value	0.942			Data Not Normal at 5% Significance Level			
1335					Lilliefors Test Statistic	0.224			**Lilliefors GOF Test**			
1336					5% Lilliefors Critical Value	0.135			Data Not Normal at 5% Significance Level			
1337	Data Not Normal at 5% Significance Level											
1338												
1339	**Background Statistics Assuming Normal Distribution**											
1340					95% UTL with 95% Coverage	6.962			90% Percentile (z)			6.459
1341					95% UPL (t)	6.717			95% Percentile (z)			6.681
1342					95% USL	7.441			99% Percentile (z)			7.098
1343												
1344	**Gamma GOF Test**											
1345					A-D Test Statistic	2.305			**Anderson-Darling Gamma GOF Test**			
1346					5% A-D Critical Value	0.747			Data Not Gamma Distributed at 5% Significance Level			
1347					K-S Test Statistic	0.211			**Kolmogorov-Smirnov Gamma GOF Test**			
1348					5% K-S Critical Value	0.136			Data Not Gamma Distributed at 5% Significance Level			
1349	Data Not Gamma Distributed at 5% Significance Level											
1350												

1351	**Gamma Statistics**											
1352					k hat (MLE)	96.93			k star (bias corrected MLE)	90.02		
1353					Theta hat (MLE)	0.0585			Theta star (bias corrected MLE)	0.063		
1354					nu hat (MLE)	8142			nu star (bias corrected)	7562		
1355					MLE Mean (bias corrected)	5.675			MLE Sd (bias corrected)	0.598		
1356												
1357	**Background Statistics Assuming Gamma Distribution**											
1358					95% Wilson Hilferty (WH) Approx. Gamma UPL	6.705			90% Percentile	6.454		
1359					95% Hawkins Wixley (HW) Approx. Gamma UPL	6.704			95% Percentile	6.693		
1360					95% WH Approx. Gamma UTL with 95% Coverage	6.97			99% Percentile	7.158		
1361					95% HW Approx. Gamma UTL with 95% Coverage	6.971						
1362					95% WH USL	7.507			95% HW USL	7.517		
1363												
1364	**Lognormal GOF Test**											
1365					Shapiro Wilk Test Statistic	0.848			**Shapiro Wilk Lognormal GOF Test**			
1366					5% Shapiro Wilk Critical Value	0.942			Data Not Lognormal at 5% Significance Level			
1367					Lilliefors Test Statistic	0.204			**Lilliefors Lognormal GOF Test**			
1368					5% Lilliefors Critical Value	0.135			Data Not Lognormal at 5% Significance Level			
1369	Data Not Lognormal at 5% Significance Level											
1370												
1371	**Background Statistics assuming Lognormal Distribution**											
1372					95% UTL with 95% Coverage	6.977			90% Percentile (z)	6.423		
1373					95% UPL (t)	6.701			95% Percentile (z)	6.662		
1374					95% USL	7.55			99% Percentile (z)	7.135		
1375												
1376	**Nonparametric Distribution Free Background Statistics**											
1377	Data do not follow a Discernible Distribution (0.05)											
1378												
1379	**Nonparametric Upper Limits for Background Threshold Values**											
1380					Order of Statistic, r	42			95% UTL with 95% Coverage	7.81		
1381					Approx, f used to compute achieved CC	2.211			Approximate Actual Confidence Coefficient achieved by UTL	0.884		
1382									Approximate Sample Size needed to achieve specified CC	59		
1383					95% Percentile Bootstrap UTL with 95% Coverage	7.782			95% BCA Bootstrap UTL with 95% Coverage	7.777		
1384					95% UPL	7.227			90% Percentile	6.424		
1385					90% Chebyshev UPL	7.532			95% Percentile	7.12		
1386					95% Chebyshev UPL	8.373			99% Percentile	7.576		
1387					95% USL	7.81						
1388												
1389	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1390	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1391	and consists of observations collected from clean unimpacted locations.											
1392	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1393	represents a background data set and when many onsite observations need to be compared with the BTV.											
1394												
1395	**POTASSIUM, TOTAL (mg/L)**											
1396												
1397	**General Statistics**											
1398					Total Number of Observations	43			Number of Distinct Observations	17		
1399					Minimum	0			First Quartile	1.2		
1400					Second Largest	11.1			Median	1.3		

1401					Maximum	14.4					Third Quartile	1.9
1402					Mean	2.183					SD	2.686
1403					Coefficient of Variation	1.231					Skewness	3.448
1404												
1405					**Critical Values for Background Threshold Values (BTVs)**							
1406					Tolerance Factor K (For UTL)	2.097					d2max (for USL)	2.897
1407												
1408					**Normal GOF Test**							
1409					Shapiro Wilk Test Statistic	0.499	**Shapiro Wilk GOF Test**					
1410					5% Shapiro Wilk Critical Value	0.943	Data Not Normal at 5% Significance Level					
1411					Lilliefors Test Statistic	0.356	**Lilliefors GOF Test**					
1412					5% Lilliefors Critical Value	0.134	Data Not Normal at 5% Significance Level					
1413					Data Not Normal at 5% Significance Level							
1414												
1415					**Background Statistics Assuming Normal Distribution**							
1416					95% UTL with 95% Coverage	7.816	90% Percentile (z)	5.625				
1417					95% UPL (t)	6.753	95% Percentile (z)	6.601				
1418					95% USL	9.965	99% Percentile (z)	8.432				
1419												
1420					**Gamma Statistics**							
1421					Gamma Statistics Not Available							
1422												
1423					Cannot Compute Gamma Statistics!							
1424												
1425					Cannot Compute Log Statistics							
1426												
1427					**Nonparametric Distribution Free Background Statistics**							
1428					Data do not follow a Discernible Distribution (0.05)							
1429												
1430					**Nonparametric Upper Limits for Background Threshold Values**							
1431					Order of Statistic, r	43	95% UTL with 95% Coverage	14.4				
1432					Approx, f used to compute achieved CC	2.263	Approximate Actual Confidence Coefficient achieved by UTL	0.89				
1433							Approximate Sample Size needed to achieve specified CC	59				
1434					95% Percentile Bootstrap UTL with 95% Coverage	14.07	95% BCA Bootstrap UTL with 95% Coverage	13.66				
1435					95% UPL	10.28	90% Percentile	3.02				
1436					90% Chebyshev UPL	10.33	95% Percentile	6.93				
1437					95% Chebyshev UPL	14.03	99% Percentile	13.01				
1438					95% USL	14.4						
1439												
1440					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
1441					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
1442					and consists of observations collected from clean unimpacted locations.							
1443					The use of USL tends to provide a balance between false positives and false negatives provided the data							
1444					represents a background data set and when many onsite observations need to be compared with the BTV.							
1445												
1446	**SODIUM, TOTAL (mg/L)**											
1447												
1448	**General Statistics**											
1449					Total Number of Observations	40	Number of Distinct Observations	30				
1450					Minimum	13.7	First Quartile	14.48				

1451					Second Largest	22.3					Median	15.7
1452					Maximum	24					Third Quartile	18.35
1453					Mean	16.6					SD	2.507
1454					Coefficient of Variation	0.151					Skewness	1.08
1455					Mean of logged Data	2.799					SD of logged Data	0.143
1456												
1457					**Critical Values for Background Threshold Values (BTVs)**							
1458					Tolerance Factor K (For UTL)	2.117					d2max (for USL)	2.868
1459												
1460					**Normal GOF Test**							
1461					Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**					
1462					5% Shapiro Wilk Critical Value	0.94	Data Not Normal at 5% Significance Level					
1463					Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**					
1464					5% Lilliefors Critical Value	0.139	Data Not Normal at 5% Significance Level					
1465					Data Not Normal at 5% Significance Level							
1466												
1467					**Background Statistics Assuming Normal Distribution**							
1468					95% UTL with 95% Coverage	21.9					90% Percentile (z)	19.81
1469					95% UPL (t)	20.87					95% Percentile (z)	20.72
1470					95% USL	23.78					99% Percentile (z)	22.43
1471												
1472					**Gamma GOF Test**							
1473					A-D Test Statistic	1.476	**Anderson-Darling Gamma GOF Test**					
1474					5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level					
1475					K-S Test Statistic	0.164	**Kolmogorov-Smirnov Gamma GOF Test**					
1476					5% K-S Critical Value	0.139	Data Not Gamma Distributed at 5% Significance Level					
1477					Data Not Gamma Distributed at 5% Significance Level							
1478												
1479					**Gamma Statistics**							
1480					k hat (MLE)	48.65					k star (bias corrected MLE)	45.02
1481					Theta hat (MLE)	0.341					Theta star (bias corrected MLE)	0.369
1482					nu hat (MLE)	3892					nu star (bias corrected)	3601
1483					MLE Mean (bias corrected)	16.6					MLE Sd (bias corrected)	2.473
1484												
1485					**Background Statistics Assuming Gamma Distribution**							
1486					95% Wilson Hilferty (WH) Approx. Gamma UPL	20.92					90% Percentile	19.83
1487					95% Hawkins Wixley (HW) Approx. Gamma UPL	20.93					95% Percentile	20.86
1488					95% WH Approx. Gamma UTL with 95% Coverage	22.1					99% Percentile	22.88
1489					95% HW Approx. Gamma UTL with 95% Coverage	22.13						
1490					95% WH USL	24.36					95% HW USL	24.45
1491												
1492					**Lognormal GOF Test**							
1493					Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk Lognormal GOF Test**					
1494					5% Shapiro Wilk Critical Value	0.94	Data Not Lognormal at 5% Significance Level					
1495					Lilliefors Test Statistic	0.157	**Lilliefors Lognormal GOF Test**					
1496					5% Lilliefors Critical Value	0.139	Data Not Lognormal at 5% Significance Level					
1497					Data Not Lognormal at 5% Significance Level							
1498												
1499					**Background Statistics assuming Lognormal Distribution**							
1500					95% UTL with 95% Coverage	22.23					90% Percentile (z)	19.72

1501					95% UPL (t)	20.96				95% Percentile (z)		20.78
1502					95% USL	24.74				99% Percentile (z)		22.9
1503												
1504	**Nonparametric Distribution Free Background Statistics**											
1505	**Data do not follow a Discernible Distribution (0.05)**											
1506												
1507	**Nonparametric Upper Limits for Background Threshold Values**											
1508					Order of Statistic, r	40				95% UTL with 95% Coverage		24
1509					Approx, f used to compute achieved CC	2.105				Approximate Actual Confidence Coefficient achieved by UTL		0.871
1510										Approximate Sample Size needed to achieve specified CC		59
1511					95% Percentile Bootstrap UTL with 95% Coverage	24				95% BCA Bootstrap UTL with 95% Coverage		24
1512					95% UPL	22.2				90% Percentile		20
1513					90% Chebyshev UPL	24.21				95% Percentile		20.4
1514					95% Chebyshev UPL	27.66				99% Percentile		23.34
1515					95% USL	24						
1516												
1517	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1518	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1519	and consists of observations collected from clean unimpacted locations.											
1520	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1521	represents a background data set and when many onsite observations need to be compared with the BTV.											
1522												
1523	**SPEC. COND., FIELD (umhos/cm)**											
1524												
1525	**General Statistics**											
1526					Total Number of Observations	42				Number of Distinct Observations		33
1527					Minimum	215				First Quartile		308.3
1528					Second Largest	590				Median		331
1529					Maximum	661				Third Quartile		350
1530					Mean	337.6				SD		79.31
1531					Coefficient of Variation	0.235				Skewness		2.351
1532					Mean of logged Data	5.8				SD of logged Data		0.205
1533												
1534	**Critical Values for Background Threshold Values (BTVs)**											
1535					Tolerance Factor K (For UTL)	2.104				d2max (for USL)		2.887
1536												
1537	**Normal GOF Test**											
1538					Shapiro Wilk Test Statistic	0.732				**Shapiro Wilk GOF Test**		
1539					5% Shapiro Wilk Critical Value	0.942				Data Not Normal at 5% Significance Level		
1540					Lilliefors Test Statistic	0.27				**Lilliefors GOF Test**		
1541					5% Lilliefors Critical Value	0.135				Data Not Normal at 5% Significance Level		
1542	**Data Not Normal at 5% Significance Level**											
1543												
1544	**Background Statistics Assuming Normal Distribution**											
1545					95% UTL with 95% Coverage	504.4				90% Percentile (z)		439.2
1546					95% UPL (t)	472.6				95% Percentile (z)		468
1547					95% USL	566.6				99% Percentile (z)		522.1
1548												
1549	**Gamma GOF Test**											
1550					A-D Test Statistic	2.615				**Anderson-Darling Gamma GOF Test**		

1551	5% A-D Critical Value					0.747	Data Not Gamma Distributed at 5% Significance Level					
1552	K-S Test Statistic					0.233	**Kolmogorov-Smirnov Gamma GOF Test**					
1553	5% K-S Critical Value					0.136	Data Not Gamma Distributed at 5% Significance Level					
1554	Data Not Gamma Distributed at 5% Significance Level											
1555												
1556	**Gamma Statistics**											
1557	k hat (MLE)					22.84	k star (bias corrected MLE)					21.23
1558	Theta hat (MLE)					14.78	Theta star (bias corrected MLE)					15.9
1559	nu hat (MLE)					1919	nu star (bias corrected)					1783
1560	MLE Mean (bias corrected)					337.6	MLE Sd (bias corrected)					73.27
1561												
1562	**Background Statistics Assuming Gamma Distribution**											
1563	95% Wilson Hilferty (WH) Approx. Gamma UPL					468	90% Percentile					434.2
1564	95% Hawkins Wixley (HW) Approx. Gamma UPL					467.8	95% Percentile					466.4
1565	95% WH Approx. Gamma UTL with 95% Coverage					504.4	99% Percentile					531
1566	95% HW Approx. Gamma UTL with 95% Coverage					505						
1567	95% WH USL					581.2	95% HW USL					584.3
1568												
1569	**Lognormal GOF Test**											
1570	Shapiro Wilk Test Statistic					0.839	**Shapiro Wilk Lognormal GOF Test**					
1571	5% Shapiro Wilk Critical Value					0.942	Data Not Lognormal at 5% Significance Level					
1572	Lilliefors Test Statistic					0.217	**Lilliefors Lognormal GOF Test**					
1573	5% Lilliefors Critical Value					0.135	Data Not Lognormal at 5% Significance Level					
1574	Data Not Lognormal at 5% Significance Level											
1575												
1576	**Background Statistics assuming Lognormal Distribution**											
1577	95% UTL with 95% Coverage					507.9	90% Percentile (z)					429.3
1578	95% UPL (t)					467.9	95% Percentile (z)					462.4
1579	95% USL					596.4	99% Percentile (z)					531.6
1580												
1581	**Nonparametric Distribution Free Background Statistics**											
1582	Data do not follow a Discernible Distribution (0.05)											
1583												
1584	**Nonparametric Upper Limits for Background Threshold Values**											
1585	Order of Statistic, r					42	95% UTL with 95% Coverage					661
1586	Approx, f used to compute achieved CC					2.211	Approximate Actual Confidence Coefficient achieved by UTL					0.884
1587							Approximate Sample Size needed to achieve specified CC					59
1588	95% Percentile Bootstrap UTL with 95% Coverage					657.5	95% BCA Bootstrap UTL with 95% Coverage					651.2
1589	95% UPL					571.4	90% Percentile					369.9
1590	90% Chebyshev UPL					578.3	95% Percentile					461.8
1591	95% Chebyshev UPL					687.4	99% Percentile					631.9
1592	95% USL					661						
1593												
1594	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1595	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1596	and consists of observations collected from clean unimpacted locations.											
1597	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1598	represents a background data set and when many onsite observations need to be compared with the BTV.											
1599												
1600	**SPEC. COND., LAB (umhos/cm)**											

	A	B	C	D	E	F	G	H	I	J	K	L
1601												
1602	**General Statistics**											
1603					Total Number of Observations	42				Number of Distinct Observations		35
1604					Minimum	242				First Quartile		278.3
1605					Second Largest	589				Median		302
1606					Maximum	656				Third Quartile		335
1607					Mean	322.2				SD		80.85
1608					Coefficient of Variation	0.251				Skewness		2.727
1609					Mean of logged Data	5.752				SD of logged Data		0.204
1610												
1611					**Critical Values for Background Threshold Values (BTVs)**							
1612					Tolerance Factor K (For UTL)	2.104				d2max (for USL)		2.887
1613												
1614					**Normal GOF Test**							
1615					Shapiro Wilk Test Statistic	0.691				**Shapiro Wilk GOF Test**		
1616					5% Shapiro Wilk Critical Value	0.942				Data Not Normal at 5% Significance Level		
1617					Lilliefors Test Statistic	0.208				**Lilliefors GOF Test**		
1618					5% Lilliefors Critical Value	0.135				Data Not Normal at 5% Significance Level		
1619					**Data Not Normal at 5% Significance Level**							
1620												
1621					**Background Statistics Assuming Normal Distribution**							
1622					95% UTL with 95% Coverage	492.3				90% Percentile (z)		425.8
1623					95% UPL (t)	459.9				95% Percentile (z)		455.2
1624					95% USL	555.7				99% Percentile (z)		510.3
1625												
1626					**Gamma GOF Test**							
1627					A-D Test Statistic	2.322				**Anderson-Darling Gamma GOF Test**		
1628					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
1629					K-S Test Statistic	0.169				**Kolmogorov-Smirnov Gamma GOF Test**		
1630					5% K-S Critical Value	0.136				Data Not Gamma Distributed at 5% Significance Level		
1631					**Data Not Gamma Distributed at 5% Significance Level**							
1632												
1633					**Gamma Statistics**							
1634					k hat (MLE)	21.8				k star (bias corrected MLE)		20.25
1635					Theta hat (MLE)	14.78				Theta star (bias corrected MLE)		15.91
1636					nu hat (MLE)	1831				nu star (bias corrected)		1701
1637					MLE Mean (bias corrected)	322.2				MLE Sd (bias corrected)		71.6
1638												
1639					**Background Statistics Assuming Gamma Distribution**							
1640					95% Wilson Hilferty (WH) Approx. Gamma UPL	449.7				90% Percentile		416.7
1641					95% Hawkins Wixley (HW) Approx. Gamma UPL	448.6				95% Percentile		448.3
1642					95% WH Approx. Gamma UTL with 95% Coverage	485.5				99% Percentile		511.7
1643					95% HW Approx. Gamma UTL with 95% Coverage	484.9						
1644					95% WH USL	561				95% HW USL		562.3
1645												
1646					**Lognormal GOF Test**							
1647					Shapiro Wilk Test Statistic	0.804				**Shapiro Wilk Lognormal GOF Test**		
1648					5% Shapiro Wilk Critical Value	0.942				Data Not Lognormal at 5% Significance Level		
1649					Lilliefors Test Statistic	0.15				**Lilliefors Lognormal GOF Test**		
1650					5% Lilliefors Critical Value	0.135				Data Not Lognormal at 5% Significance Level		

1651	Data Not Lognormal at 5% Significance Level											
1652												
1653	Background Statistics assuming Lognormal Distribution											
1654				95% UTL with	95% Coverage	483.6			90% Percentile (z)	409		
1655				95% UPL (t)		445.7			95% Percentile (z)	440.4		
1656				95% USL		567.5			99% Percentile (z)	506.1		
1657												
1658	Nonparametric Distribution Free Background Statistics											
1659	Data do not follow a Discernible Distribution (0.05)											
1660												
1661	Nonparametric Upper Limits for Background Threshold Values											
1662				Order of Statistic, r		42			95% UTL with	95% Coverage	656	
1663				Approx, f used to compute achieved CC		2.211			Approximate Actual Confidence Coefficient achieved by UTL		0.884	
1664									Approximate Sample Size needed to achieve specified CC		59	
1665				95% Percentile Bootstrap UTL with	95% Coverage	652.7			95% BCA Bootstrap UTL with	95% Coverage	645.8	
1666				95% UPL		568.5			90% Percentile		380.5	
1667				90% Chebyshev UPL		567.7			95% Percentile		449.3	
1668				95% Chebyshev UPL		678.8			99% Percentile		628.5	
1669				95% USL		656						
1670												
1671	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1672	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1673	and consists of observations collected from clean unimpacted locations.											
1674	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1675	represents a background data set and when many onsite observations need to be compared with the BTV.											
1676												
1677	SULFATE (mg/L)											
1678												
1679	General Statistics											
1680				Total Number of Observations		42			Number of Distinct Observations		38	
1681				Minimum		6.9			First Quartile		9.875	
1682				Second Largest		60.4			Median		12.3	
1683				Maximum		74			Third Quartile		23.2	
1684				Mean		20.09			SD		15.82	
1685				Coefficient of Variation		0.788			Skewness		1.788	
1686				Mean of logged Data		2.773			SD of logged Data		0.641	
1687												
1688	Critical Values for Background Threshold Values (BTVs)											
1689				Tolerance Factor K (For UTL)		2.104			d2max (for USL)		2.887	
1690												
1691	Normal GOF Test											
1692				Shapiro Wilk Test Statistic		0.734			Shapiro Wilk GOF Test			
1693				5% Shapiro Wilk Critical Value		0.942			Data Not Normal at 5% Significance Level			
1694				Lilliefors Test Statistic		0.249			Lilliefors GOF Test			
1695				5% Lilliefors Critical Value		0.135			Data Not Normal at 5% Significance Level			
1696	Data Not Normal at 5% Significance Level											
1697												
1698	Background Statistics Assuming Normal Distribution											
1699				95% UTL with	95% Coverage	53.37			90% Percentile (z)	40.36		
1700				95% UPL (t)		47.03			95% Percentile (z)	46.11		

1701					95% USL	65.78				99% Percentile (z)		56.9
1702												
1703						**Gamma GOF Test**						
1704					A-D Test Statistic	2.135	**Anderson-Darling Gamma GOF Test**					
1705					5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level					
1706					K-S Test Statistic	0.233	**Kolmogorov-Smirnov Gamma GOF Test**					
1707					5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level					
1708						Data Not Gamma Distributed at 5% Significance Level							
1709												
1710						**Gamma Statistics**						
1711					k hat (MLE)	2.355				k star (bias corrected MLE)		2.202
1712					Theta hat (MLE)	8.53				Theta star (bias corrected MLE)		9.12
1713					nu hat (MLE)	197.8				nu star (bias corrected)		185
1714					MLE Mean (bias corrected)	20.09				MLE Sd (bias corrected)		13.53
1715												
1716						**Background Statistics Assuming Gamma Distribution**							
1717					95% Wilson Hilferty (WH) Approx. Gamma UPL	46.52				90% Percentile		38.19
1718					95% Hawkins Wixley (HW) Approx. Gamma UPL	46.68				95% Percentile		46.23
1719					95% WH Approx. Gamma UTL with 95% Coverage	56.44				99% Percentile		63.94
1720					95% HW Approx. Gamma UTL with 95% Coverage	57.37						
1721					95% WH USL	79.72				95% HW USL		83.47
1722												
1723						**Lognormal GOF Test**						
1724					Shapiro Wilk Test Statistic	0.858	**Shapiro Wilk Lognormal GOF Test**					
1725					5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level					
1726					Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**					
1727					5% Lilliefors Critical Value	0.135	Data Not Lognormal at 5% Significance Level					
1728						Data Not Lognormal at 5% Significance Level							
1729												
1730						**Background Statistics assuming Lognormal Distribution**							
1731					95% UTL with 95% Coverage	61.66				90% Percentile (z)		36.4
1732					95% UPL (t)	47.69				95% Percentile (z)		45.95
1733					95% USL	101.9				99% Percentile (z)		71.13
1734												
1735						**Nonparametric Distribution Free Background Statistics**							
1736						Data do not follow a Discernible Distribution (0.05)							
1737												
1738						**Nonparametric Upper Limits for Background Threshold Values**							
1739					Order of Statistic, r	42				95% UTL with 95% Coverage		74
1740					Approx, f used to compute achieved CC	2.211	Approximate Actual Confidence Coefficient achieved by UTL					0.884
1741							Approximate Sample Size needed to achieve specified CC					59
1742					95% Percentile Bootstrap UTL with 95% Coverage	73.32				95% BCA Bootstrap UTL with 95% Coverage		72.88
1743					95% UPL	59.1				90% Percentile		42.18
1744					90% Chebyshev UPL	68.12				95% Percentile		51.48
1745					95% Chebyshev UPL	89.88				99% Percentile		68.42
1746					95% USL	74						
1747												
1748						Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
1749						Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
1750						and consists of observations collected from clean unimpacted locations.							

	A	B	C	D	E	F	G	H	I	J	K	L
1751	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1752	represents a background data set and when many onsite observations need to be compared with the BTV.											
1753												
1754	**Total Dissolved Solids (mg/L)**											
1755												
1756	**General Statistics**											
1757					Total Number of Observations	42				Number of Distinct Observations	40	
1758					Minimum	135				First Quartile	201.8	
1759					Second Largest	381				Median	237	
1760					Maximum	433				Third Quartile	261	
1761					Mean	236.1				SD	58.29	
1762					Coefficient of Variation	0.247				Skewness	1.113	
1763					Mean of logged Data	5.437				SD of logged Data	0.237	
1764												
1765	**Critical Values for Background Threshold Values (BTVs)**											
1766					Tolerance Factor K (For UTL)	2.104				d2max (for USL)	2.887	
1767												
1768	**Normal GOF Test**											
1769					Shapiro Wilk Test Statistic	0.893				**Shapiro Wilk GOF Test**		
1770					5% Shapiro Wilk Critical Value	0.942				Data Not Normal at 5% Significance Level		
1771					Lilliefors Test Statistic	0.127				**Lilliefors GOF Test**		
1772					5% Lilliefors Critical Value	0.135				Data appear Normal at 5% Significance Level		
1773	**Data appear Approximate Normal at 5% Significance Level**											
1774												
1775	**Background Statistics Assuming Normal Distribution**											
1776				95% UTL with	95% Coverage	358.8				90% Percentile (z)	310.8	
1777					95% UPL (t)	335.4				95% Percentile (z)	332	
1778					95% USL	404.4				99% Percentile (z)	371.7	
1779												
1780	**Gamma GOF Test**											
1781					A-D Test Statistic	0.609				**Anderson-Darling Gamma GOF Test**		
1782					5% A-D Critical Value	0.747				Detected data appear Gamma Distributed at 5% Significance Level		
1783					K-S Test Statistic	0.106				**Kolmogorov-Smirnov Gamma GOF Test**		
1784					5% K-S Critical Value	0.136				Detected data appear Gamma Distributed at 5% Significance Level		
1785	**Detected data appear Gamma Distributed at 5% Significance Level**											
1786												
1787	**Gamma Statistics**											
1788					k hat (MLE)	18.13				k star (bias corrected MLE)	16.85	
1789					Theta hat (MLE)	13.03				Theta star (bias corrected MLE)	14.02	
1790					nu hat (MLE)	1523				nu star (bias corrected)	1415	
1791					MLE Mean (bias corrected)	236.1				MLE Sd (bias corrected)	57.53	
1792												
1793	**Background Statistics Assuming Gamma Distribution**											
1794					95% Wilson Hilferty (WH) Approx. Gamma UPL	339.5				90% Percentile	312.2	
1795					95% Hawkins Wixley (HW) Approx. Gamma UPL	340.5				95% Percentile	338.1	
1796					95% WH Approx. Gamma UTL with 95% Coverage	369				99% Percentile	390.1	
1797					95% HW Approx. Gamma UTL with 95% Coverage	371						
1798					95% WH USL	431.5				95% HW USL	436.6	
1799												
1800	**Lognormal GOF Test**											

1801					Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk Lognormal GOF Test**					
1802					5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level					
1803					Lilliefors Test Statistic	0.12	**Lilliefors Lognormal GOF Test**					
1804					5% Lilliefors Critical Value	0.135	Data appear Lognormal at 5% Significance Level					
1805	Data appear Approximate Lognormal at 5% Significance Level											
1806												
1807	**Background Statistics assuming Lognormal Distribution**											
1808					95% UTL with 95% Coverage	378.1				90% Percentile (z)	311.2	
1809					95% UPL (t)	343.9				95% Percentile (z)	339.2	
1810					95% USL	455.3				99% Percentile (z)	398.6	
1811												
1812	**Nonparametric Distribution Free Background Statistics**											
1813	Data appear Approximate Normal at 5% Significance Level											
1814												
1815	**Nonparametric Upper Limits for Background Threshold Values**											
1816					Order of Statistic, r	42				95% UTL with 95% Coverage	433	
1817					Approx, f used to compute achieved CC	2.211				Approximate Actual Confidence Coefficient achieved by UTL	0.884	
1818										Approximate Sample Size needed to achieve specified CC	59	
1819					95% Percentile Bootstrap UTL with 95% Coverage	430.4				95% BCA Bootstrap UTL with 95% Coverage	427.9	
1820					95% UPL	373.5				90% Percentile	292.2	
1821					90% Chebyshev UPL	413.1				95% Percentile	330	
1822					95% Chebyshev UPL	493.2				99% Percentile	411.7	
1823					95% USL	433						
1824												
1825	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1826	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1827	and consists of observations collected from clean unimpacted locations.											
1828	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1829	represents a background data set and when many onsite observations need to be compared with the BTV.											
1830												
1831	**TETRACHLOROETHENE (ug/L)**											
1832												
1833	**General Statistics**											
1834					Total Number of Observations	45				Number of Missing Observations	0	
1835					Number of Distinct Observations	1						
1836					Number of Detects	0				Number of Non-Detects	45	
1837					Number of Distinct Detects	0				Number of Distinct Non-Detects	1	
1838					Minimum Detect	N/A				Minimum Non-Detect	1	
1839					Maximum Detect	N/A				Maximum Non-Detect	1	
1840					Variance Detected	N/A				Percent Non-Detects	100%	
1841					Mean Detected	N/A				SD Detected	N/A	
1842					Mean of Detected Logged Data	N/A				SD of Detected Logged Data	N/A	
1843												
1844	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
1845	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
1846	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
1847												
1848	The data set for variable TETRACHLOROETHENE (ug/L) was not processed!											
1849												
1850												

	A	B	C	D	E	F	G	H	I	J	K	L
1851	TOTAL ORGANIC CARBON (mg/L)											
1852												
1853						General Statistics						
1854					Total Number of Observations	42			Number of Missing Observations	0		
1855					Number of Distinct Observations	13						
1856					Number of Detects	12			Number of Non-Detects	30		
1857					Number of Distinct Detects	11			Number of Distinct Non-Detects	2		
1858					Minimum Detect	0.6			Minimum Non-Detect	0.5		
1859					Maximum Detect	1.4			Maximum Non-Detect	1		
1860					Variance Detected	0.0659			Percent Non-Detects	71.43%		
1861					Mean Detected	0.887			SD Detected	0.257		
1862					Mean of Detected Logged Data	-0.157			SD of Detected Logged Data	0.278		
1863												
1864						Critical Values for Background Threshold Values (BTVs)						
1865					Tolerance Factor K (For UTL)	2.104			d2max (for USL)	2.887		
1866												
1867						Normal GOF Test on Detects Only						
1868					Shapiro Wilk Test Statistic	0.912			Shapiro Wilk GOF Test			
1869					5% Shapiro Wilk Critical Value	0.859			Detected Data appear Normal at 5% Significance Level			
1870					Lilliefors Test Statistic	0.177			Lilliefors GOF Test			
1871					5% Lilliefors Critical Value	0.243			Detected Data appear Normal at 5% Significance Level			
1872						Detected Data appear Normal at 5% Significance Level						
1873												
1874						Kaplan Meier (KM) Background Statistics Assuming Normal Distribution						
1875					KM Mean	0.695			KM SD	0.212		
1876					95% UTL95% Coverage	1.141			95% KM UPL (t)	1.056		
1877					90% KM Percentile (z)	0.966			95% KM Percentile (z)	1.043		
1878					99% KM Percentile (z)	1.188			95% KM USL	1.307		
1879												
1880						DL/2 Substitution Background Statistics Assuming Normal Distribution						
1881					Mean	0.581			SD	0.25		
1882					95% UTL95% Coverage	1.106			95% UPL (t)	1.006		
1883					90% Percentile (z)	0.901			95% Percentile (z)	0.992		
1884					99% Percentile (z)	1.162			95% USL	1.302		
1885						DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons						
1886												
1887						Gamma GOF Tests on Detected Observations Only						
1888					A-D Test Statistic	0.365			Anderson-Darling GOF Test			
1889					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
1890					K-S Test Statistic	0.155			Kolmogorov-Smirnov GOF			
1891					5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level			
1892						Detected data appear Gamma Distributed at 5% Significance Level						
1893												
1894						Gamma Statistics on Detected Data Only						
1895					k hat (MLE)	13.9			k star (bias corrected MLE)	10.48		
1896					Theta hat (MLE)	0.0638			Theta star (bias corrected MLE)	0.0846		
1897					nu hat (MLE)	333.7			nu star (bias corrected)	251.6		
1898					MLE Mean (bias corrected)	0.887						
1899					MLE Sd (bias corrected)	0.274			95% Percentile of Chisquare (2kstar)	32.63		
1900												

	A	B	C	D	E	F	G	H	I	J	K	L
1901	**Gamma ROS Statistics using Imputed Non-Detects**											
1902	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1903	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1904	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1905	This is especially true when the sample size is small.											
1906	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1907				Minimum	0.193			Mean	0.652			
1908				Maximum	1.4			Median	0.63			
1909				SD	0.27			CV	0.414			
1910				k hat (MLE)	5.701			k star (bias corrected MLE)	5.309			
1911				Theta hat (MLE)	0.114			Theta star (bias corrected MLE)	0.123			
1912				nu hat (MLE)	478.8			nu star (bias corrected)	446			
1913				MLE Mean (bias corrected)	0.652			MLE Sd (bias corrected)	0.283			
1914				95% Percentile of Chisquare (2kstar)	19.16			90% Percentile	1.03			
1915				95% Percentile	1.176			99% Percentile	1.482			
1916	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
1917	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
1918					WH	HW				WH	HW	
1919				95% Approx. Gamma UTL with 95% Coverage	1.36	1.391		95% Approx. Gamma UPL		1.187	1.204	
1920				95% Gamma USL	1.745	1.819						
1921												
1922	**Estimates of Gamma Parameters using KM Estimates**											
1923				Mean (KM)	0.695			SD (KM)	0.212			
1924				Variance (KM)	0.0449			SE of Mean (KM)	0.0447			
1925				k hat (KM)	10.74			k star (KM)	9.99			
1926				nu hat (KM)	902.3			nu star (KM)	839.1			
1927				theta hat (KM)	0.0647			theta star (KM)	0.0695			
1928				80% gamma percentile (KM)	0.87			90% gamma percentile (KM)	0.987			
1929				95% gamma percentile (KM)	1.091			99% gamma percentile (KM)	1.305			
1930												
1931	**The following statistics are computed using gamma distribution and KM estimates**											
1932	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
1933					WH	HW				WH	HW	
1934				95% Approx. Gamma UTL with 95% Coverage	1.167	1.172		95% Approx. Gamma UPL		1.059	1.061	
1935				95% KM Gamma Percentile	1.044	1.045		95% Gamma USL		1.398	1.415	
1936												
1937	**Lognormal GOF Test on Detected Observations Only**											
1938				Shapiro Wilk Test Statistic	0.941			**Shapiro Wilk GOF Test**				
1939				5% Shapiro Wilk Critical Value	0.859			Detected Data appear Lognormal at 5% Significance Level				
1940				Lilliefors Test Statistic	0.151			**Lilliefors GOF Test**				
1941				5% Lilliefors Critical Value	0.243			Detected Data appear Lognormal at 5% Significance Level				
1942	Detected Data appear Lognormal at 5% Significance Level											
1943												
1944	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
1945				Mean in Original Scale	0.678			Mean in Log Scale	-0.444			
1946				SD in Original Scale	0.237			SD in Log Scale	0.337			
1947				95% UTL95% Coverage	1.302			95% BCA UTL95% Coverage	1.2			
1948				95% Bootstrap (%) UTL95% Coverage	1.39			95% UPL (t)	1.138			
1949				90% Percentile (z)	0.987			95% Percentile (z)	1.116			
1950				99% Percentile (z)	1.404			95% USL	1.695			

1951												
1952	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1953	KM Mean of Logged Data				-0.405	95% KM UTL (Lognormal)95% Coverage					1.191	
1954	KM SD of Logged Data				0.275	95% KM UPL (Lognormal)					1.066	
1955	95% KM Percentile Lognormal (z)				1.05	95% KM USL (Lognormal)					1.478	
1956												
1957	**Background DL/2 Statistics Assuming Lognormal Distribution**											
1958	Mean in Original Scale				0.581	Mean in Log Scale					-0.622	
1959	SD in Original Scale				0.25	SD in Log Scale					0.398	
1960	95% UTL95% Coverage				1.24	95% UPL (t)					1.057	
1961	90% Percentile (z)				0.894	95% Percentile (z)					1.033	
1962	99% Percentile (z)				1.355	95% USL					1.694	
1963	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
1964												
1965	**Nonparametric Distribution Free Background Statistics**											
1966	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1967												
1968	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
1969	Order of Statistic, r				42	95% UTL with95% Coverage					1.4	
1970	Approx, f used to compute achieved CC				2.211	Approximate Actual Confidence Coefficient achieved by UTL					0.884	
1971	Approximate Sample Size needed to achieve specified CC				59	95% UPL					1.185	
1972	95% USL				1.4	95% KM Chebyshev UPL					1.63	
1973												
1974	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1975	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1976	and consists of observations collected from clean unimpacted locations.											
1977	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1978	represents a background data set and when many onsite observations need to be compared with the BTV.											
1979												
1980	**TOLUENE (mg/)**											
1981												
1982	**General Statistics**											
1983	Total Number of Observations				44	Number of Missing Observations					0	
1984	Number of Distinct Observations				1							
1985	Number of Detects				0	Number of Non-Detects					44	
1986	Number of Distinct Detects				0	Number of Distinct Non-Detects					1	
1987	Minimum Detect				N/A	Minimum Non-Detect					1	
1988	Maximum Detect				N/A	Maximum Non-Detect					1	
1989	Variance Detected				N/A	Percent Non-Detects					100%	
1990	Mean Detected				N/A	SD Detected					N/A	
1991	Mean of Detected Logged Data				N/A	SD of Detected Logged Data					N/A	
1992												
1993	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
1994	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
1995	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
1996												
1997	**The data set for variable TOLUENE (mg/) was not processed!**											
1998												
1999												
2000	**TOTAL PHENOLICS (mg/L)**											

	A	B	C	D	E	F	G	H	I	J	K	L
2001												
2002	**General Statistics**											
2003	Total Number of Observations					45	Number of Missing Observations					0
2004	Number of Distinct Observations					2						
2005	Number of Detects					2	Number of Non-Detects					43
2006	Number of Distinct Detects					1	Number of Distinct Non-Detects					2
2007	Minimum Detect					0.01	Minimum Non-Detect					0.005
2008	Maximum Detect					0.01	Maximum Non-Detect					0.01
2009	Variance Detected					0	Percent Non-Detects					95.56%
2010	Mean Detected					0.01	SD Detected					0
2011	Mean of Detected Logged Data					-4.605	SD of Detected Logged Data					0
2012												
2013	**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!**											
2014	**It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**											
2015												
2016	**The data set for variable TOTAL PHENOLICS (mg/L) was not processed!**											
2017												
2018												
2019	**TRANS 1,2-DICHLOROETHENE (ug/L)**											
2020												
2021	**General Statistics**											
2022	Total Number of Observations					45	Number of Missing Observations					0
2023	Number of Distinct Observations					1						
2024	Number of Detects					0	Number of Non-Detects					45
2025	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2026	Minimum Detect					N/A	Minimum Non-Detect					1
2027	Maximum Detect					N/A	Maximum Non-Detect					1
2028	Variance Detected					N/A	Percent Non-Detects					100%
2029	Mean Detected					N/A	SD Detected					N/A
2030	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2031												
2032	**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**											
2033	**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**											
2034	**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**											
2035												
2036	**The data set for variable TRANS 1,2-DICHLOROETHENE (ug/L) was not processed!**											
2037												
2038												
2039	**TRICHLOROETHENE (ug/L)**											
2040												
2041	**General Statistics**											
2042	Total Number of Observations					45	Number of Missing Observations					0
2043	Number of Distinct Observations					1						
2044	Number of Detects					0	Number of Non-Detects					45
2045	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2046	Minimum Detect					N/A	Minimum Non-Detect					1
2047	Maximum Detect					N/A	Maximum Non-Detect					1
2048	Variance Detected					N/A	Percent Non-Detects					100%
2049	Mean Detected					N/A	SD Detected					N/A
2050	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A

	A	B	C	D	E	F	G	H	I	J	K	L
2051												
2052	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2053	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2054	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2055												
2056	The data set for variable TRICHLOROETHENE (ug/L) was not processed!											
2057												
2058												
2059	**TURBIDITY (NTU)**											
2060												
2061	**General Statistics**											
2062	Total Number of Observations					45	Number of Missing Observations					0
2063	Number of Distinct Observations					29						
2064	Number of Detects					37	Number of Non-Detects					8
2065	Number of Distinct Detects					28	Number of Distinct Non-Detects					1
2066	Minimum Detect					0.11	Minimum Non-Detect					0.1
2067	Maximum Detect					10.1	Maximum Non-Detect					0.1
2068	Variance Detected					3.434	Percent Non-Detects					17.78%
2069	Mean Detected					0.826	SD Detected					1.853
2070	Mean of Detected Logged Data					-1.038	SD of Detected Logged Data					1.05
2071												
2072	**Critical Values for Background Threshold Values (BTVs)**											
2073	Tolerance Factor K (For UTL)					2.085	d2max (for USL)					2.915
2074												
2075	**Normal GOF Test on Detects Only**											
2076	Shapiro Wilk Test Statistic					0.405	**Shapiro Wilk GOF Test**					
2077	5% Shapiro Wilk Critical Value					0.936	Data Not Normal at 5% Significance Level					
2078	Lilliefors Test Statistic					0.401	**Lilliefors GOF Test**					
2079	5% Lilliefors Critical Value					0.144	Data Not Normal at 5% Significance Level					
2080	Data Not Normal at 5% Significance Level											
2081												
2082	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
2083	KM Mean					0.697	KM SD					1.681
2084	95% UTL95% Coverage					4.201	95% KM UPL (t)					3.552
2085	90% KM Percentile (z)					2.851	95% KM Percentile (z)					3.461
2086	99% KM Percentile (z)					4.607	95% KM USL					5.596
2087												
2088	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
2089	Mean					0.688	SD					1.703
2090	95% UTL95% Coverage					4.239	95% UPL (t)					3.581
2091	90% Percentile (z)					2.87	95% Percentile (z)					3.489
2092	99% Percentile (z)					4.65	95% USL					5.653
2093	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
2094												
2095	**Gamma GOF Tests on Detected Observations Only**											
2096	A-D Test Statistic					4.196	**Anderson-Darling GOF Test**					
2097	5% A-D Critical Value					0.792	Data Not Gamma Distributed at 5% Significance Level					
2098	K-S Test Statistic					0.277	**Kolmogorov-Smirnov GOF**					
2099	5% K-S Critical Value					0.151	Data Not Gamma Distributed at 5% Significance Level					
2100	Data Not Gamma Distributed at 5% Significance Level											

	A	B	C	D	E	F	G	H	I	J	K	L
2101												
2102	**Gamma Statistics on Detected Data Only**											
2103					k hat (MLE)	0.712			k star (bias corrected MLE)			0.673
2104					Theta hat (MLE)	1.16			Theta star (bias corrected MLE)			1.228
2105					nu hat (MLE)	52.71			nu star (bias corrected)			49.77
2106					MLE Mean (bias corrected)	0.826						
2107					MLE Sd (bias corrected)	1.007			95% Percentile of Chisquare (2kstar)			4.645
2108												
2109	**Gamma ROS Statistics using Imputed Non-Detects**											
2110	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2111	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2112	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2113	This is especially true when the sample size is small.											
2114	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2115					Minimum	0.01			Mean			0.681
2116					Maximum	10.1			Median			0.23
2117					SD	1.706			CV			2.505
2118					k hat (MLE)	0.494			k star (bias corrected MLE)			0.476
2119					Theta hat (MLE)	1.378			Theta star (bias corrected MLE)			1.43
2120					nu hat (MLE)	44.48			nu star (bias corrected)			42.85
2121					MLE Mean (bias corrected)	0.681			MLE Sd (bias corrected)			0.987
2122					95% Percentile of Chisquare (2kstar)	3.722			90% Percentile			1.861
2123					95% Percentile	2.662			99% Percentile			4.64
2124	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
2125	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2126					WH	HW				WH	HW	
2127				95% Approx. Gamma UTL with 95% Coverage	3.134	3.255			95% Approx. Gamma UPL	2.275	2.265	
2128				95% Gamma USL	5.66	6.442						
2129												
2130	**Estimates of Gamma Parameters using KM Estimates**											
2131					Mean (KM)	0.697			SD (KM)			1.681
2132					Variance (KM)	2.825			SE of Mean (KM)			0.254
2133					k hat (KM)	0.172			k star (KM)			0.175
2134					nu hat (KM)	15.47			nu star (KM)			15.78
2135					theta hat (KM)	4.053			theta star (KM)			3.976
2136					80% gamma percentile (KM)	0.85			90% gamma percentile (KM)			2.099
2137					95% gamma percentile (KM)	3.71			99% gamma percentile (KM)			8.247
2138												
2139	**The following statistics are computed using gamma distribution and KM estimates**											
2140	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2141					WH	HW				WH	HW	
2142				95% Approx. Gamma UTL with 95% Coverage	2.802	2.69			95% Approx. Gamma UPL	2.096	1.966	
2143				95% KM Gamma Percentile	2.008	1.877			95% Gamma USL	4.824	4.907	
2144												
2145	**Lognormal GOF Test on Detected Observations Only**											
2146					Shapiro Wilk Test Statistic	0.855			**Shapiro Wilk GOF Test**			
2147					5% Shapiro Wilk Critical Value	0.936			Data Not Lognormal at 5% Significance Level			
2148					Lilliefors Test Statistic	0.143			**Lilliefors GOF Test**			
2149					5% Lilliefors Critical Value	0.144			Detected Data appear Lognormal at 5% Significance Level			
2150	**Detected Data appear Approximate Lognormal at 5% Significance Level**											

2151												
2152	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
2153					Mean in Original Scale	0.686				Mean in Log Scale	-1.454	
2154					SD in Original Scale	1.704				SD in Log Scale	1.327	
2155					95% UTL95% Coverage	3.718				95% BCA UTL95% Coverage	8.734	
2156					95% Bootstrap (%) UTL95% Coverage	9.176				95% UPL (t)	2.227	
2157					90% Percentile (z)	1.28				95% Percentile (z)	2.073	
2158					99% Percentile (z)	5.121				95% USL	11.19	
2159												
2160	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2161					KM Mean of Logged Data	-1.262				95% KM UTL (Lognormal)95% Coverage	2.562	
2162					KM SD of Logged Data	1.057				95% KM UPL (Lognormal)	1.704	
2163					95% KM Percentile Lognormal (z)	1.609				95% KM USL (Lognormal)	6.161	
2164												
2165	**Background DL/2 Statistics Assuming Lognormal Distribution**											
2166					Mean in Original Scale	0.688				Mean in Log Scale	-1.386	
2167					SD in Original Scale	1.703				SD in Log Scale	1.215	
2168					95% UTL95% Coverage	3.15				95% UPL (t)	1.97	
2169					90% Percentile (z)	1.187				95% Percentile (z)	1.845	
2170					99% Percentile (z)	4.223				95% USL	8.638	
2171	**DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.**											
2172												
2173	**Nonparametric Distribution Free Background Statistics**											
2174	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
2175												
2176	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
2177					Order of Statistic, r	44				95% UTL with95% Coverage	5.48	
2178					Approx, f used to compute achieved CC	1.158				Approximate Actual Confidence Coefficient achieved by UTL	0.665	
2179					Approximate Sample Size needed to achieve specified CC	93				95% UPL	4.817	
2180					95% USL	10.1				95% KM Chebyshev UPL	8.104	
2181												
2182	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2183	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2184	and consists of observations collected from clean unimpacted locations.											
2185	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2186	represents a background data set and when many onsite observations need to be compared with the BTV.											
2187												
2188	**VINYL CHLORIDE (ug/L)**											
2189												
2190	**General Statistics**											
2191					Total Number of Observations	45				Number of Missing Observations	0	
2192					Number of Distinct Observations	1						
2193					Number of Detects	0				Number of Non-Detects	45	
2194					Number of Distinct Detects	0				Number of Distinct Non-Detects	1	
2195					Minimum Detect	N/A				Minimum Non-Detect	1	
2196					Maximum Detect	N/A				Maximum Non-Detect	1	
2197					Variance Detected	N/A				Percent Non-Detects	100%	
2198					Mean Detected	N/A				SD Detected	N/A	
2199					Mean of Detected Logged Data	N/A				SD of Detected Logged Data	N/A	
2200												

	A	B	C	D	E	F	G	H	I	J	K	L
2201	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2202	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2203	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2204												
2205	The data set for variable VINYL CHLORIDE (ug/L) was not processed!											
2206												
2207												
2208	**TOTAL XYLENES (ug/L)**											
2209												
2210	**General Statistics**											
2211	Total Number of Observations					45	Number of Missing Observations					0
2212	Number of Distinct Observations					1						
2213	Number of Detects					0	Number of Non-Detects					45
2214	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2215	Minimum Detect					N/A	Minimum Non-Detect					3
2216	Maximum Detect					N/A	Maximum Non-Detect					3
2217	Variance Detected					N/A	Percent Non-Detects					100%
2218	Mean Detected					N/A	SD Detected					N/A
2219	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2220												
2221	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2222	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2223	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2224												
2225	The data set for variable TOTAL XYLENES (ug/L) was not processed!											
2226												
2227												

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP015W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 36.43 " — Longitude: 76 o 27 ' 10.82 "

Depth to Water Level: 61.09 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.90 ft — Elevation of Water Level: 515.31 ft./MSL

Sampling Depth: 135 ft — Volume of Water Column: 128.96 gal

Total Well Depth: 148.9 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.6

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/17/2020 — Sample Collection Time: 10:25

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3086978001 — Final Lab Analysis CompletionDate: 2/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP015W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.187	D6919-09
BICARBONATE ALKALINITY	20	SM20-2320B
CALCIUM, TOTAL	19.6	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	23.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	460	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	18.9	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	52	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	27.8	EPA 300
pH-FIELD (SU)	4.96	FIELD
pH-LAB (SU)	6.53	SM20-4500HB
POTASSIUM, TOTAL	2.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	19.8	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	409	FIELD
SPEC. COND., LAB (umhos/cm)	382	SW846 9050A
SULFATE	30	EPA 300
ALKALINITY	20	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	210	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	2.3	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP015W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
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FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP033W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 o 57 ' 31.09 " — Longitude: 76 o 27 ' 4.98 "

Depth to Water Level: 17.79 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 0.49 ft — Elevation of Water Level: 498.73 ft./MSL

Sampling Depth: 79 ft — Volume of Water Column: 114.86 gal

Total Well Depth: 96 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.8

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/17/2020 — Sample Collection Time: 11:47

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3086978002 — Final Lab Analysis CompletionDate: 2/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP033W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.681	D6919-09
BICARBONATE ALKALINITY	45	SM20-2320B
CALCIUM, TOTAL	25.6	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	40.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	6100	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	9.4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	490	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	11.5	EPA 300
pH-FIELD (SU)	5.65	FIELD
pH-LAB (SU)	6.87	SM20-4500HB
POTASSIUM, TOTAL	1.8	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	14.5	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	357	FIELD
SPEC. COND., LAB (umhos/cm)	332	SW846 9050A
SULFATE	6.8	EPA 300
ALKALINITY	45	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	86	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	13.7	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).
Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP033W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

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FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP028W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 37 ° 57 ' 21.62 " — Longitude: 76 ° 27 ' 0.1 "

Depth to Water Level: 10.24 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.50 ft — Elevation of Water Level: 454.76 ft./MSL

Sampling Depth: 50 ft — Volume of Water Column: ___ gal

Total Well Depth: 60 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 2.3

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/17/2020 — Sample Collection Time: 13:02

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3086978003 — Final Lab Analysis CompletionDate: 2/25/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP028W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	27	SM20-2320B
CALCIUM, TOTAL	38.9	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	88.3	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	17.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	8	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	17.1	EPA 300
pH-FIELD (SU)	5.33	FIELD
pH-LAB (SU)	6.26	SM20-4500HB
POTASSIUM, TOTAL	2.4	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	28.2	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	569	FIELD
SPEC. COND., LAB (umhos/cm)	543	SW846 9050A
SULFATE	26.2	EPA 300
ALKALINITY	27	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	294	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.87	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.13	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4).
Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP028W
Sample Date	2/17/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP017W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 8.5 " — Longitude: 76 o 27 ' 6.17 "

Depth to Water Level: 37.88 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.00 ft — Elevation of Water Level: 442.82 ft./MSL

Sampling Depth: 135 ft — Volume of Water Column: 165.40 gal

Total Well Depth: 150.5 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.1

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 10:09

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135001 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP017W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.256	D6919-09
BICARBONATE ALKALINITY	70	SM20-2320B
CALCIUM, TOTAL	114	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	387	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	42.2	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	1100	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	1.5	EPA 300
pH-FIELD (SU)	5.68	FIELD
pH-LAB (SU)	6.71	SM20-4500HB
POTASSIUM, TOTAL	10	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	105	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1577	FIELD
SPEC. COND., LAB (umhos/cm)	1540	SW846 9050A
SULFATE	98.2	EPA 300
ALKALINITY	70	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	760	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	3.3	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.26	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP017W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP018W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 11.62 " — Longitude: 76 ° 27 ' 5.68 "

Depth to Water Level: 24.78 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.46 ft — Elevation of Water Level: 447.42 ft./MSL

Sampling Depth: 40 ft — Volume of Water Column: 17.40 gal

Total Well Depth: 51.43 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 4.5

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 10:37

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135002 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP018W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.136	D6919-09
BICARBONATE ALKALINITY	22	SM20-2320B
CALCIUM, TOTAL	33.9	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	106	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	15.4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	240	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	4.5	EPA 300
pH-FIELD (SU)	4.37	FIELD
pH-LAB (SU)	6.44	SM20-4500HB
POTASSIUM, TOTAL	5.7	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	32.4	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	541	FIELD
SPEC. COND., LAB (umhos/cm)	517	SW846 9050A
SULFATE	41.8	EPA 300
ALKALINITY	22	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	314	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.97	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP018W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP019W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 11.58 " — Longitude: 76 o 27 ' 5.75 "

Depth to Water Level: 25.8 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.79 ft — Elevation of Water Level: 446.15 ft./MSL

Sampling Depth: 49 ft — Volume of Water Column: 69.84 gal

Total Well Depth: 132.79 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 2.6

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 11:26

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135003 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP019W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	64	SM20-2320B
CALCIUM, TOTAL	60.2	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	82.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	5.7	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.22	EPA 300
pH-FIELD (SU)	5.51	FIELD
pH-LAB (SU)	7.36	SM20-4500HB
POTASSIUM, TOTAL	0.98	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	10.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	460	FIELD
SPEC. COND., LAB (umhos/cm)	444	SW846 9050A
SULFATE	15.4	EPA 300
ALKALINITY	64	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	252	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.4	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP019W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
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FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP029W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 12.93 " — Longitude: 76 o 27 ' 0.67 "

Depth to Water Level: 29.2 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.00 ft — Elevation of Water Level: 448.1 ft./MSL

Sampling Depth: 55 ft — Volume of Water Column: 43.03 gal

Total Well Depth: 58.5 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 2.4

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 12:29

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135004 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP029W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	13	SM20-2320B
CALCIUM, TOTAL	14.7	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	66.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	9.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	34	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	3.9	EPA 300
pH-FIELD (SU)	4.96	FIELD
pH-LAB (SU)	6.37	SM20-4500HB
POTASSIUM, TOTAL	2.3	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	23.3	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	311	FIELD
SPEC. COND., LAB (umhos/cm)	295	SW846 9050A
SULFATE	7	EPA 300
ALKALINITY	13	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	144	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.3	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
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I.D. No	101389
Monitoring Point No.	FFMP029W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
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FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP26RW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 11.03 " — Longitude: 76 o 27 ' 20.3 "

Depth to Water Level: 59.2 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 3.30 ft — Elevation of Water Level: 488.20 ft./MSL

Sampling Depth: 105 ft — Volume of Water Column: 80.48 gal

Total Well Depth: 114 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.8

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 13:43

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135005 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP26RW
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	65	SM20-2320B
CALCIUM, TOTAL	75.3	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	127	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	14.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	1000	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	2.3	EPA 300
pH-FIELD (SU)	5.5	FIELD
pH-LAB (SU)	6.81	SM20-4500HB
POTASSIUM, TOTAL	10.6	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	48.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	814	FIELD
SPEC. COND., LAB (umhos/cm)	789	SW846 9050A
SULFATE	119	EPA 300
ALKALINITY	65	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	500	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	2.5	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.32	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP26RW
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP005W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 10.67 " — Longitude: 76 ° 27 ' 21.3 "

Depth to Water Level: 52.5 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.70 ft — Elevation of Water Level: 484.90 ft./MSL

Sampling Depth: 135 ft — Volume of Water Column: 143.19 gal

Total Well Depth: 150 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.0

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/18/2020 — Sample Collection Time: 14:55

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087135006 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP005W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	54	SM20-2320B
CALCIUM, TOTAL	83.4	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	203	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	20.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	97	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	2	EPA 300
pH-FIELD (SU)	5.33	FIELD
pH-LAB (SU)	6.8	SM20-4500HB
POTASSIUM, TOTAL	3.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	59.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	977	FIELD
SPEC. COND., LAB (umhos/cm)	954	SW846 9050A
SULFATE	84.7	EPA 300
ALKALINITY	54	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	640	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.9	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP005W
Sample Date	2/18/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (D° MM' SS.S")

Monitoring Point Number: FFMP30RW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 ° 57 ' 15.52 " — Longitude: 76 ° 27 ' 26.8 "

Depth to Water Level: 32.78 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.20 ft — Elevation of Water Level: 529.52 ft./MSL

Sampling Depth: 85 ft — Volume of Water Column: 84.04 gal

Total Well Depth: 90 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.6

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/19/2020 — Sample Collection Time: 10:17

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087427001 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP30RW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.103	D6919-09
BICARBONATE ALKALINITY	28	SM20-2320B
CALCIUM, TOTAL	33.3	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	163	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	15.8	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	2000	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	5.1	EPA 300
pH-FIELD (SU)	5.2	FIELD
pH-LAB (SU)	6.04	SM20-4500HB
POTASSIUM, TOTAL	4.8	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	79.8	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	746	FIELD
SPEC. COND., LAB (umhos/cm)	713	SW846 9050A
SULFATE	25.8	EPA 300
ALKALINITY	28	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	696	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.76	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.75	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP30RW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP04AW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 15.4 " — Longitude: 76 o 27 ' 26.58 "

Depth to Water Level: 32.42 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.52 ft — Elevation of Water Level: 528.3 ft./MSL

Sampling Depth: 146 ft — Volume of Water Column: 395.21 gal

Total Well Depth: 301.52 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.7

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/19/2020 — Sample Collection Time: 11:25

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087427002 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP04AW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	196	SM20-2320B
CALCIUM, TOTAL	157	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	306	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	26.2	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	300	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.42	EPA 300
pH-FIELD (SU)	6.8	FIELD
pH-LAB (SU)	7.58	SM20-4500HB
POTASSIUM, TOTAL	2.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	88.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1476	FIELD
SPEC. COND., LAB (umhos/cm)	1420	SW846 9050A
SULFATE	46.5	EPA 300
ALKALINITY	196	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	944	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.8	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.51	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP04AW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DO MM' SS.S")

Monitoring Point Number: FFMP03AW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 24.05 " — Longitude: 76 o 27 ' 30.58 "

Depth to Water Level: 52.06 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.20 ft — Elevation of Water Level: 538.84 ft./MSL

Sampling Depth: 130 ft — Volume of Water Column: 139.73 gal

Total Well Depth: 147.2 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.7

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/19/2020 — Sample Collection Time: 12:40

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087427003 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP03AW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.193	D6919-09
BICARBONATE ALKALINITY	18	SM20-2320B
CALCIUM, TOTAL	19.2	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	27.3	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	13.4	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	280	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	21.1	EPA 300
pH-FIELD (SU)	4.94	FIELD
pH-LAB (SU)	5.84	SM20-4500HB
POTASSIUM, TOTAL	1.5	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	12.8	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	318	FIELD
SPEC. COND., LAB (umhos/cm)	294	SW846 9050A
SULFATE	3.3	EPA 300
ALKALINITY	18	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	222	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP03AW
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP031W — X Well ___ Spring ___ Stream ___ Other

X Upgradient/Upstream ___ Downgradient/Downstream

Location (County): Lancaster County — Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 o 57 ' 31.2 " — Longitude: 76 o 27 ' 23.53 "

Depth to Water Level: 66.38 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.38 ft — Elevation of Water Level: 546.28 ft./MSL

Sampling Depth: 130 ft — Volume of Water Column: 108.12 gal

Total Well Depth: 140 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 1.4

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/19/2020 — Sample Collection Time: 14:23

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087427004 — Final Lab Analysis CompletionDate: 2/26/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP031W
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.104	D6919-09
BICARBONATE ALKALINITY	64	SM20-2320B
CALCIUM, TOTAL	40.6	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	24.6	EPA 300
FLUORIDE	0.3	EPA 300
IRON, TOTAL (ug/l)	4200	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	3.9	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	300	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	7.4	FIELD
pH-LAB (SU)	7.81	SM20-4500HB
POTASSIUM, TOTAL	1.4	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	11.2	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	312	FIELD
SPEC. COND., LAB (umhos/cm)	282	SW846 9050A
SULFATE	40.8	EPA 300
ALKALINITY	64	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	328	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	19.1	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP031W
Sample Date	2/19/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DO MM' SS.S")

Monitoring Point Number: FFMP002W — X Well ___ Spring ___ Stream ___ Other

X Upgradient/Upstream ___ Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 32.25 " — Longitude: 76 o 27 ' 24.03 "

Depth to Water Level: 62.79 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.60 ft — Elevation of Water Level: 550.41 ft./MSL

Sampling Depth: 85 ft — Volume of Water Column: 156.87 gal

Total Well Depth: 169.6 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.6

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 10:11

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711001 — Final Lab Analysis CompletionDate: 2/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP002W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	5 ND	SM20-2320B
CALCIUM, TOTAL	20.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	22.5	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	92	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	8.6	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	250	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	21.3	EPA 300
pH-FIELD (SU)	4.44	FIELD
pH-LAB (SU)	4.81	SM20-4500HB
POTASSIUM, TOTAL	1.4	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	14.7	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	306	FIELD
SPEC. COND., LAB (umhos/cm)	270	SW846 9050A
SULFATE	12	EPA 300
ALKALINITY	5 ND	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	224	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.1 ND	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP002W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP032W — X Well ___ Spring ___ Stream ___ Other

X Upgradient/Upstream ___ Downgradient/Downstream

Location (County): Lancaster County — Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 o 57 ' 33.45 " — Longitude: 76 o 27 ' 17.71 "

Depth to Water Level: 49.72 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 2.06 ft — Elevation of Water Level: 544.37 ft./MSL

Sampling Depth: 62 ft — Volume of Water Column: 37.13 gal

Total Well Depth: 75 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.5

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 10:58

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711002 — Final Lab Analysis CompletionDate: 2/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP032W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.511	D6919-09
BICARBONATE ALKALINITY	68	SM20-2320B
CALCIUM, TOTAL	15.5	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	22.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	17500	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	5.3	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	650	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.73	FIELD
pH-LAB (SU)	7.15	SM20-4500HB
POTASSIUM, TOTAL	1.3	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	14	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	217	FIELD
SPEC. COND., LAB (umhos/cm)	184	SW846 9050A
SULFATE	2 ND	EPA 300
ALKALINITY	68	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	78	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.53	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	118	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP032W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
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FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP025W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 19.07 " — Longitude: 76 o 27 ' 1.12 "

Depth to Water Level: 22.32 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.50 ft — Elevation of Water Level: 454.48 ft./MSL

Sampling Depth: 39 ft — Volume of Water Column: 25.97 gal

Total Well Depth: 40 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.9

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 12:06

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711003 — Final Lab Analysis CompletionDate: 2/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP025W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.261	D6919-09
BICARBONATE ALKALINITY	36	SM20-2320B
CALCIUM, TOTAL	40.6	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	96.4	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	67 ND	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	19.5	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	5.6 ND	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	3	EPA 300
pH-FIELD (SU)	5.9	FIELD
pH-LAB (SU)	6.46	SM20-4500HB
POTASSIUM, TOTAL	3.3	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	34.5	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	576	FIELD
SPEC. COND., LAB (umhos/cm)	536	SW846 9050A
SULFATE	57	EPA 300
ALKALINITY	36	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	290	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	1.7	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	0.12	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP025W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
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Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP02DW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 o 57 ' 27.74 " — Longitude: 76 o 27 ' 1.49 "

Depth to Water Level: 19.15 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: ___ ft — Elevation of Water Level: 490.45 ft./MSL

Sampling Depth: 120 ft — Volume of Water Column: ___ gal

Total Well Depth: 152 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.5

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 13:23

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711004 — Final Lab Analysis CompletionDate: 2/27/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP02DW
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	D6919-09
BICARBONATE ALKALINITY	119	SM20-2320B
CALCIUM, TOTAL	118	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	299	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	940	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	18.7	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	480	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	10.2	EPA 300
pH-FIELD (SU)	7.08	FIELD
pH-LAB (SU)	7.62	SM20-4500HB
POTASSIUM, TOTAL	2	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	111	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	1357	FIELD
SPEC. COND., LAB (umhos/cm)	1270	SW846 9050A
SULFATE	31.1	EPA 300
ALKALINITY	119	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	866	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.68	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	8.69	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP02DW
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP02SW — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: MANOR TOWNSHIP

Sampling Point: Latitude: 39 o 57 ' 27.9 " — Longitude: 76 o 27 ' 1.58 "

Depth to Water Level: 14.51 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: ___ ft — Elevation of Water Level: 495.39 ft./MSL

Sampling Depth: 18 ft — Volume of Water Column: ___ gal

Total Well Depth: 25 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: 0.4

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 13:48

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711005 — Final Lab Analysis CompletionDate: 2/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP02SW
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.106	D6919-09
BICARBONATE ALKALINITY	14	SM20-2320B
CALCIUM, TOTAL	16.9	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	55.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	1100	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	6.6	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	17	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	15.1	EPA 300
pH-FIELD (SU)	5.62	FIELD
pH-LAB (SU)	6.12	SM20-4500HB
POTASSIUM, TOTAL	5.9	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	49.6	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	445	FIELD
SPEC. COND., LAB (umhos/cm)	409	SW846 9050A
SULFATE	28.9	EPA 300
ALKALINITY	14	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	108	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	2.9	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	25.9	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP02SW
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0041 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/18/2020
DEP USE ONLY
Date Received

FORM 19

MUNICIPAL WASTE LANDFILL
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 19, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General Reference: Section 273.284
Federal Regulations, Subtitle D: 258.54 and Appendix I to Part 258.

SECTION A. APPLICANT IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Mana

Site Name: Frey Farm Landfill

Facitlity ID (as issued by DEP): 101389

SECTION B. FACILITY INFORMATION

Monitoring Wells must be designed and constructed in accordance with Department Standards. INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (Do MM' SS.S")

Monitoring Point Number: FFMP016W — X Well ___ Spring ___ Stream ___ Other

___ Upgradient/Upstream X Downgradient/Downstream

Location (County): Lancaster County — Municipality: Manor Township

Sampling Point: Latitude: 39 o 57 ' 19.15 " — Longitude: 76 o 27 ' 0.88 "

Depth to Water Level: 20.16 ft — Measured from: ___ Land Surface X TOC

Casing Stickup: 1.97 ft — Elevation of Water Level: 454.44 ft./MSL

Sampling Depth: 135 ft — Volume of Water Column: 190.40 gal

Total Well Depth: 149.8 ft — Sampling Method: X Pumped ___ Bailed ___ Grab

Well Purged: X Yes ___ No — Well Volumes Purged: ___

Sample Field Filtered (must be 0.45 micron)?: ___ Yes X No

Spring Flow Rate: ___ gpm

Sample Date (mm/dd/yy): 2/20/2020 — Sample Collection Time: 14:00

Sample Collector's Name: Mr. Brian G Shade

Sample Collector's Affiliation: ALS

Laboratory(ies) Performing Analysis: ALS Environmental

Were any holding times exceeded?: ___ Yes X No If yes, please explain in comments field.

Lab Accreditation Number(s): 22-293

Lab Sample Number(s): 3087711006 — Final Lab Analysis CompletionDate: 2/28/2020

Name/Affiliation of Person who Filled Out Form: Daniel A. Brown

Comments:

I.D. No	101389
Monitoring Point No.	FFMP016W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.319	D6919-09
BICARBONATE ALKALINITY	38	SM20-2320B
CALCIUM, TOTAL	41.8	SW846 6010C
CALCIUM, DISSOLVED		SW846 6010C
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.4
CHLORIDE	101	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	140	SW846 6010C
IRON, DISSOLVED (ug/l)		SW846 6010C
MAGNESIUM, TOTAL	18.1	SW846 6010C
MAGNESIUM, DISSOLVED		SW846 6010C
MANGANESE, TOTAL (ug/l)	6.2	SW846 6010C
MANGANESE, DISSOLVED (ug/l)		SW846 6010C
NITRATE-NITROGEN	2.7	EPA 300
pH-FIELD (SU)	5.95	FIELD
pH-LAB (SU)	6.45	SM20-4500HB
POTASSIUM, TOTAL	3.3	SW846 6010C
POTASSIUM, DISSOLVED		SW846 6010C
SODIUM, TOTAL	33.9	SW846 6010C
SODIUM, DISSOLVED		SW846 6010C
SPEC. COND., FIELD (umhos/cm)	596	FIELD
SPEC. COND., LAB (umhos/cm)	550	SW846 9050A
SULFATE	62.5	EPA 300
ALKALINITY	38	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	252	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	2	SW846 9060A
TOTAL PHENOLICS (ug/l)	5 ND	SW846 9066
TURBIDITY (N.T.U.)	1.43	SM 2130B

* Indicator Analyte - For comparison with detection zone analytes.
T Please indicate detection limit if analyte is not detected.
** Total and dissolved analysis required only in conjunction with additional annual metals sampling (see page 4). Remaining quarterly samples only require total metals analysis.

I.D. No	101389
Monitoring Point No.	FFMP016W
Sample Date	2/20/2020

FORM 19

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

2-Q. Organics (Enter all data in ug/l)

ANALYTE	VALUE[T]	ANALYSIS METHOD NUMBER
BENZENE	1 ND	SW846 8260B
1,2-DIBROMOETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHANE	1 ND	SW846 8260B
1,1-DICHLOROETHENE	1 ND	SW846 8260B
1,2-DICHLOROETHANE	1 ND	SW846 8260B
CIS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
TRANS 1,2-DICHLOROETHENE	1 ND	SW846 8260B
ETHYLBENZENE	1 ND	SW846 8260B
METHYLENE CHLORIDE	1 ND	SW846 8260B
TETRACHLOROETHENE	1 ND	SW846 8260B
TOLUENE	1 ND	SW846 8260B
1,1,1-TRICHLOROETHANE	1 ND	SW846 8260B
TRICHLOROETHENE	1 ND	SW846 8260B
VINYL CHLORIDE	1 ND	SW846 8260B
XYLENES (TOTAL)	3 ND	SW846 8260B

T Please indicate detection limit if analyte is not detected.

ALS Environmental

301 Fulling Mill Road - Middletown, PA 17057 - Phone: 717-944-5541 - Fax:717-944-1430 - www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

March 2, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	**FREY FARM**	Workorder:	**3087711**
Purchase Order:	**PO1000126**	Workorder ID:	**1ST QTR 2020 GWMP-FORM 19Q**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Thursday, February 20, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3087711001	FFMP002W	Ground Water	2/20/2020 10:11	2/20/2020 15:51	Mr. Brian G Shade
3087711002	FFMP032W	Ground Water	2/20/2020 10:58	2/20/2020 15:51	Mr. Brian G Shade
3087711003	FFMP025W	Ground Water	2/20/2020 12:06	2/20/2020 15:51	Mr. Brian G Shade
3087711004	FFMP02DW	Ground Water	2/20/2020 13:23	2/20/2020 15:51	Mr. Brian G Shade
3087711005	FFMP02SW	Ground Water	2/20/2020 13:48	2/20/2020 15:51	Mr. Brian G Shade
3087711006	FFMP016W	Ground Water	2/20/2020 14:00	2/20/2020 15:51	Mr. Brian G Shade
3087711007	FIELD BLANK	Water	2/20/2020 14:15	2/20/2020 15:51	Mr. Brian G Shade
3087711008	TRIP BLANK	Ground Water	2/20/2020 00:00	2/20/2020 15:51	Mr. Brian G Shade

ALS Environmental

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State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

SAMPLE SUMMARY

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711001** Date Collected: 2/20/2020 10:11 Matrix: Ground Water
Sample ID: **FFMP002W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 14:58	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 14:58	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	115		%	62 - 133	SW846 8260B			2/25/20 14:58	DPC	G
4-Bromofluorobenzene (S)	109		%	79 - 114	SW846 8260B			2/25/20 14:58	DPC	G
Dibromofluoromethane (S)	106		%	78 - 116	SW846 8260B			2/25/20 14:58	DPC	G
Toluene-d8 (S)	108		%	76 - 127	SW846 8260B			2/25/20 14:58	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	ND	5	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/27/20 11:20	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	22.5		mg/L	2.0	EPA 300.0			2/21/20 06:55	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 06:55	MBW	B
Nitrate-N	21.3	3	mg/L	0.50	EPA 300.0			2/25/20 10:53	MBW	B
pH	4.81	4	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	270		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	12.0		mg/L	2.0	EPA 300.0			2/21/20 06:55	MBW	B
Total Dissolved Solids	224		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/24/20 19:44	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711001** Date Collected: 2/20/2020 10:11 Matrix: Ground Water
Sample ID: **FFMP002W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	20.8		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
Iron, Total	0.092		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
Magnesium, Total	8.6		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
Manganese, Total	0.25		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
Potassium, Total	1.4		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
Sodium, Total	14.7		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:23	SRT	J
FIELD PARAMETERS										
Depth to Water Level	62.79		Feet		Field			2/20/20 10:11	BGS	C
Elev Top MW Casing above MSL	613.20		Feet		Field			2/20/20 10:11	BGS	C
Flow Rate	1.31		gal/min		Field			2/20/20 10:11	BGS	C
Ground Water Elevation	550.41		ft/MSL		Field			2/20/20 10:11	BGS	C
pH, Field (SM4500B)	4.44		pH_Units		Field			2/20/20 10:11	BGS	C
Sample Depth	85.00		Feet		Field			2/20/20 10:11	BGS	C
Specific Conductance, Field	306		umhos/cm	1	Field			2/20/20 10:11	BGS	C
Temperature	10.52		Deg. C		Field			2/20/20 10:11	BGS	C
Total Well Depth	90.02		Feet		Field			2/20/20 10:11	BGS	C
Volume in Water Column	40.03		Gallons		Field			2/20/20 10:11	BGS	C
Water Level After Purge	77.39		Feet		Field			2/20/20 10:11	BGS	C
Well Volumes Purged	0.65		Vol		Field			2/20/20 10:11	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711002** Date Collected: 2/20/2020 10:58 Matrix: Ground Water

Sample ID: **FFMP032W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 15:22	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 15:22	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	114		%	62 - 133	SW846 8260B			2/25/20 15:22	DPC	G
4-Bromofluorobenzene (S)	108		%	79 - 114	SW846 8260B			2/25/20 15:22	DPC	G
Dibromofluoromethane (S)	105		%	78 - 116	SW846 8260B			2/25/20 15:22	DPC	G
Toluene-d8 (S)	107		%	76 - 127	SW846 8260B			2/25/20 15:22	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	68		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	68	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	0.511		mg/L	0.100	ASTM D6919-09			2/27/20 10:39	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	22.7		mg/L	2.0	EPA 300.0			2/21/20 08:37	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 08:37	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			2/21/20 08:37	MBW	B
pH	7.15	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	184		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	ND		mg/L	2.0	EPA 300.0			2/21/20 08:37	MBW	B
Total Dissolved Solids	78		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	0.53		mg/L	0.50	SW846 9060A			2/24/20 19:44	PAG	D
Turbidity	118		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711002** Date Collected: 2/20/2020 10:58 Matrix: Ground Water

Sample ID: **FFMP032W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	15.5		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
Iron, Total	17.5		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
Magnesium, Total	5.3		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
Manganese, Total	0.65		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
Potassium, Total	1.3		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
Sodium, Total	14.0		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:26	SRT	J
FIELD PARAMETERS										
Depth to Water Level	49.72		Feet		Field			2/20/20 11:47	BGS	C
Elev Top MW Casing above MSL	594.09		Feet		Field			2/20/20 11:47	BGS	C
Flow Rate	0.61		gal/min		Field			2/20/20 11:47	BGS	C
Ground Water Elevation	544.37		ft/MSL		Field			2/20/20 11:47	BGS	C
pH, Field (SM4500B)	6.73		pH_Units		Field			2/20/20 11:47	BGS	C
Sample Depth	62.00		Feet		Field			2/20/20 11:47	BGS	C
Specific Conductance, Field	217		umhos/cm	1	Field			2/20/20 11:47	BGS	C
Temperature	9.82		Deg. C		Field			2/20/20 11:47	BGS	C
Total Well Depth	77.60		Feet		Field			2/20/20 11:47	BGS	C
Volume in Water Column	40.98		Gallons		Field			2/20/20 11:47	BGS	C
Water Level After Purge	58.88		Feet		Field			2/20/20 11:47	BGS	C
Well Volumes Purged	0.52		Vol		Field			2/20/20 11:47	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711003** Date Collected: 2/20/2020 12:06 Matrix: Ground Water
Sample ID: **FFMP025W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 15:45	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 15:45	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	116		%	62 - 133	SW846 8260B			2/25/20 15:45	DPC	G
4-Bromofluorobenzene (S)	111		%	79 - 114	SW846 8260B			2/25/20 15:45	DPC	G
Dibromofluoromethane (S)	106		%	78 - 116	SW846 8260B			2/25/20 15:45	DPC	G
Toluene-d8 (S)	109		%	76 - 127	SW846 8260B			2/25/20 15:45	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	36		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	36	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	0.261		mg/L	0.100	ASTM D6919-09			2/27/20 11:34	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	96.4		mg/L	2.0	EPA 300.0			2/21/20 08:54	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 08:54	MBW	B
Nitrate-N	3.0		mg/L	0.20	EPA 300.0			2/21/20 08:54	MBW	B
pH	6.46	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	536		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	57.0		mg/L	2.0	EPA 300.0			2/21/20 08:54	MBW	B
Total Dissolved Solids	290		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	1.7		mg/L	0.50	SW846 9060A			2/24/20 19:44	PAG	D
Turbidity	0.12		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711003** Date Collected: 2/20/2020 12:06 Matrix: Ground Water

Sample ID: **FFMP025W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	40.6		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
Magnesium, Total	19.5		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
Potassium, Total	3.3		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
Sodium, Total	34.5		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:30	SRT	J
FIELD PARAMETERS										
Depth to Water Level	22.32		Feet		Field			2/20/20 11:43	BGS	C
Elev Top MW Casing above MSL	476.80		Feet		Field			2/20/20 11:43	BGS	C
Flow Rate	3.82		gal/min		Field			2/20/20 11:43	BGS	C
Ground Water Elevation	454.48		ft/MSL		Field			2/20/20 11:43	BGS	C
pH, Field (SM4500B)	5.90		pH_Units		Field			2/20/20 11:43	BGS	C
Sample Depth	39.00		Feet		Field			2/20/20 11:43	BGS	C
Specific Conductance, Field	576		umhos/cm	1	Field			2/20/20 11:43	BGS	C
Temperature	9.88		Deg. C		Field			2/20/20 11:43	BGS	C
Total Well Depth	41.50		Feet		Field			2/20/20 11:43	BGS	C
Volume in Water Column	28.19		Gallons		Field			2/20/20 11:43	BGS	C
Water Level After Purge	22.78		Feet		Field			2/20/20 11:43	BGS	C
Well Volumes Purged	0.95		Vol		Field			2/20/20 11:43	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711004** Date Collected: 2/20/2020 13:23 Matrix: Ground Water
Sample ID: **FFMP02DW** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 16:08	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:08	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	115		%	62 - 133	SW846 8260B			2/25/20 16:08	DPC	G
4-Bromofluorobenzene (S)	109		%	79 - 114	SW846 8260B			2/25/20 16:08	DPC	G
Dibromofluoromethane (S)	105		%	78 - 116	SW846 8260B			2/25/20 16:08	DPC	G
Toluene-d8 (S)	108		%	76 - 127	SW846 8260B			2/25/20 16:08	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	119		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	119	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/27/20 03:19	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	299		mg/L	5.0	EPA 300.0			2/25/20 11:10	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 09:10	MBW	B
Nitrate-N	10.2		mg/L	0.20	EPA 300.0			2/21/20 09:10	MBW	B
pH	7.62	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	1270		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	31.1		mg/L	2.0	EPA 300.0			2/21/20 09:10	MBW	B
Total Dissolved Solids	866		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	0.68		mg/L	0.50	SW846 9060A			2/25/20 00:21	PAG	D
Turbidity	8.69		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711004** Date Collected: 2/20/2020 13:23 Matrix: Ground Water

Sample ID: **FFMP02DW** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	118		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
Iron, Total	0.94		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
Magnesium, Total	18.7		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
Manganese, Total	0.48		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
Potassium, Total	2.0		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
Sodium, Total	111		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 11:34	SRT	J
FIELD PARAMETERS										
Depth to Water Level	19.15		Feet		Field			2/20/20 13:23	BGS	C
Elev Top MW Casing above MSL	509.60		Feet		Field			2/20/20 13:23	BGS	C
Flow Rate	1.70		gal/min		Field			2/20/20 13:23	BGS	C
Ground Water Elevation	490.45		ft/MSL		Field			2/20/20 13:23	BGS	C
pH, Field (SM4500B)	7.08		pH_Units		Field			2/20/20 13:23	BGS	C
Sample Depth	120.00		Feet		Field			2/20/20 13:23	BGS	C
Specific Conductance, Field	1357		umhos/cm	1	Field			2/20/20 13:23	BGS	C
Temperature	10.26		Deg. C		Field			2/20/20 13:23	BGS	C
Total Well Depth	153.00		Feet		Field			2/20/20 13:23	BGS	C
Volume in Water Column	196.76		Gallons		Field			2/20/20 13:23	BGS	C
Water Level After Purge	51.35		Feet		Field			2/20/20 13:23	BGS	C
Well Volumes Purged	0.52		Vol		Field			2/20/20 13:23	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711005** Date Collected: 2/20/2020 13:48 Matrix: Ground Water
Sample ID: **FFMP02SW** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 16:32	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:32	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	114		%	62 - 133	SW846 8260B			2/25/20 16:32	DPC	G
4-Bromofluorobenzene (S)	107		%	79 - 114	SW846 8260B			2/25/20 16:32	DPC	G
Dibromofluoromethane (S)	103		%	78 - 116	SW846 8260B			2/25/20 16:32	DPC	G
Toluene-d8 (S)	106		%	76 - 127	SW846 8260B			2/25/20 16:32	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	14		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	14	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	0.106		mg/L	0.100	ASTM D6919-09			2/27/20 10:52	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	55.8		mg/L	2.0	EPA 300.0			2/21/20 09:27	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 09:27	MBW	B
Nitrate-N	15.1		mg/L	0.20	EPA 300.0			2/21/20 09:27	MBW	B
pH	6.12	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	409		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	28.9		mg/L	2.0	EPA 300.0			2/21/20 09:27	MBW	B
Total Dissolved Solids	108		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	2.9		mg/L	0.50	SW846 9060A			2/25/20 00:21	PAG	D
Turbidity	25.9		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711005** Date Collected: 2/20/2020 13:48 Matrix: Ground Water

Sample ID: **FFMP02SW** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	16.9		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
Iron, Total	1.1		mg/L	0.067	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
Magnesium, Total	6.6		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
Manganese, Total	0.017		mg/L	0.0056	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
Potassium, Total	5.9		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
Sodium, Total	49.6		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:35	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	14.51		Feet		Field			2/20/20 13:48	BGS	C
Elev Top MW Casing above MSL	509.90		Feet		Field			2/20/20 13:48	BGS	C
Flow Rate	0.50		gal/min		Field			2/20/20 13:48	BGS	C
Ground Water Elevation	495.39		ft/MSL		Field			2/20/20 13:48	BGS	C
pH, Field (SM4500B)	5.62		pH_Units		Field			2/20/20 13:48	BGS	C
Sample Depth	18.00		Feet		Field			2/20/20 13:48	BGS	C
Specific Conductance, Field	445		umhos/cm	1	Field			2/20/20 13:48	BGS	C
Temperature	10.52		Deg. C		Field			2/20/20 13:48	BGS	C
Total Well Depth	22.70		Feet		Field			2/20/20 13:48	BGS	C
Volume in Water Column	5.32		Gallons		Field			2/20/20 13:48	BGS	C
Water Level After Purge	17.49		Feet		Field			2/20/20 13:48	BGS	C
Well Volumes Purged	0.38		Vol		Field			2/20/20 13:48	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711006** Date Collected: 2/20/2020 14:00 Matrix: Ground Water

Sample ID: **FFMP016W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 16:55	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 16:55	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	114		%	62 - 133	SW846 8260B			2/25/20 16:55	DPC	G
4-Bromofluorobenzene (S)	107		%	79 - 114	SW846 8260B			2/25/20 16:55	DPC	G
Dibromofluoromethane (S)	104		%	78 - 116	SW846 8260B			2/25/20 16:55	DPC	G
Toluene-d8 (S)	107		%	76 - 127	SW846 8260B			2/25/20 16:55	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	38		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	38	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	0.319		mg/L	0.100	ASTM D6919-09			2/27/20 03:33	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	101		mg/L	2.0	EPA 300.0			2/21/20 09:44	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/21/20 09:44	MBW	B
Nitrate-N	2.7		mg/L	0.20	EPA 300.0			2/21/20 09:44	MBW	B
pH	6.45	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:41	C_D	2/26/20 05:48	C_D	F
Specific Conductance	550		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	62.5		mg/L	2.0	EPA 300.0			2/21/20 09:44	MBW	B
Total Dissolved Solids	252		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	2.0		mg/L	0.50	SW846 9060A			2/25/20 00:21	PAG	D
Turbidity	1.43		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711006** Date Collected: 2/20/2020 14:00 Matrix: Ground Water
Sample ID: **FFMP016W** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	41.8		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
Iron, Total	0.14		mg/L	0.067	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
Magnesium, Total	18.1		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
Manganese, Total	0.0062		mg/L	0.0056	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
Potassium, Total	3.3		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
Sodium, Total	33.9		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:39	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	20.16		Feet		Field			2/20/20 14:00	BGS	C
Elev Top MW Casing above MSL	474.60		Feet		Field			2/20/20 14:00	BGS	C
Ground Water Elevation	454.44		ft/MSL		Field			2/20/20 14:00	BGS	C
pH, Field (SM4500B)	5.95		pH_Units		Field			2/20/20 14:00	BGS	C
Sample Depth	135.00		Feet		Field			2/20/20 14:00	BGS	C
Specific Conductance, Field	596		umhos/cm	1	Field			2/20/20 14:00	BGS	C
Temperature	8.69		Deg. C		Field			2/20/20 14:00	BGS	C
Total Well Depth	149.80		Feet		Field			2/20/20 14:00	BGS	C
Volume in Water Column	338.36		Gallons		Field			2/20/20 14:00	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711007** Date Collected: 2/20/2020 14:15 Matrix: Water

Sample ID: **FIELD BLANK** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 14:35	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 14:35	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	115		%	62 - 133	SW846 8260B			2/25/20 14:35	DPC	G
4-Bromofluorobenzene (S)	108		%	79 - 114	SW846 8260B			2/25/20 14:35	DPC	G
Dibromofluoromethane (S)	106		%	78 - 116	SW846 8260B			2/25/20 14:35	DPC	G
Toluene-d8 (S)	108		%	76 - 127	SW846 8260B			2/25/20 14:35	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Alkalinity, Total	ND	4	mg/L	5	SM2320B-2011			2/27/20 20:04	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/27/20 10:25	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	ND		mg/L	1.0	EPA 300.0			2/21/20 10:01	MBW	B
Fluoride	ND		mg/L	0.10	EPA 300.0			2/21/20 10:01	MBW	B
Nitrate-N	ND		mg/L	0.10	EPA 300.0			2/21/20 10:01	MBW	B
pH	4.70	3	pH_Units		S4500HB-11			2/27/20 20:04	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:41	C_D	2/26/20 05:48	C_D	F
Specific Conductance	1		umhos/cm	1	SW846 9050A			2/25/20 20:24	MBW	B
Sulfate	ND		mg/L	1.0	EPA 300.0			2/21/20 10:01	MBW	B
Total Dissolved Solids	21		mg/L	5	S2540C-11			2/25/20 17:02	VXF	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/25/20 00:21	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/21/20 07:41	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711007** Date Collected: 2/20/2020 14:15 Matrix: Water

Sample ID: **FIELD BLANK** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	ND		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1
Magnesium, Total	ND		mg/L	0.11	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1
Potassium, Total	ND		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1
Sodium, Total	ND		mg/L	0.56	SW846 6010C	2/27/20 17:45	SXC	2/28/20 12:42	SRT	J1

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087711008** Date Collected: 2/20/2020 00:00 Matrix: Ground Water
Sample ID: **TRIP BLANK** Date Received: 2/20/2020 15:51

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Toluene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/25/20 13:26	DPC	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/25/20 13:26	DPC	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	114		%	62 - 133	SW846 8260B			2/25/20 13:26	DPC	A
4-Bromofluorobenzene (S)	105		%	79 - 114	SW846 8260B			2/25/20 13:26	DPC	A
Dibromofluoromethane (S)	105		%	78 - 116	SW846 8260B			2/25/20 13:26	DPC	A
Toluene-d8 (S)	106		%	76 - 127	SW846 8260B			2/25/20 13:26	DPC	A

Susan J. Scherer
Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3087711001	3	FFMP002W	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
3087711001	4	FFMP002W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711001	5	FFMP002W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711002	3	FFMP032W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711002	4	FFMP032W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711003	3	FFMP025W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711003	4	FFMP025W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711004	3	FFMP02DW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711004	4	FFMP02DW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711005	3	FFMP02SW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711005	4	FFMP02SW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711006	3	FFMP016W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711006	4	FFMP016W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087711007	3	FIELD BLANK	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087711007	4	FIELD BLANK	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087711001	FFMP002W	ASTM D6919-09	
3087711001	FFMP002W	EPA 300.0	
3087711001	FFMP002W	EPA 410.4	
3087711001	FFMP002W	Field	
3087711001	FFMP002W	S2540C-11	
3087711001	FFMP002W	S4500HB-11	
3087711001	FFMP002W	SM2130B-2011	
3087711001	FFMP002W	SM2320B-2011	
3087711001	FFMP002W	SW846 6010C	SW846 3015
3087711001	FFMP002W	SW846 8260B	
3087711001	FFMP002W	SW846 9050A	
3087711001	FFMP002W	SW846 9060A	
3087711001	FFMP002W	SW846 9066	420.4/9066
3087711002	FFMP032W	ASTM D6919-09	
3087711002	FFMP032W	EPA 300.0	
3087711002	FFMP032W	EPA 410.4	
3087711002	FFMP032W	Field	
3087711002	FFMP032W	S2540C-11	
3087711002	FFMP032W	S4500HB-11	
3087711002	FFMP032W	SM2130B-2011	
3087711002	FFMP032W	SM2320B-2011	
3087711002	FFMP032W	SW846 6010C	SW846 3015
3087711002	FFMP032W	SW846 8260B	
3087711002	FFMP032W	SW846 9050A	
3087711002	FFMP032W	SW846 9060A	
3087711002	FFMP032W	SW846 9066	420.4/9066
3087711003	FFMP025W	ASTM D6919-09	
3087711003	FFMP025W	EPA 300.0	
3087711003	FFMP025W	EPA 410.4	
3087711003	FFMP025W	Field	
3087711003	FFMP025W	S2540C-11	
3087711003	FFMP025W	S4500HB-11	
3087711003	FFMP025W	SM2130B-2011	
3087711003	FFMP025W	SM2320B-2011	
3087711003	FFMP025W	SW846 6010C	SW846 3015
3087711003	FFMP025W	SW846 8260B	
3087711003	FFMP025W	SW846 9050A	
3087711003	FFMP025W	SW846 9060A	
3087711003	FFMP025W	SW846 9066	420.4/9066
3087711004	FFMP02DW	ASTM D6919-09	
3087711004	FFMP02DW	EPA 300.0	
3087711004	FFMP02DW	EPA 410.4	
3087711004	FFMP02DW	Field	
3087711004	FFMP02DW	S2540C-11	
3087711004	FFMP02DW	S4500HB-11	
3087711004	FFMP02DW	SM2130B-2011	

ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087711 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087711004	FFMP02DW	SM2320B-2011	
3087711004	FFMP02DW	SW846 6010C	SW846 3015
3087711004	FFMP02DW	SW846 8260B	
3087711004	FFMP02DW	SW846 9050A	
3087711004	FFMP02DW	SW846 9060A	
3087711004	FFMP02DW	SW846 9066	420.4/9066
3087711005	FFMP02SW	ASTM D6919-09	
3087711005	FFMP02SW	EPA 300.0	
3087711005	FFMP02SW	EPA 410.4	
3087711005	FFMP02SW	Field	
3087711005	FFMP02SW	S2540C-11	
3087711005	FFMP02SW	S4500HB-11	
3087711005	FFMP02SW	SM2130B-2011	
3087711005	FFMP02SW	SM2320B-2011	
3087711005	FFMP02SW	SW846 6010C	SW846 3015
3087711005	FFMP02SW	SW846 8260B	
3087711005	FFMP02SW	SW846 9050A	
3087711005	FFMP02SW	SW846 9060A	
3087711005	FFMP02SW	SW846 9066	420.4/9066
3087711006	FFMP016W	ASTM D6919-09	
3087711006	FFMP016W	EPA 300.0	
3087711006	FFMP016W	EPA 410.4	
3087711006	FFMP016W	Field	
3087711006	FFMP016W	S2540C-11	
3087711006	FFMP016W	S4500HB-11	
3087711006	FFMP016W	SM2130B-2011	
3087711006	FFMP016W	SM2320B-2011	
3087711006	FFMP016W	SW846 6010C	SW846 3015
3087711006	FFMP016W	SW846 8260B	
3087711006	FFMP016W	SW846 9050A	
3087711006	FFMP016W	SW846 9060A	
3087711006	FFMP016W	SW846 9066	420.4/9066
3087711007	FIELD BLANK	ASTM D6919-09	
3087711007	FIELD BLANK	EPA 300.0	
3087711007	FIELD BLANK	EPA 410.4	
3087711007	FIELD BLANK	S2540C-11	
3087711007	FIELD BLANK	S4500HB-11	
3087711007	FIELD BLANK	SM2130B-2011	
3087711007	FIELD BLANK	SM2320B-2011	
3087711007	FIELD BLANK	SW846 6010C	SW846 3015
3087711007	FIELD BLANK	SW846 8260B	
3087711007	FIELD BLANK	SW846 9050A	
3087711007	FIELD BLANK	SW846 9060A	
3087711007	FIELD BLANK	SW846 9066	420.4/9066
3087711008	TRIP BLANK	SW846 8260B	

20

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

1 of 1

ALS Environmental

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ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

(Lab Use Only) Received by Receiving Lab)

Client Name: Lancaster County Solid Waste MA

Address: 1299 Harrisburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown

Phone#: (717) 735-0193

Project Name/#: Frey Farm Quarterly (GWMP)

Bill To: Lancaster County Solid Waste MA

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____

Email? [X] -Y mreider@LCSWMA.com dbrown@LCSWMA.com

Fax? [X] -Y No.: (717) 397-9973 3c 2/24/20 acrs

Cooler Temp: 1 Therm ID: 441

No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Container Type	AG	AW	CG	---	---	PL	PL	PL	PL	
Container Size	40 ml	125 ml	40 ml	---	---	250 ml	125 ml	500 ml	500 ml	
Preservative	HCl	H2SO4	HCl	---	---	H2SO4	HNO3	None	None	

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	VOC - Form 19Q	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SpC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate		Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
1. FFMP002W	02/20/20	1011	G	GW	2	1	2	X	X	1	1	1	1		
2. FFMP032W	02/20/20	1058	G	GW	2	1	2	X	X	1	1	1	1		
3. FFMP025W	02/20/20	1206	G	GW	2	1	2	X	X	1	1	1	1		
4. FFMP02DW	02/20/20	1323	G	GW	2	1	2	X	X	1	1	1	1		
5. FFMP02SW	02/20/20	1348	G	GW	2	1	2	X	X	1	1	1	1		
6. FFMP016W	02/20/20	1400	G	GW	2	1	2	X	X	1	1	1	1		
7. Field Blank	02/20/20	1415	G	GW	2	1	2			1	1	1	1		
8. Trip Blank	02/20/20		G	GW			2								
9															
10															

ALS Field Services: ☐Pickup ☐Labor ☐Composite_Sampling ☐Rental_Equipment ☐Other: _____

Project Comments:

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 RGD Woolen FEDEX ALS	2-20-20	1551	2	2/20/20	1551
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐Standard ☐CLP-like ☐USACE ☐

Special Processing: USACE ☐ Navy ☐ ☐

State Samples Collected In: ☐NY ☐NJ ☒PA ☐NC ☐

Reportable to PADEP? Yes ☐ PWSID # _____

Sample Disposal: Lab ☒ Special ☐

EDDS: Format Type

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Oil=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 8/04

301 Fulling Mill Road
Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3087711 Initials: CJ Date: 2/20/2020

1. Were airbills / tracking numbers present and recorded?	(NONE)	YES	NO
Tracking number: _____			
2. Are Custody Seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody Seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present?		(YES)	NO
5. Are the COC and bottle labels complete, legible and in agreement?		(YES)	NO
5a. Does the COC contain sample locations?		(YES)	NO
5b. Does the COC contain date and time of sample collection for all samples?		(YES)	NO
5c. Does the COC contain sample collectors name?		(YES)	NO
5d. Does the COC note the type(s) of preservation for all bottles?		(YES)	NO
5e. Does the COC note the number of bottles submitted for each sample?		(YES)	NO
5f. Does the COC note the type of sample, composite or grab?		(YES)	NO
5g. Does the COC note the matrix of the sample(s)?		(YES)	NO
6. Are all aqueous samples requiring preservation preserved correctly?[1]	N/A	(YES)	NO
7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?		(YES)	NO
8. Are all samples within holding times for the requested analyses?		(YES)	NO
9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)		(YES)	NO
10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?	(N/A)	YES	NO
11. Were the samples received on ice?		(YES)	NO
12. Were sample temperatures measured at 0.0-6.0°C		(YES)	NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below		YES	(NO)
13a. Are the samples required for SDWA compliance reporting?	(N/A)	YES	NO
13b. Did the client provide a SDWA PWS ID#?	(N/A)	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?	(N/A)	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?	(N/A)	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?	(N/A)	YES	NO

Cooler #: _____

Temperature (°C): 1

Thermometer ID: 441

Radiological (µCi): _____

COMMENTS (Required for all NO responses above and any sample non-conformance):

[1]Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis

Rev 1/20/2020

ALS Environmental

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State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

February 28, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	**FREY FARM**	Workorder:	**3087427**
Purchase Order:	**PO1000126**	Workorder ID:	**1ST QTR 2020 GWMP-FORM 19Q**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Wednesday, February 19, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3087427001	FFMP30RW	Ground Water	2/19/2020 10:17	2/19/2020 15:33	Mr. Brian G Shade
3087427002	FFMP04AW	Ground Water	2/19/2020 11:25	2/19/2020 15:33	Mr. Brian G Shade
3087427003	FFMP03AW	Ground Water	2/19/2020 12:40	2/19/2020 15:33	Mr. Brian G Shade
3087427004	FFMP031W	Ground Water	2/19/2020 14:23	2/19/2020 15:33	Mr. Brian G Shade

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State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

SAMPLE SUMMARY

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

ALS Environmental

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State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427001** Date Collected: 2/19/2020 10:17 Matrix: Ground Water
Sample ID: **FFMP30RW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/24/20 13:05	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:05	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	93.4		%	62 - 133	SW846 8260B			2/24/20 13:05	DPC	G
4-Bromofluorobenzene (S)	110		%	79 - 114	SW846 8260B			2/24/20 13:05	DPC	G
Dibromofluoromethane (S)	92.8		%	78 - 116	SW846 8260B			2/24/20 13:05	DPC	G
Toluene-d8 (S)	92.8		%	76 - 127	SW846 8260B			2/24/20 13:05	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	28		mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Alkalinity, Total	28	2	mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Ammonia-N	0.103		mg/L	0.100	ASTM D6919-09			2/26/20 04:11	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	163		mg/L	2.0	EPA 300.0			2/20/20 13:44	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/20/20 13:44	MBW	B
Nitrate-N	5.1		mg/L	0.20	EPA 300.0			2/20/20 13:44	MBW	B
pH	6.04	1	pH_Units		S4500HB-11			2/22/20 19:52	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	713		umhos/cm	1	SW846 9050A			2/22/20 19:52	MBW	B
Sulfate	25.8		mg/L	2.0	EPA 300.0			2/20/20 13:44	MBW	B
Total Dissolved Solids	696		mg/L	5	S2540C-11			2/21/20 13:50	D1C	B
Total Organic Carbon (TOC)	0.76		mg/L	0.50	SW846 9060A			2/20/20 19:21	PAG	D
Turbidity	0.75		NTU	0.10	SM2130B-2011			2/20/20 06:34	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427001** Date Collected: 2/19/2020 10:17 Matrix: Ground Water

Sample ID: **FFMP30RW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	33.3		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
Magnesium, Total	15.8		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
Manganese, Total	2.0		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
Potassium, Total	4.8		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
Sodium, Total	79.8		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:13	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	32.78		Feet		Field			2/19/20 10:17	BGS	C
Elev Top MW Casing above MSL	562.30		Feet		Field			2/19/20 10:17	BGS	C
Flow Rate	2.34		gal/min		Field			2/19/20 10:17	BGS	C
Ground Water Elevation	529.52		ft/MSL		Field			2/19/20 10:17	BGS	C
pH, Field (SM4500B)	5.20		pH_Units		Field			2/19/20 10:17	BGS	C
Sample Depth	85.00		Feet		Field			2/19/20 10:17	BGS	C
Specific Conductance, Field	746		umhos/cm	1	Field			2/19/20 10:17	BGS	C
Temperature	10.32		Deg. C		Field			2/19/20 10:17	BGS	C
Total Well Depth	94.20		Feet		Field			2/19/20 10:17	BGS	C
Volume in Water Column	90.29		Gallons		Field			2/19/20 10:17	BGS	C
Water Level After Purge	38.33		Feet		Field			2/19/20 10:17	BGS	C
Well Volumes Purged	1.56		Vol		Field			2/19/20 10:17	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427002** Date Collected: 2/19/2020 11:25 Matrix: Ground Water
Sample ID: **FFMP04AW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/24/20 13:28	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:28	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	94.6		%	62 - 133	SW846 8260B			2/24/20 13:28	DPC	G
4-Bromofluorobenzene (S)	109		%	79 - 114	SW846 8260B			2/24/20 13:28	DPC	G
Dibromofluoromethane (S)	93.9		%	78 - 116	SW846 8260B			2/24/20 13:28	DPC	G
Toluene-d8 (S)	94		%	76 - 127	SW846 8260B			2/24/20 13:28	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	196		mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Alkalinity, Total	196	2	mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/26/20 07:10	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	306		mg/L	5.0	EPA 300.0			2/25/20 06:22	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/20/20 14:00	MBW	B
Nitrate-N	0.42		mg/L	0.20	EPA 300.0			2/20/20 14:00	MBW	B
pH	7.58	1	pH_Units		S4500HB-11			2/22/20 19:52	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	1420		umhos/cm	1	SW846 9050A			2/22/20 19:52	MBW	B
Sulfate	46.5		mg/L	2.0	EPA 300.0			2/20/20 14:00	MBW	B
Total Dissolved Solids	944		mg/L	5	S2540C-11			2/21/20 13:50	D1C	B
Total Organic Carbon (TOC)	0.80		mg/L	0.50	SW846 9060A			2/20/20 19:21	PAG	D
Turbidity	0.51		NTU	0.10	SM2130B-2011			2/20/20 06:34	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427002** Date Collected: 2/19/2020 11:25 Matrix: Ground Water

Sample ID: **FFMP04AW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	157		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
Magnesium, Total	26.2		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
Manganese, Total	0.30		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
Potassium, Total	2.5		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
Sodium, Total	88.7		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:16	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	32.42		Feet		Field			2/19/20 11:25	BGS	C
Elev Top MW Casing above MSL	560.72		Feet		Field			2/19/20 11:25	BGS	C
Flow Rate	1.98		gal/min		Field			2/19/20 11:25	BGS	C
Ground Water Elevation	528.30		ft/MSL		Field			2/19/20 11:25	BGS	C
pH, Field (SM4500B)	6.80		pH_Units		Field			2/19/20 11:25	BGS	C
Sample Depth	146.00		Feet		Field			2/19/20 11:25	BGS	C
Specific Conductance, Field	1476		umhos/cm	1	Field			2/19/20 11:25	BGS	C
Temperature	10.14		Deg. C		Field			2/19/20 11:25	BGS	C
Total Well Depth	148.50		Feet		Field			2/19/20 11:25	BGS	C
Volume in Water Column	170.64		Gallons		Field			2/19/20 11:25	BGS	C
Water Level After Purge	79.38		Feet		Field			2/19/20 11:25	BGS	C
Well Volumes Purged	0.70		Vol		Field			2/19/20 11:25	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427003** Date Collected: 2/19/2020 12:40 Matrix: Ground Water
Sample ID: **FFMP03AW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/24/20 13:50	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 13:50	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	95.8		%	62 - 133	SW846 8260B			2/24/20 13:50	DPC	G
4-Bromofluorobenzene (S)	113		%	79 - 114	SW846 8260B			2/24/20 13:50	DPC	G
Dibromofluoromethane (S)	95.3		%	78 - 116	SW846 8260B			2/24/20 13:50	DPC	G
Toluene-d8 (S)	95.1		%	76 - 127	SW846 8260B			2/24/20 13:50	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	18		mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Alkalinity, Total	18	2	mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Ammonia-N	0.193		mg/L	0.100	ASTM D6919-09			2/26/20 04:25	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	27.3		mg/L	2.0	EPA 300.0			2/20/20 14:15	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/20/20 14:15	MBW	B
Nitrate-N	21.1	3	mg/L	0.50	EPA 300.0			2/25/20 06:39	MBW	B
pH	5.84	1	pH_Units		S4500HB-11			2/22/20 19:52	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	294		umhos/cm	1	SW846 9050A			2/22/20 19:52	MBW	B
Sulfate	3.3		mg/L	2.0	EPA 300.0			2/20/20 14:15	MBW	B
Total Dissolved Solids	222		mg/L	5	S2540C-11			2/21/20 13:50	D1C	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/20/20 19:21	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/20/20 06:34	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427003** Date Collected: 2/19/2020 12:40 Matrix: Ground Water

Sample ID: **FFMP03AW** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Calcium, Total	19.2		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
Magnesium, Total	13.4		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
Manganese, Total	0.28		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
Potassium, Total	1.5		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
Sodium, Total	12.8		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:20	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	52.06		Feet		Field			2/19/20 12:40	BGS	C
Elev Top MW Casing above MSL	590.90		Feet		Field			2/19/20 12:40	BGS	C
Flow Rate	1.56		gal/min		Field			2/19/20 12:40	BGS	C
Ground Water Elevation	538.84		ft/MSL		Field			2/19/20 12:40	BGS	C
pH, Field (SM4500B)	4.94		pH_Units		Field			2/19/20 12:40	BGS	C
Sample Depth	130.00		Feet		Field			2/19/20 12:40	BGS	C
Specific Conductance, Field	318		umhos/cm	1	Field			2/19/20 12:40	BGS	C
Temperature	10.65		Deg. C		Field			2/19/20 12:40	BGS	C
Total Well Depth	148.40		Feet		Field			2/19/20 12:40	BGS	C
Volume in Water Column	141.62		Gallons		Field			2/19/20 12:40	BGS	C
Water Level After Purge	79.25		Feet		Field			2/19/20 12:40	BGS	C
Well Volumes Purged	0.66		Vol		Field			2/19/20 12:40	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427004** Date Collected: 2/19/2020 14:23 Matrix: Ground Water
Sample ID: **FFMP031W** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/24/20 14:12	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/24/20 14:12	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	95.4		%	62 - 133	SW846 8260B			2/24/20 14:12	DPC	G
4-Bromofluorobenzene (S)	113		%	79 - 114	SW846 8260B			2/24/20 14:12	DPC	G
Dibromofluoromethane (S)	96.6		%	78 - 116	SW846 8260B			2/24/20 14:12	DPC	G
Toluene-d8 (S)	94.7		%	76 - 127	SW846 8260B			2/24/20 14:12	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	64		mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Alkalinity, Total	64	2	mg/L	5	SM2320B-2011			2/22/20 19:52	MBW	B
Ammonia-N	0.104		mg/L	0.100	ASTM D6919-09			2/26/20 12:12	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 23:30	JAM	A
Chloride	24.6		mg/L	2.0	EPA 300.0			2/20/20 14:30	MBW	B
Fluoride	0.30		mg/L	0.20	EPA 300.0			2/20/20 14:30	MBW	B
Nitrate-N	ND		mg/L	0.20	EPA 300.0			2/20/20 14:30	MBW	B
pH	7.81	1	pH_Units		S4500HB-11			2/22/20 19:52	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	282		umhos/cm	1	SW846 9050A			2/22/20 19:52	MBW	B
Sulfate	40.8		mg/L	2.0	EPA 300.0			2/20/20 14:30	MBW	B
Total Dissolved Solids	328		mg/L	5	S2540C-11			2/21/20 13:50	D1C	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/20/20 19:21	PAG	D
Turbidity	19.1		NTU	0.10	SM2130B-2011			2/20/20 06:34	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087427004** Date Collected: 2/19/2020 14:23 Matrix: Ground Water

Sample ID: **FFMP031W** Date Received: 2/19/2020 15:33

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	40.6		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
Iron, Total	4.2		mg/L	0.067	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
Magnesium, Total	3.9		mg/L	0.11	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
Manganese, Total	0.30		mg/L	0.0056	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
Potassium, Total	1.4		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
Sodium, Total	11.2		mg/L	0.56	SW846 6010C	2/23/20 17:45	SXC	2/24/20 10:46	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	66.38		Feet		Field			2/19/20 14:23	BGS	C
Elev Top MW Casing above MSL	612.66		Feet		Field			2/19/20 14:23	BGS	C
Flow Rate	1.74		gal/min		Field			2/19/20 14:23	BGS	C
Ground Water Elevation	546.28		ft/MSL		Field			2/19/20 14:23	BGS	C
pH, Field (SM4500B)	7.40		pH_Units		Field			2/19/20 14:23	BGS	C
Sample Depth	130.00		Feet		Field			2/19/20 14:23	BGS	C
Specific Conductance, Field	312		umhos/cm	1	Field			2/19/20 14:23	BGS	C
Temperature	11.81		Deg. C		Field			2/19/20 14:23	BGS	C
Total Well Depth	142.70		Feet		Field			2/19/20 14:23	BGS	C
Volume in Water Column	112.19		Gallons		Field			2/19/20 14:23	BGS	C
Water Level After Purge	88.85		Feet		Field			2/19/20 14:23	BGS	C
Well Volumes Purged	1.40		Vol		Field			2/19/20 14:23	BGS	C

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3087427001	1	FFMP30RW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087427001	2	FFMP30RW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087427002	1	FFMP04AW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087427002	2	FFMP04AW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087427003	1	FFMP03AW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087427003	2	FFMP03AW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087427003	3	FFMP03AW	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				
3087427004	1	FFMP031W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087427004	2	FFMP031W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087427001	FFMP30RW	ASTM D6919-09	
3087427001	FFMP30RW	EPA 300.0	
3087427001	FFMP30RW	EPA 410.4	
3087427001	FFMP30RW	Field	
3087427001	FFMP30RW	S2540C-11	
3087427001	FFMP30RW	S4500HB-11	
3087427001	FFMP30RW	SM2130B-2011	
3087427001	FFMP30RW	SM2320B-2011	
3087427001	FFMP30RW	SW846 6010C	SW846 3015
3087427001	FFMP30RW	SW846 8260B	
3087427001	FFMP30RW	SW846 9050A	
3087427001	FFMP30RW	SW846 9060A	
3087427001	FFMP30RW	SW846 9066	420.4/9066
3087427002	FFMP04AW	ASTM D6919-09	
3087427002	FFMP04AW	EPA 300.0	
3087427002	FFMP04AW	EPA 410.4	
3087427002	FFMP04AW	Field	
3087427002	FFMP04AW	S2540C-11	
3087427002	FFMP04AW	S4500HB-11	
3087427002	FFMP04AW	SM2130B-2011	
3087427002	FFMP04AW	SM2320B-2011	
3087427002	FFMP04AW	SW846 6010C	SW846 3015
3087427002	FFMP04AW	SW846 8260B	
3087427002	FFMP04AW	SW846 9050A	
3087427002	FFMP04AW	SW846 9060A	
3087427002	FFMP04AW	SW846 9066	420.4/9066
3087427003	FFMP03AW	ASTM D6919-09	
3087427003	FFMP03AW	EPA 300.0	
3087427003	FFMP03AW	EPA 410.4	
3087427003	FFMP03AW	Field	
3087427003	FFMP03AW	S2540C-11	
3087427003	FFMP03AW	S4500HB-11	
3087427003	FFMP03AW	SM2130B-2011	
3087427003	FFMP03AW	SM2320B-2011	
3087427003	FFMP03AW	SW846 6010C	SW846 3015
3087427003	FFMP03AW	SW846 8260B	
3087427003	FFMP03AW	SW846 9050A	
3087427003	FFMP03AW	SW846 9060A	
3087427003	FFMP03AW	SW846 9066	420.4/9066
3087427004	FFMP031W	ASTM D6919-09	
3087427004	FFMP031W	EPA 300.0	
3087427004	FFMP031W	EPA 410.4	
3087427004	FFMP031W	Field	
3087427004	FFMP031W	S2540C-11	
3087427004	FFMP031W	S4500HB-11	
3087427004	FFMP031W	SM2130B-2011	

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087427 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087427004	FFMP031W	SM2320B-2011	
3087427004	FFMP031W	SW846 6010C	SW846 3015
3087427004	FFMP031W	SW846 8260B	
3087427004	FFMP031W	SW846 9050A	
3087427004	FFMP031W	SW846 9060A	
3087427004	FFMP031W	SW846 9066	420.4/9066

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

COC #: *30874278*

1 of 1

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Client Name: Lancaster County Solid Waste MA

Address: 1299 Harrisburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown

Phone#: (717) 735-0193

Project Name/#: Frey Farm Quarterly (GWMP)

Bill To: Lancaster County Solid Waste MA

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.

Date Required: dbrown 2/24/20 sc Approved By:

Email? [X] -Y ~~mroider@LCSWMA.com~~org

Fax? [X] -Y No.: (717) 397-9973

Container Type	AG	AW	CG	—	—	PL	PL	PL	PL	
Container Size	40 ml	125 ml	40 ml	—	—	250 ml	125 ml	500 ml	500 ml	
Preservative	HCl	H2SO4	HCl	—	—	H2SO4	HNO3	None	None	

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	VOC - Form 19Q	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SpC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate	
					Enter Number of Containers Per Sample or Field Results Below.									
1. FFMP30RW	02/19/20	1017	G	GW	2	1	2	X	X	1	1	1	1	
2. FFMP04AW	02/19/20	1125	G	GW	2	1	2	X	X	1	1	1	1	
3. FFMP03AW	02/19/20	1240	G	GW	2	1	2	X	X	1	1	1	1	
4. FFMP031W	02/19/20	1423	G	GW	2	1	2	X	X	1	1	1	1	
5														
6														
7														
8														
9														
10														

Receipt Information (Completed by Receiving Lab)

Cooler Temp: _____ Therm ID: _____

No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(If present) Seals Intact?			
Received on ice?			
COC/Labels Complete/Accurate?			
Cont. In Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: ☐Pickup ☐Labor ☐Composite_Sampling ☐Rental_Equipment ☐Other:

Project Comments:

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [illegible] ALS	2-19-20	1530	2 [illegible]	2/19/2020	1530
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐Standard ☐CLP-like ☐USACE ☐

Special Processing: USACE ☐ Navy ☐ ☐

State Samples Collected In: ☐NY ☐NJ [X]PA ☐NC ☐

Reportable to PADEP? Yes ☐

PWSID #

Sample Disposal: Lab [X] Special ☐

EDDS: Format Type:

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 8/04

301 Fulling Mill Road
Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA | Work Order #: 3087427 | Initials: TS | Date: 2-19-2020

1. Were airbills / tracking numbers present and recorded?	(NONE)	YES	NO
Tracking number:			
2. Are Custody Seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody Seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present?		(YES)	NO
5. Are the COC and bottle labels complete, legible and in agreement?		(YES)	NO
5a. Does the COC contain sample locations?		(YES)	NO
5b. Does the COC contain date and time of sample collection for all samples?		(YES)	NO
5c. Does the COC contain sample collectors name?		(YES)	NO
5d. Does the COC note the type(s) of preservation for all bottles?		(YES)	NO
5e. Does the COC note the number of bottles submitted for each sample?		(YES)	NO
5f. Does the COC note the type of sample, composite or grab?		(YES)	NO
5g. Does the COC note the matrix of the sample(s)?		(YES)	NO
6. Are all aqueous samples requiring preservation preserved correctly?[1]	N/A	(YES)	NO
7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?		(YES)	NO
8. Are all samples within holding times for the requested analyses?		(YES)	NO
9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)		(YES)	NO
10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?	(N/A)	YES	NO
11. Were the samples received on ice?		(YES)	NO
12. Were sample temperatures measured at 0.0-6.0°C		(YES)	NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below		YES	(NO)
13a. Are the samples required for SDWA compliance reporting?	(N/A)	YES	NO
13b. Did the client provide a SDWA PWS ID#?	(N/A)	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?	(N/A)	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?	(N/A)	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?	(N/A)	YES	NO

Cooler #:								
Temperature (°C):	3							
Thermometer ID:	441							
Radiological (µCi):								

COMMENTS (Required for all NO responses above and any sample non-conformance):

[1]Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis

Rev 1/20/2020

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February 28, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	**FREY FARM**	Workorder:	**3087135**
Purchase Order:	**PO1000126**	Workorder ID:	**1ST QTR 2020 GWMP-FORM 19Q**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Tuesday, February 18, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3087135001	FFMP017W	Ground Water	2/18/2020 10:09	2/18/2020 16:19	Mr. Brian G Shade
3087135002	FFMP018W	Ground Water	2/18/2020 10:37	2/18/2020 16:19	Mr. Brian G Shade
3087135003	FFMP019W	Ground Water	2/18/2020 11:26	2/18/2020 16:19	Mr. Brian G Shade
3087135004	FFMP029W	Ground Water	2/18/2020 12:29	2/18/2020 16:19	Mr. Brian G Shade
3087135005	FFMP26RW	Ground Water	2/18/2020 13:43	2/18/2020 16:19	Mr. Brian G Shade
3087135006	FFMP005W	Ground Water	2/18/2020 14:55	2/18/2020 16:19	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135001** Date Collected: 2/18/2020 10:09 Matrix: Ground Water
Sample ID: **FFMP017W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 17:51	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 17:51	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	96		%	62 - 133	SW846 8260B			2/20/20 17:51	DPC	G
4-Bromofluorobenzene (S)	100		%	79 - 114	SW846 8260B			2/20/20 17:51	DPC	G
Dibromofluoromethane (S)	93.3		%	78 - 116	SW846 8260B			2/20/20 17:51	DPC	G
Toluene-d8 (S)	88.2		%	76 - 127	SW846 8260B			2/20/20 17:51	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	70		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	70	3	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	0.256		mg/L	0.100	ASTM D6919-09			2/25/20 11:15	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	387		mg/L	10.0	EPA 300.0			2/20/20 06:31	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 14:03	MBW	B
Nitrate-N	1.5		mg/L	0.20	EPA 300.0			2/19/20 14:03	MBW	B
pH	6.71	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	1540		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	98.2		mg/L	2.0	EPA 300.0			2/19/20 14:03	MBW	B
Total Dissolved Solids	760	2	mg/L	5	S2540C-11			2/20/20 16:07	D1C	B
Total Organic Carbon (TOC)	3.3		mg/L	0.50	SW846 9060A			2/24/20 19:44	PAG	D
Turbidity	0.26		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135001** Date Collected: 2/18/2020 10:09 Matrix: Ground Water

Sample ID: **FFMP017W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	114		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
Magnesium, Total	42.2		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
Manganese, Total	1.1		mg/L	0.0056	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
Potassium, Total	10.0		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
Sodium, Total	105		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/20/20 14:00	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	37.88		Feet		Field			2/18/20 10:09	BGS	C
Elev Top MW Casing above MSL	480.70		Feet		Field			2/18/20 10:09	BGS	C
Flow Rate	2.28		gal/min		Field			2/18/20 10:09	BGS	C
Ground Water Elevation	442.82		ft/MSL		Field			2/18/20 10:09	BGS	C
pH, Field (SM4500B)	5.68		pH_Units		Field			2/18/20 10:09	BGS	C
Sample Depth	135.00		Feet		Field			2/18/20 10:09	BGS	C
Specific Conductance, Field	1577		umhos/cm	1	Field			2/18/20 10:09	BGS	C
Temperature	9.70		Deg. C		Field			2/18/20 10:09	BGS	C
Total Well Depth	150.50		Feet		Field			2/18/20 10:09	BGS	C
Volume in Water Column	165.55		Gallons		Field			2/18/20 10:09	BGS	C
Water Level After Purge	46.28		Feet		Field			2/18/20 10:09	BGS	C
Well Volumes Purged	1.10		Vol		Field			2/18/20 10:09	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135002** Date Collected: 2/18/2020 10:37 Matrix: Ground Water
Sample ID: **FFMP018W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 18:14	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 18:14	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	95.1		%	62 - 133	SW846 8260B			2/20/20 18:14	DPC	G
4-Bromofluorobenzene (S)	99.4		%	79 - 114	SW846 8260B			2/20/20 18:14	DPC	G
Dibromofluoromethane (S)	93.7		%	78 - 116	SW846 8260B			2/20/20 18:14	DPC	G
Toluene-d8 (S)	88.5		%	76 - 127	SW846 8260B			2/20/20 18:14	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	22		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	22	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	0.136		mg/L	0.100	ASTM D6919-09			2/25/20 13:32	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	106		mg/L	2.0	EPA 300.0			2/19/20 14:20	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 14:20	MBW	B
Nitrate-N	4.5		mg/L	0.20	EPA 300.0			2/19/20 14:20	MBW	B
pH	6.44	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	517		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	41.8		mg/L	2.0	EPA 300.0			2/19/20 14:20	MBW	B
Total Dissolved Solids	314		mg/L	5	S2540C-11			2/20/20 16:07	D1C	B
Total Organic Carbon (TOC)	0.97		mg/L	0.50	SW846 9060A			2/19/20 22:36	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135002** Date Collected: 2/18/2020 10:37 Matrix: Ground Water

Sample ID: **FFMP018W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	33.9		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
Magnesium, Total	15.4		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
Manganese, Total	0.24		mg/L	0.0056	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
Potassium, Total	5.7		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
Sodium, Total	32.4		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:04	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	24.78		Feet		Field			2/18/20 10:37	BGS	C
Elev Top MW Casing above MSL	472.20		Feet		Field			2/18/20 10:37	BGS	C
Flow Rate	5.16		gal/min		Field			2/18/20 10:37	BGS	C
Ground Water Elevation	447.42		ft/MSL		Field			2/18/20 10:37	BGS	C
pH, Field (SM4500B)	4.37		pH_Units		Field			2/18/20 10:37	BGS	C
Sample Depth	40.00		Feet		Field			2/18/20 10:37	BGS	C
Specific Conductance, Field	541		umhos/cm	1	Field			2/18/20 10:37	BGS	C
Temperature	12.21		Deg. C		Field			2/18/20 10:37	BGS	C
Total Well Depth	51.46		Feet		Field			2/18/20 10:37	BGS	C
Volume in Water Column	17.34		Gallons		Field			2/18/20 10:37	BGS	C
Water Level After Purge	25.19		Feet		Field			2/18/20 10:37	BGS	C
Well Volumes Purged	4.46		Vol		Field			2/18/20 10:37	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135003** Date Collected: 2/18/2020 11:26 Matrix: Ground Water
Sample ID: **FFMP019W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 18:37	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 18:37	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	96.6		%	62 - 133	SW846 8260B			2/20/20 18:37	DPC	G
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			2/20/20 18:37	DPC	G
Dibromofluoromethane (S)	95		%	78 - 116	SW846 8260B			2/20/20 18:37	DPC	G
Toluene-d8 (S)	90.4		%	76 - 127	SW846 8260B			2/20/20 18:37	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	64		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	I
Alkalinity, Total	64	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	I
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/25/20 16:03	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	82.8		mg/L	2.0	EPA 300.0			2/19/20 14:37	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 14:37	MBW	B
Nitrate-N	0.22		mg/L	0.20	EPA 300.0			2/19/20 14:37	MBW	B
pH	7.36	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	I
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	444		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	I
Sulfate	15.4		mg/L	2.0	EPA 300.0			2/19/20 14:37	MBW	B
Total Dissolved Solids	252		mg/L	5	S2540C-11			2/20/20 16:07	D1C	B
Total Organic Carbon (TOC)	1.4		mg/L	0.50	SW846 9060A			2/19/20 22:36	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135003** Date Collected: 2/18/2020 11:26 Matrix: Ground Water
Sample ID: **FFMP019W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	60.2		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
Magnesium, Total	5.7		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
Manganese, Total	ND		mg/L	0.0056	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
Potassium, Total	0.98		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
Sodium, Total	10.7		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:07	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	25.80		Feet		Field			2/18/20 11:26	BGS	C
Elev Top MW Casing above MSL	471.95		Feet		Field			2/18/20 11:26	BGS	C
Flow Rate	4.50		gal/min		Field			2/18/20 11:26	BGS	C
Ground Water Elevation	446.15		ft/MSL		Field			2/18/20 11:26	BGS	C
pH, Field (SM4500B)	5.51		pH_Units		Field			2/18/20 11:26	BGS	C
Sample Depth	49.00		Feet		Field			2/18/20 11:26	BGS	C
Specific Conductance, Field	460		umhos/cm	1	Field			2/18/20 11:26	BGS	C
Temperature	10.95		Deg. C		Field			2/18/20 11:26	BGS	C
Total Well Depth	132.79		Feet		Field			2/18/20 11:26	BGS	C
Volume in Water Column	69.54		Gallons		Field			2/18/20 11:26	BGS	C
Water Level After Purge	35.91		Feet		Field			2/18/20 11:26	BGS	C
Well Volumes Purged	2.59		Vol		Field			2/18/20 11:26	BGS	C

Susan J. Scherer
Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135004** Date Collected: 2/18/2020 12:29 Matrix: Ground Water

Sample ID: **FFMP029W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND	10	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
1,1-Dichloroethane	ND	7	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
1,1-Dichloroethene	ND	2,3	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
cis-1,2-Dichloroethene	ND	8	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
trans-1,2-Dichloroethene	ND	5,6	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Methylene Chloride	ND	4	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 19:01	DPC	G
1,1,1-Trichloroethane	ND	9	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Trichloroethene	ND	11	ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 19:01	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	96.3		%	62 - 133	SW846 8260B			2/20/20 19:01	DPC	G
4-Bromofluorobenzene (S)	101		%	79 - 114	SW846 8260B			2/20/20 19:01	DPC	G
Dibromofluoromethane (S)	93.9		%	78 - 116	SW846 8260B			2/20/20 19:01	DPC	G
Toluene-d8 (S)	89		%	76 - 127	SW846 8260B			2/20/20 19:01	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	13		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	13	12	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/25/20 13:05	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	66.7		mg/L	2.0	EPA 300.0			2/19/20 16:19	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 16:19	MBW	B
Nitrate-N	3.9		mg/L	0.20	EPA 300.0			2/19/20 16:19	MBW	B
pH	6.37	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	295		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	7.0		mg/L	2.0	EPA 300.0			2/19/20 16:19	MBW	B
Total Dissolved Solids	144		mg/L	5	S2540C-11			2/20/20 16:07	D1C	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/19/20 22:36	PAG	D
Turbidity	0.30		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135004** Date Collected: 2/18/2020 12:29 Matrix: Ground Water
Sample ID: **FFMP029W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	14.7		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
Magnesium, Total	9.8		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
Manganese, Total	0.034		mg/L	0.0056	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
Potassium, Total	2.3		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
Sodium, Total	23.3		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:23	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	29.20		Feet		Field			2/18/20 12:29	BGS	C
Elev Top MW Casing above MSL	477.30		Feet		Field			2/18/20 12:29	BGS	C
Flow Rate	2.21		gal/min		Field			2/18/20 12:29	BGS	C
Ground Water Elevation	448.10		ft/MSL		Field			2/18/20 12:29	BGS	C
pH, Field (SM4500B)	4.96		pH_Units		Field			2/18/20 12:29	BGS	C
Sample Depth	55.00		Feet		Field			2/18/20 12:29	BGS	C
Specific Conductance, Field	311		umhos/cm	1	Field			2/18/20 12:29	BGS	C
Temperature	11.50		Deg. C		Field			2/18/20 12:29	BGS	C
Total Well Depth	60.50		Feet		Field			2/18/20 12:29	BGS	C
Volume in Water Column	46.01		Gallons		Field			2/18/20 12:29	BGS	C
Water Level After Purge	42.65		Feet		Field			2/18/20 12:29	BGS	C
Well Volumes Purged	2.40		Vol		Field			2/18/20 12:29	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135005** Date Collected: 2/18/2020 13:43 Matrix: Ground Water
Sample ID: **FFMP26RW** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/21/20 16:23	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/21/20 16:23	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97.5		%	62 - 133	SW846 8260B			2/21/20 16:23	DPC	G
4-Bromofluorobenzene (S)	108		%	79 - 114	SW846 8260B			2/21/20 16:23	DPC	G
Dibromofluoromethane (S)	95.1		%	78 - 116	SW846 8260B			2/21/20 16:23	DPC	G
Toluene-d8 (S)	94.6		%	76 - 127	SW846 8260B			2/21/20 16:23	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	65		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	65	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/25/20 15:36	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 17:00	JAM	A
Chloride	127		mg/L	2.0	EPA 300.0			2/19/20 16:36	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 16:36	MBW	B
Nitrate-N	2.3		mg/L	0.20	EPA 300.0			2/19/20 16:36	MBW	B
pH	6.81	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	789		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	119		mg/L	2.0	EPA 300.0			2/19/20 16:36	MBW	B
Total Dissolved Solids	500		mg/L	5	S2540C-11			2/20/20 16:07	D1C	B
Total Organic Carbon (TOC)	2.5		mg/L	0.50	SW846 9060A			2/19/20 22:36	PAG	D
Turbidity	0.32		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135005** Date Collected: 2/18/2020 13:43 Matrix: Ground Water

Sample ID: **FFMP26RW** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	75.3		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
Magnesium, Total	14.8		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
Manganese, Total	1.0		mg/L	0.0056	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
Potassium, Total	10.6		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
Sodium, Total	48.6		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:26	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	59.20		Feet		Field			2/18/20 13:43	BGS	C
Elev Top MW Casing above MSL	547.40		Feet		Field			2/18/20 13:43	BGS	C
Flow Rate	2.57		gal/min		Field			2/18/20 13:43	BGS	C
Ground Water Elevation	488.20		ft/MSL		Field			2/18/20 13:43	BGS	C
pH, Field (SM4500B)	5.50		pH_Units		Field			2/18/20 13:43	BGS	C
Sample Depth	105.00		Feet		Field			2/18/20 13:43	BGS	C
Specific Conductance, Field	814		umhos/cm	1	Field			2/18/20 13:43	BGS	C
Temperature	11.12		Deg. C		Field			2/18/20 13:43	BGS	C
Total Well Depth	118.30		Feet		Field			2/18/20 13:43	BGS	C
Volume in Water Column	86.88		Gallons		Field			2/18/20 13:43	BGS	C
Water Level After Purge	75.11		Feet		Field			2/18/20 13:43	BGS	C
Well Volumes Purged	1.77		Vol		Field			2/18/20 13:43	BGS	C

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135006** Date Collected: 2/18/2020 14:55 Matrix: Ground Water
Sample ID: **FFMP005W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/21/20 16:46	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/21/20 16:46	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	99.7		%	62 - 133	SW846 8260B			2/21/20 16:46	DPC	G
4-Bromofluorobenzene (S)	107		%	79 - 114	SW846 8260B			2/21/20 16:46	DPC	G
Dibromofluoromethane (S)	96.9		%	78 - 116	SW846 8260B			2/21/20 16:46	DPC	G
Toluene-d8 (S)	93.9		%	76 - 127	SW846 8260B			2/21/20 16:46	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	54		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	54	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/25/20 14:55	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/26/20 19:00	JAM	A
Chloride	203		mg/L	5.0	EPA 300.0			2/20/20 06:47	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/19/20 16:53	MBW	B
Nitrate-N	2.0		mg/L	0.20	EPA 300.0			2/19/20 16:53	MBW	B
pH	6.80	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/24/20 09:40	C_D	2/26/20 05:48	C_D	F
Specific Conductance	954		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	84.7		mg/L	2.0	EPA 300.0			2/19/20 16:53	MBW	B
Total Dissolved Solids	640		mg/L	5	S2540C-11			2/21/20 13:50	D1C	B
Total Organic Carbon (TOC)	1.9		mg/L	0.50	SW846 9060A			2/19/20 22:36	PAG	D
Turbidity	ND		NTU	0.10	SM2130B-2011			2/19/20 07:31	R2B	B

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ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3087135006** Date Collected: 2/18/2020 14:55 Matrix: Ground Water

Sample ID: **FFMP005W** Date Received: 2/18/2020 16:19

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	83.4		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
Magnesium, Total	20.8		mg/L	0.11	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
Manganese, Total	0.097		mg/L	0.0056	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
Potassium, Total	3.5		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
Sodium, Total	59.7		mg/L	0.56	SW846 6010C	2/19/20 11:45	AHI	2/20/20 14:30	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	52.50		Feet		Field			2/18/20 14:55	BGS	C
Elev Top MW Casing above MSL	537.40		Feet		Field			2/18/20 14:55	BGS	C
Flow Rate	2.49		gal/min		Field			2/18/20 14:55	BGS	C
Ground Water Elevation	484.90		ft/MSL		Field			2/18/20 14:55	BGS	C
pH, Field (SM4500B)	5.33		pH_Units		Field			2/18/20 14:55	BGS	C
Sample Depth	135.00		Feet		Field			2/18/20 14:55	BGS	C
Specific Conductance, Field	977		umhos/cm	1	Field			2/18/20 14:55	BGS	C
Temperature	10.26		Deg. C		Field			2/18/20 14:55	BGS	C
Total Well Depth	149.70		Feet		Field			2/18/20 14:55	BGS	C
Volume in Water Column	142.88		Gallons		Field			2/18/20 14:55	BGS	C
Water Level After Purge	86.31		Feet		Field			2/18/20 14:55	BGS	C
Well Volumes Purged	1.05		Vol		Field			2/18/20 14:55	BGS	C

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3087135001	1	FFMP017W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135001	2	FFMP017W	S2540C-11	Total Dissolved Solids
The QC sample type DUP for method S2540C-11 was outside the control limits for the analyte Total Dissolved Solids. The RPD was reported as 10.5 and the upper control limit is 5.				
3087135001	3	FFMP017W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087135002	1	FFMP018W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135002	2	FFMP018W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087135003	1	FFMP019W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135003	2	FFMP019W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087135004	1	FFMP029W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135004	2	FFMP029W	SW846 8260B	1,1-Dichloroethene
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethene. The % Recovery was reported as 145 and the control limits were 63 to 128.				
3087135004	3	FFMP029W	SW846 8260B	1,1-Dichloroethene
The QC sample type MSD for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethene. The % Recovery was reported as 134 and the control limits were 63 to 128.				
3087135004	4	FFMP029W	SW846 8260B	Methylene Chloride
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte Methylene Chloride. The % Recovery was reported as 126 and the control limits were 76 to 121.				
3087135004	5	FFMP029W	SW846 8260B	trans-1,2-Dichloroethene
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte trans-1,2-Dichloroethene. The % Recovery was reported as 141 and the control limits were 71 to 122.				
3087135004	6	FFMP029W	SW846 8260B	trans-1,2-Dichloroethene
The QC sample type MSD for method SW846 8260B was outside the control limits for the analyte trans-1,2-Dichloroethene. The % Recovery was reported as 130 and the control limits were 71 to 122.				
3087135004	7	FFMP029W	SW846 8260B	1,1-Dichloroethane
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte 1,1-Dichloroethane. The % Recovery was reported as 133 and the control limits were 78 to 124.				
3087135004	8	FFMP029W	SW846 8260B	cis-1,2-Dichloroethene
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte cis-1,2-Dichloroethene. The % Recovery was reported as 128 and the control limits were 78 to 125.				

ANALYTICAL RESULTS

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

3087135004	9	FFMP029W	SW846 8260B	1,1,1-Trichloroethane
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte 1,1,1-Trichloroethane. The % Recovery was reported as 131 and the control limits were 66 to 130.				
3087135004	10	FFMP029W	SW846 8260B	Benzene
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte Benzene. The % Recovery was reported as 129 and the control limits were 80 to 124.				
3087135004	11	FFMP029W	SW846 8260B	Trichloroethene
The QC sample type MS for method SW846 8260B was outside the control limits for the analyte Trichloroethene. The % Recovery was reported as 128 and the control limits were 77 to 124.				
3087135004	12	FFMP029W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087135005	1	FFMP26RW	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135005	2	FFMP26RW	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3087135006	1	FFMP005W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3087135006	2	FFMP005W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087135001	FFMP017W	ASTM D6919-09	
3087135001	FFMP017W	EPA 300.0	
3087135001	FFMP017W	EPA 410.4	
3087135001	FFMP017W	Field	
3087135001	FFMP017W	S2540C-11	
3087135001	FFMP017W	S4500HB-11	
3087135001	FFMP017W	SM2130B-2011	
3087135001	FFMP017W	SM2320B-2011	
3087135001	FFMP017W	SW846 6010C	SW846 3015
3087135001	FFMP017W	SW846 8260B	
3087135001	FFMP017W	SW846 9050A	
3087135001	FFMP017W	SW846 9060A	
3087135001	FFMP017W	SW846 9066	420.4/9066
3087135002	FFMP018W	ASTM D6919-09	
3087135002	FFMP018W	EPA 300.0	
3087135002	FFMP018W	EPA 410.4	
3087135002	FFMP018W	Field	
3087135002	FFMP018W	S2540C-11	
3087135002	FFMP018W	S4500HB-11	
3087135002	FFMP018W	SM2130B-2011	
3087135002	FFMP018W	SM2320B-2011	
3087135002	FFMP018W	SW846 6010C	SW846 3015
3087135002	FFMP018W	SW846 8260B	
3087135002	FFMP018W	SW846 9050A	
3087135002	FFMP018W	SW846 9060A	
3087135002	FFMP018W	SW846 9066	420.4/9066
3087135003	FFMP019W	ASTM D6919-09	
3087135003	FFMP019W	EPA 300.0	
3087135003	FFMP019W	EPA 410.4	
3087135003	FFMP019W	Field	
3087135003	FFMP019W	S2540C-11	
3087135003	FFMP019W	S4500HB-11	
3087135003	FFMP019W	SM2130B-2011	
3087135003	FFMP019W	SM2320B-2011	
3087135003	FFMP019W	SW846 6010C	SW846 3015
3087135003	FFMP019W	SW846 8260B	
3087135003	FFMP019W	SW846 9050A	
3087135003	FFMP019W	SW846 9060A	
3087135003	FFMP019W	SW846 9066	420.4/9066
3087135004	FFMP029W	ASTM D6919-09	
3087135004	FFMP029W	EPA 300.0	
3087135004	FFMP029W	EPA 410.4	
3087135004	FFMP029W	Field	
3087135004	FFMP029W	S2540C-11	
3087135004	FFMP029W	S4500HB-11	
3087135004	FFMP029W	SM2130B-2011	

ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3087135 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3087135004	FFMP029W	SM2320B-2011	
3087135004	FFMP029W	SW846 6010C	SW846 3015
3087135004	FFMP029W	SW846 8260B	
3087135004	FFMP029W	SW846 9050A	
3087135004	FFMP029W	SW846 9060A	
3087135004	FFMP029W	SW846 9066	420.4/9066
3087135005	FFMP26RW	ASTM D6919-09	
3087135005	FFMP26RW	EPA 300.0	
3087135005	FFMP26RW	EPA 410.4	
3087135005	FFMP26RW	Field	
3087135005	FFMP26RW	S2540C-11	
3087135005	FFMP26RW	S4500HB-11	
3087135005	FFMP26RW	SM2130B-2011	
3087135005	FFMP26RW	SM2320B-2011	
3087135005	FFMP26RW	SW846 6010C	SW846 3015
3087135005	FFMP26RW	SW846 8260B	
3087135005	FFMP26RW	SW846 9050A	
3087135005	FFMP26RW	SW846 9060A	
3087135005	FFMP26RW	SW846 9066	420.4/9066
3087135006	FFMP005W	ASTM D6919-09	
3087135006	FFMP005W	EPA 300.0	
3087135006	FFMP005W	EPA 410.4	
3087135006	FFMP005W	Field	
3087135006	FFMP005W	S2540C-11	
3087135006	FFMP005W	S4500HB-11	
3087135006	FFMP005W	SM2130B-2011	
3087135006	FFMP005W	SM2320B-2011	
3087135006	FFMP005W	SW846 6010C	SW846 3015
3087135006	FFMP005W	SW846 8260B	
3087135006	FFMP005W	SW846 9050A	
3087135006	FFMP005W	SW846 9060A	
3087135006	FFMP005W	SW846 9066	420.4/9066

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

COC #

ALS #

1 of 1

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Client Name: Lancaster County Solid Waste MA

Address: 1299 Harrisburg Pike, P.O. Box 4424
Lancaster, PA 17604

Contact: Dan Brown

Phone#: (717) 735-0193

Project Name/#: Frey Farm Quarterly (GWMP)

Bill To: Lancaster County Solid Waste MA

TAT [X] Normal-Standard TAT is 10-12 business days.
[ ] Rush-Subject to ALS approval and surcharges.

Date Required: dbrown@lcswma.com Approved By: _____

Email? [X] -Y mreider@LCSWMA.com 2/21/20 SL

Fax? [X] -Y No.: (717) 397-9973

Container Type	AG	AW	CG	—	—	PL	PL	PL	PL	
Container Size	40 ml	125 ml	40 ml	—	—	250 ml	125 ml	500 ml	500 ml	
Preservative	HCl	H2SO4	HCl	—	—	H2SO4	HNO3	None	None	

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	VOC - Form 19Q	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SpC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate	
					Enter Number of Containers Per Sample or Field Results Below.									
1. FFMP017W	02/18/20	1009	G	GW	2	1	2	X	X	1	1	1	1	
2. FFMP018W	02/18/20	1037	G	GW	2	1	2	X	X	1	1	1	1	
3. FFMP019W	02/18/20	1126	G	GW	2	1	2	X	X	1	1	1	1	
4. FFMP029W	02/18/20	1229	G	GW	2	1	2	X	X	1	1	1	1	
5. FFMP26RW	02/18/20	1343	G	GW	2	1	2	X	X	1	1	1	1	
6. FFMP005W	02/18/20	1455	G	GW	2	1	2	X	X	1	1	1	1	
7														
8														
9														
10														

(ing Lab)

Cooler Temp: 2 Therm ID: 407

No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: ☐Pickup ☐Labor ☐Composite_Sampling ☐Rental_Equipment ☐Other: _____

Project Comments:

LOGGED BY(signature): DATE TIME

REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 BC Hall ALS	2-18-20	1619	2	2/18/20	1619
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐Standard ☐CLP-like ☐USACE ☐

Special Processing: USACE ☐ Navy ☐ ☐

State Samples Collected In: ☐NY ☐NJ ☒PA ☐NC ☐

Reportable to PADEP? Yes ☐

PWSID # _____

Sample Disposal: Lab ☒ Special ☐

EDDS: Format Type: _____

* G=Grab; C=Composite **Matrix - Al=Air; DW=Drinking Water; GW=Groundwater; Oi=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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Rev 8/04

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Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client:	Work Order #:	Initials:	Date:
LCSWMA	3087135	TS	2182020

1. Were airbills / tracking numbers present and recorded?	(NONE)	YES	NO
Tracking number:			
2. Are Custody Seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody Seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present?		(YES)	NO
5. Are the COC and bottle labels complete, legible and in agreement?		(YES)	NO
5a. Does the COC contain sample locations?		(YES)	NO
5b. Does the COC contain date and time of sample collection for all samples?		(YES)	NO
5c. Does the COC contain sample collectors name?		(YES)	NO
5d. Does the COC note the type(s) of preservation for all bottles?		(YES)	NO
5e. Does the COC note the number of bottles submitted for each sample?		(YES)	NO
5f. Does the COC note the type of sample, composite or grab?		(YES)	NO
5g. Does the COC note the matrix of the sample(s)?		(YES)	NO
6. Are all aqueous samples requiring preservation preserved correctly?[1]	N/A	(YES)	NO
7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?		(YES)	NO
8. Are all samples within holding times for the requested analyses?		(YES)	NO
9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)		(YES)	NO
10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?	(N/A)	YES	NO
11. Were the samples received on ice?		(YES)	NO
12. Were sample temperatures measured at 0.0-6.0°C		(YES)	NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below		YES	(NO)
13a. Are the samples required for SDWA compliance reporting?	N/A	YES	NO
13b. Did the client provide a SDWA PWS ID#?	N/A	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?	N/A	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?	N/A	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?	N/A	YES	NO

Cooler #:								
Temperature (°C):	2							
Thermometer ID:	407							
Radiological (µCi):								

COMMENTS (Required for all NO responses above and any sample non-conformance):

[1]Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis

Rev 1/20/2020

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February 26, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	**FREY FARM**	Workorder:	**3086978**
Purchase Order:	**PO1000126**	Workorder ID:	**1ST QTR 2020 GWMP-FORM 19Q**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Monday, February 17, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3086978001	FFMP015W	Ground Water	2/17/2020 10:25	2/17/2020 16:06	Mr. Brian G Shade
3086978002	FFMP033W	Ground Water	2/17/2020 11:47	2/17/2020 16:06	Mr. Brian G Shade
3086978003	FFMP028W	Ground Water	2/17/2020 13:02	2/17/2020 16:06	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978001** Date Collected: 2/17/2020 10:25 Matrix: Ground Water
Sample ID: **FFMP015W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 15:39	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 15:39	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97.1		%	62 - 133	SW846 8260B			2/20/20 15:39	DPC	G
4-Bromofluorobenzene (S)	108		%	79 - 114	SW846 8260B			2/20/20 15:39	DPC	G
Dibromofluoromethane (S)	93.3		%	78 - 116	SW846 8260B			2/20/20 15:39	DPC	G
Toluene-d8 (S)	94.5		%	76 - 127	SW846 8260B			2/20/20 15:39	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	20		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	20	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	0.187		mg/L	0.100	ASTM D6919-09			2/24/20 23:07	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/25/20 23:35	NJA	A
Chloride	23.7		mg/L	2.0	EPA 300.0			2/18/20 06:26	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/18/20 06:26	MBW	B
Nitrate-N	27.8		mg/L	0.50	EPA 300.0			2/19/20 05:03	MBW	B
pH	6.53	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/18/20 07:00	VXF	2/18/20 09:12	VXF	F
Specific Conductance	382		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	30.0		mg/L	2.0	EPA 300.0			2/18/20 06:26	MBW	B
Total Dissolved Solids	210		mg/L	5	S2540C-11			2/18/20 16:37	D1C	B
Total Organic Carbon (TOC)	1.0		mg/L	0.50	SW846 9060A			2/18/20 18:01	PAG	D
Turbidity	2.30		NTU	0.10	SM2130B-2011			2/18/20 08:38	R2B	B

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978001** Date Collected: 2/17/2020 10:25 Matrix: Ground Water

Sample ID: **FFMP015W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	19.6		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
Iron, Total	0.46		mg/L	0.067	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
Magnesium, Total	18.9		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
Manganese, Total	0.052		mg/L	0.0056	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
Potassium, Total	2.5		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
Sodium, Total	19.8		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:15	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	61.09		Feet		Field			2/17/20 10:25	BGS	C
Elev Top MW Casing above MSL	576.40		Feet		Field			2/17/20 10:25	BGS	C
Flow Rate	3.00		gal/min		Field			2/17/20 10:25	BGS	C
Ground Water Elevation	515.31		ft/MSL		Field			2/17/20 10:25	BGS	C
pH, Field (SM4500B)	4.96		pH_Units		Field			2/17/20 10:25	BGS	C
Sample Depth	135.00		Feet		Field			2/17/20 10:25	BGS	C
Specific Conductance, Field	409		umhos/cm	1	Field			2/17/20 10:25	BGS	C
Temperature	10.47		Deg. C		Field			2/17/20 10:25	BGS	C
Total Well Depth	149.90		Feet		Field			2/17/20 10:25	BGS	C
Volume in Water Column	130.55		Gallons		Field			2/17/20 10:25	BGS	C
Water Level After Purge	131.25		Feet		Field			2/17/20 10:25	BGS	C
Well Volumes Purged	1.61		Vol		Field			2/17/20 10:25	BGS	C

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978002** Date Collected: 2/17/2020 11:47 Matrix: Ground Water
Sample ID: **FFMP033W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 16:02	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 16:02	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97.1		%	62 - 133	SW846 8260B			2/20/20 16:02	DPC	G
4-Bromofluorobenzene (S)	107		%	79 - 114	SW846 8260B			2/20/20 16:02	DPC	G
Dibromofluoromethane (S)	95.3		%	78 - 116	SW846 8260B			2/20/20 16:02	DPC	G
Toluene-d8 (S)	93.7		%	76 - 127	SW846 8260B			2/20/20 16:02	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	45		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	45	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	0.681		mg/L	0.100	ASTM D6919-09			2/24/20 23:34	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/25/20 23:35	NJA	A
Chloride	40.8		mg/L	2.0	EPA 300.0			2/18/20 07:59	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/18/20 07:59	MBW	B
Nitrate-N	11.5		mg/L	0.20	EPA 300.0			2/18/20 07:59	MBW	B
pH	6.87	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/18/20 07:00	VXF	2/18/20 09:12	VXF	F
Specific Conductance	332		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	6.8		mg/L	2.0	EPA 300.0			2/18/20 07:59	MBW	B
Total Dissolved Solids	86		mg/L	5	S2540C-11			2/20/20 11:53	D1C	B
Total Organic Carbon (TOC)	ND		mg/L	0.50	SW846 9060A			2/18/20 18:01	PAG	D
Turbidity	13.7		NTU	0.10	SM2130B-2011			2/18/20 08:38	R2B	B

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978002** Date Collected: 2/17/2020 11:47 Matrix: Ground Water

Sample ID: **FFMP033W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	25.6		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
Iron, Total	6.1		mg/L	0.067	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
Magnesium, Total	9.4		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
Manganese, Total	0.49		mg/L	0.0056	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
Potassium, Total	1.8		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
Sodium, Total	14.5		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:19	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	17.79		Feet		Field			2/17/20 11:47	BGS	C
Elev Top MW Casing above MSL	516.52		Feet		Field			2/17/20 11:47	BGS	C
Flow Rate	1.67		gal/min		Field			2/17/20 11:47	BGS	C
Ground Water Elevation	498.73		ft/MSL		Field			2/17/20 11:47	BGS	C
pH, Field (SM4500B)	5.65		pH_Units		Field			2/17/20 11:47	BGS	C
Sample Depth	79.00		Feet		Field			2/17/20 11:47	BGS	C
Specific Conductance, Field	357		umhos/cm	1	Field			2/17/20 11:47	BGS	C
Temperature	11.79		Deg. C		Field			2/17/20 11:47	BGS	C
Total Well Depth	100.00		Feet		Field			2/17/20 11:47	BGS	C
Volume in Water Column	120.85		Gallons		Field			2/17/20 11:47	BGS	C
Water Level After Purge	30.15		Feet		Field			2/17/20 11:47	BGS	C
Well Volumes Purged	0.83		Vol		Field			2/17/20 11:47	BGS	C

Susan J. Scherer

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978003** Date Collected: 2/17/2020 13:02 Matrix: Ground Water
Sample ID: **FFMP028W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 16:25	DPC	G
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 16:25	DPC	G
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97.8		%	62 - 133	SW846 8260B			2/20/20 16:25	DPC	G
4-Bromofluorobenzene (S)	107		%	79 - 114	SW846 8260B			2/20/20 16:25	DPC	G
Dibromofluoromethane (S)	93.3		%	78 - 116	SW846 8260B			2/20/20 16:25	DPC	G
Toluene-d8 (S)	94.6		%	76 - 127	SW846 8260B			2/20/20 16:25	DPC	G
WET CHEMISTRY										
Alkalinity, Bicarbonate	27		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	27	2	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/24/20 23:20	JWB	A
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/25/20 23:35	NJA	A
Chloride	88.3		mg/L	2.0	EPA 300.0			2/18/20 08:20	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/18/20 08:20	MBW	B
Nitrate-N	17.1		mg/L	0.20	EPA 300.0			2/18/20 08:20	MBW	B
pH	6.26	1	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND		mg/L	0.005	SW846 9066	2/18/20 07:00	VXF	2/18/20 09:12	VXF	F
Specific Conductance	543		umhos/cm	1	SW846 9050A			2/20/20 16:57	MBW	B
Sulfate	26.2		mg/L	2.0	EPA 300.0			2/18/20 08:20	MBW	B
Total Dissolved Solids	294		mg/L	5	S2540C-11			2/20/20 11:53	D1C	B
Total Organic Carbon (TOC)	0.87		mg/L	0.50	SW846 9060A			2/18/20 18:01	PAG	D
Turbidity	0.13		NTU	0.10	SM2130B-2011			2/18/20 08:38	R2B	B

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ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID: **3086978003** Date Collected: 2/17/2020 13:02 Matrix: Ground Water
Sample ID: **FFMP028W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
METALS										
Calcium, Total	38.9		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
Iron, Total	ND		mg/L	0.067	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
Magnesium, Total	17.8		mg/L	0.11	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
Manganese, Total	0.0080		mg/L	0.0056	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
Potassium, Total	2.4		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
Sodium, Total	28.2		mg/L	0.56	SW846 6010C	2/19/20 09:52	SRT	2/19/20 15:22	SRT	J1
FIELD PARAMETERS										
Depth to Water Level	10.24		Feet		Field			2/17/20 13:02	BGS	C
Elev Top MW Casing above MSL	465.00		Feet		Field			2/17/20 13:02	BGS	C
Flow Rate	2.79		gal/min		Field			2/17/20 13:02	BGS	C
Ground Water Elevation	454.76		ft/MSL		Field			2/17/20 13:02	BGS	C
pH, Field (SM4500B)	5.33		pH_Units		Field			2/17/20 13:02	BGS	C
Sample Depth	50.00		Feet		Field			2/17/20 13:02	BGS	C
Specific Conductance, Field	569		umhos/cm	1	Field			2/17/20 13:02	BGS	C
Temperature	10.01		Deg. C		Field			2/17/20 13:02	BGS	C
Total Well Depth	60.00		Feet		Field			2/17/20 13:02	BGS	C
Volume in Water Column	73.15		Gallons		Field			2/17/20 13:02	BGS	C
Water Level After Purge	36.69		Feet		Field			2/17/20 13:02	BGS	C
Well Volumes Purged	2.29		Vol		Field			2/17/20 13:02	BGS	C

Susan J. Scherer
Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3086978001	1	FFMP015W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3086978001	2	FFMP015W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3086978002	1	FFMP033W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3086978002	2	FFMP033W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3086978003	1	FFMP028W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3086978003	2	FFMP028W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3086978 1ST QTR 2020 GWMP-FORM 19Q

Lab ID	Sample ID	Analysis Method	Prep Method
3086978001	FFMP015W	ASTM D6919-09	
3086978001	FFMP015W	EPA 300.0	
3086978001	FFMP015W	EPA 410.4	
3086978001	FFMP015W	Field	
3086978001	FFMP015W	S2540C-11	
3086978001	FFMP015W	S4500HB-11	
3086978001	FFMP015W	SM2130B-2011	
3086978001	FFMP015W	SM2320B-2011	
3086978001	FFMP015W	SW846 6010C	SW846 3015
3086978001	FFMP015W	SW846 8260B	
3086978001	FFMP015W	SW846 9050A	
3086978001	FFMP015W	SW846 9060A	
3086978001	FFMP015W	SW846 9066	420.4/9066
3086978002	FFMP033W	ASTM D6919-09	
3086978002	FFMP033W	EPA 300.0	
3086978002	FFMP033W	EPA 410.4	
3086978002	FFMP033W	Field	
3086978002	FFMP033W	S2540C-11	
3086978002	FFMP033W	S4500HB-11	
3086978002	FFMP033W	SM2130B-2011	
3086978002	FFMP033W	SM2320B-2011	
3086978002	FFMP033W	SW846 6010C	SW846 3015
3086978002	FFMP033W	SW846 8260B	
3086978002	FFMP033W	SW846 9050A	
3086978002	FFMP033W	SW846 9060A	
3086978002	FFMP033W	SW846 9066	420.4/9066
3086978003	FFMP028W	ASTM D6919-09	
3086978003	FFMP028W	EPA 300.0	
3086978003	FFMP028W	EPA 410.4	
3086978003	FFMP028W	Field	
3086978003	FFMP028W	S2540C-11	
3086978003	FFMP028W	S4500HB-11	
3086978003	FFMP028W	SM2130B-2011	
3086978003	FFMP028W	SM2320B-2011	
3086978003	FFMP028W	SW846 6010C	SW846 3015
3086978003	FFMP028W	SW846 8260B	
3086978003	FFMP028W	SW846 9050A	
3086978003	FFMP028W	SW846 9060A	
3086978003	FFMP028W	SW846 9066	420.4/9066

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ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

* 3 0 8 6 9 7 8 *

1 of 1

Client Name: Lancaster County Solid Waste MA
Address: 1299 Harrisburg Pike, P.O. Box 4424
Lancaster, PA 17604
Contact: Dan Brown
Phone#: (717) 735-0193
Project Name/#: Frey Farm Quarterly (GWMP)
Bill To: Lancaster County Solid Waste MA

TAT [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: _____ Approved By: _____
Email? [X] -Y mreider@LCSWMA.com dbrown@lcswma
Fax? [X] -Y No.: (717) 397-9973 3c fax

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	Container Type	Container Size	Preservative	TOC	O-OH	VOC - Form 19Q	Field Measurements	Sample Depth for AUX Data	NH3-N, COD	Metals: Fe, Mn, Na, Ca, K, Mg	pH, Cl, SpC, F, SO4, TDS, NO3, Turb.	Alkalinity Bicarbonate	
					AG	AW	CG	—	—	PL	PL	PL	PL				
					40 ml	125 ml	40 ml	—	—	250 ml	125 ml	500 ml	500 ml				
					HCl	H2SO4	HCl	—	—	H2SO4	HNO3	None	None				
					ANALYSES/METHOD REQUESTED												
					Enter Number of Containers Per Sample or Field Results Below.												
1. FFMP015W	02/17/20	10:25	G	GW	2	1	2	x	x	1	1	1	1				
2. FFMP033W	02/17/20	11:47	G	GW	2	1	2	x	x	1	1	1	1				
3. FFMP028W	02/17/20	13:02	G	GW	2	1	2	x	x	1	1	1	1				
4																	
5																	
6																	
7																	
8																	
9																	
10																	

(by Receiving Lab)

Cooler Temp: 3 Therm ID: [illegible]
No. of Coolers: _____

	Y	N	Initial
Custody Seals Present?			
(if present) Seals Intact?			
Received on Ice?			
COC/Labels Complete/Accurate?			
Cont. in Good Cond.?			
Correct Containers?			
Correct Sample Volumes?			
Correct Preservation?			
Headspace/Volatiles?			

Courier/Tracking #:

Sample/COC Comments

ALS Field Services: ☐Pickup ☐Labor ☐Composite_Sampling ☐Rental_Equipment ☐Other: _____

Project Comments:

LOGGED BY(signature): DATE TIME
REVIEWED BY(signature): DATE TIME

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 [illegible] ALS	2-17-20	16:57	2	2/17/2020	1650
3			4		
5			6		
7			8		
9			10		

Data Deliverables: ☐Standard ☐CLP-like ☐USACE ☐

Special Processing: USACE ☐ Navy ☐ ☐

State Samples Collected In: ☐NY ☐NJ [X]PA ☐NC ☐

Reportable to PADEP? Yes ☐ PWSID # _____

Sample Disposal: Lab [X] Special ☐

EDDS: Format Type: _____

* G=Grab; C=Composite **Matrix - AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

ALS ENVIRONMENTAL SHIPPING ADDRESS: 34 DOGWOOD LANE, MIDDLETOWN, PA 17057

Rev 8/04

301 Fulling Mill Road
Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3086978 Initials: CO Date: 2/17/2020

1. Were airbills / tracking numbers present and recorded?	(NONE)	YES	NO
Tracking number:			
2. Are Custody Seals on shipping containers intact?	(NONE)	YES	NO
3. Are Custody Seals on sample containers intact?	(NONE)	YES	NO
4. Is there a COC (Chain-of-Custody) present?		(YES)	NO
5. Are the COC and bottle labels complete, legible and in agreement?		(YES)	NO
5a. Does the COC contain sample locations?		(YES)	NO
5b. Does the COC contain date and time of sample collection for all samples?		(YES)	NO
5c. Does the COC contain sample collectors name?		(YES)	NO
5d. Does the COC note the type(s) of preservation for all bottles?		(YES)	NO
5e. Does the COC note the number of bottles submitted for each sample?		(YES)	NO
5f. Does the COC note the type of sample, composite or grab?		(YES)	NO
5g. Does the COC note the matrix of the sample(s)?		(YES)	NO
6. Are all aqueous samples requiring preservation preserved correctly?[1]	N/A	(YES)	NO
7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume?		(YES)	NO
8. Are all samples within holding times for the requested analyses? pH >5 entered		(YES)	(NO)
9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.)		(YES)	NO
10. Did we receive trip blanks (applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)?	(N/A)	YES	NO
11. Were the samples received on ice?		(YES)	NO
12. Were sample temperatures measured at 0.0-6.0°C		(YES)	NO
13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below		YES	(NO)
13a. Are the samples required for SDWA compliance reporting?	(N/A)	YES	NO
13b. Did the client provide a SDWA PWS ID#?	N/A	YES	NO
13c. Are all aqueous unpreserved SDWA samples pH 5-9?	N/A	YES	NO
13d. Did the client provide the SDWA sample location ID/Description?	N/A	YES	NO
13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)?	N/A	YES	NO

Cooler #: ____

Temperature (°C): 3

Thermometer ID: 441

Radiological (µCi): ____

COMMENTS (Required for all NO responses above and any sample non-conformance):

[1]Final determination of correct preservation for analysis such as volatiles, microbiology, and oil and grease is made in the analytical department at the time of or following the analysis

Rev 1/20/2020

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February 26, 2020

Mr. Daniel Brown
Lancaster County Solid Waste Authority
1299 Hbg Pike, P.O. Box 4425
Lancaster, PA 17604

Certificate of Analysis

Project Name:	**FREY FARM**	Workorder:	**3086975**
Purchase Order:	**PO1000126**	Workorder ID:	**1st QTR 2020 GWMP-FORM 8**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Monday, February 17, 2020.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Ms. Susan J Scherer (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Mr. Jeff Musser

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3086975001	FFMP034W	Ground Water	2/17/2020 14:45	2/17/2020 16:06	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix “S” followed by a method number (such as S2310B-97) refer to methods from “Standard Methods for the Examination of Water and Wastewater”.
-- For microbiological analyses, the "Prepared" value is the date/time into the incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID: **3086975001** Date Collected: 2/17/2020 14:45 Matrix: Ground Water

Sample ID: **FFMP034W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
VOLATILE ORGANICS										
Acetone	ND		ug/L	10.0	SW846 8260B			2/20/20 15:17	DPC	J
Acrylonitrile	ND		ug/L	5.0	SW846 8260B			2/20/20 15:17	DPC	J
Benzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Bromochloromethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Bromodichloromethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Bromoform	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Bromomethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
2-Butanone	ND		ug/L	10.0	SW846 8260B			2/20/20 15:17	DPC	J
Carbon Disulfide	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Carbon Tetrachloride	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Chlorobenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Chlorodibromomethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Chloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Chloroform	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Chloromethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
3-Chloro-1-propene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2-Dibromo-3-chloropropane	ND		ug/L	7.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2-Dibromoethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Dibromomethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
trans-1,4-Dichloro-2-butene	ND		ug/L	3.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,3-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,4-Dichlorobenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Dichlorodifluoromethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2-Dichloropropane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
cis-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
trans-1,3-Dichloropropene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
2-Hexanone	ND		ug/L	5.0	SW846 8260B			2/20/20 15:17	DPC	J
Iodomethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
4-Methyl-2-Pentanone(MIBK)	ND		ug/L	5.0	SW846 8260B			2/20/20 15:17	DPC	J

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ANALYTICAL RESULTS

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID: **3086975001** Date Collected: 2/17/2020 14:45 Matrix: Ground Water
Sample ID: **FFMP034W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Styrene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1,1,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1,2,2-Tetrachloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Toluene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Total Xylenes	ND		ug/L	3.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,1,2-Trichloroethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Trichloroethene	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
1,2,3-Trichloropropane	ND		ug/L	2.0	SW846 8260B			2/20/20 15:17	DPC	J
Vinyl Acetate	ND		ug/L	5.0	SW846 8260B			2/20/20 15:17	DPC	J
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			2/20/20 15:17	DPC	J
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	97		%	62 - 133	SW846 8260B			2/20/20 15:17	DPC	J
4-Bromofluorobenzene (S)	108		%	79 - 114	SW846 8260B			2/20/20 15:17	DPC	J
Dibromofluoromethane (S)	93		%	78 - 116	SW846 8260B			2/20/20 15:17	DPC	J
Toluene-d8 (S)	94.7		%	76 - 127	SW846 8260B			2/20/20 15:17	DPC	J
LIBRARY SEARCH - VOLATILES										
No TIC's Detected	.				Lib Search VOC			2/20/20 15:17	CPK	J
WET CHEMISTRY										
Alkalinity, Bicarbonate	42		mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Alkalinity, Total	42	1	mg/L	5	SM2320B-2011			2/20/20 16:57	MBW	B
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			2/24/20 22:53	JWB	C
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			2/25/20 23:35	NJA	C
Chloride	100		mg/L	2.0	EPA 300.0			2/18/20 06:11	MBW	B
Fluoride	ND		mg/L	0.20	EPA 300.0			2/18/20 06:11	MBW	B
Nitrate-N	7.7		mg/L	0.20	EPA 300.0			2/18/20 06:11	MBW	B
pH	6.62	2	pH_Units		S4500HB-11			2/20/20 16:57	MBW	B
Phenolics	ND	3	mg/L	0.005	SW846 9066	2/18/20 07:00	VXF	2/18/20 09:12	VXF	I
Specific Conductance	562		umhos/cm	1	SM2510B-2011			2/20/20 16:57	MBW	B
Sulfate	37.6		mg/L	2.0	EPA 300.0			2/18/20 06:11	MBW	B
Total Dissolved Solids	324		mg/L	25	S2540C-11			2/20/20 11:53	D1C	B
Total Organic Carbon (TOC)	3.4		mg/L	0.50	SM5310B-2011			2/18/20 18:01	PAG	G
Turbidity	12.9		NTU	0.10	SM2130B-2011			2/18/20 08:38	R2B	B

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ANALYTICAL RESULTS

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID: **3086975001** Date Collected: 2/17/2020 14:45 Matrix: Ground Water
Sample ID: **FFMP034W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
METALS										
Antimony, Total	ND		mg/L	0.0022	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Arsenic, Total	ND		mg/L	0.0033	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Arsenic, Dissolved	ND		mg/L	0.0030	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Barium, Total	0.037		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Barium, Dissolved	0.032		mg/L	0.0056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Beryllium, Total	ND		mg/L	0.0011	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Cadmium, Total	ND		mg/L	0.0011	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Cadmium, Dissolved	ND		mg/L	0.0011	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Calcium, Total	47.6		mg/L	0.11	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Calcium, Dissolved	41.4		mg/L	0.11	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Chromium, Total	ND		mg/L	0.0022	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Chromium, Dissolved	ND		mg/L	0.0022	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Cobalt, Total	ND		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Copper, Total	ND		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Copper, Dissolved	ND		mg/L	0.0056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Iron, Total	1.1		mg/L	0.056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Iron, Dissolved	0.35		mg/L	0.056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Lead, Total	ND		mg/L	0.0022	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Lead, Dissolved	ND		mg/L	0.0022	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Magnesium, Total	18.3		mg/L	0.11	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Magnesium, Dissolved	17.5		mg/L	0.11	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Manganese, Total	0.12		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Manganese, Dissolved	0.097		mg/L	0.0056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Mercury, Total	ND		mg/L	0.00050	SW846 7470A	2/18/20 10:20	AHI	2/18/20 13:51	AHI	E
Mercury, Dissolved	ND		mg/L	0.00050	SW846 7470A	2/21/20 11:25	AHI	2/22/20 14:41	AHI	D
Nickel, Total	ND		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Potassium, Total	2.5		mg/L	0.11	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Potassium, Dissolved	2.4		mg/L	0.11	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Selenium, Total	ND		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Selenium, Dissolved	ND		mg/L	0.0056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Silver, Total	ND		mg/L	0.0022	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Silver, Dissolved	ND		mg/L	0.0022	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Sodium, Total	32.6		mg/L	0.11	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Sodium, Dissolved	29.9		mg/L	0.11	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
Thallium, Total	ND		mg/L	0.0011	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Vanadium, Total	ND		mg/L	0.0022	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1
Zinc, Total	ND		mg/L	0.0056	SW846 6020A	2/23/20 17:55	SXC	2/26/20 02:54	MSA	E1

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYTICAL RESULTS

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID: **3086975001** Date Collected: 2/17/2020 14:45 Matrix: Ground Water
Sample ID: **FFMP034W** Date Received: 2/17/2020 16:06

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Zinc, Dissolved	ND		mg/L	0.0056	SW846 6020A	2/21/20 13:00	AHI	2/23/20 10:52	MSA	D1
FIELD PARAMETERS										
Depth to Water Level	9.00		Feet		Field			2/17/20 14:45	BGS	F
Elev Top MW Casing above MSL	472.88		Feet		Field			2/17/20 14:45	BGS	F
Flow Rate	1.55		gal/min		Field			2/17/20 14:45	BGS	F
Ground Water Elevation	463.88		ft/MSL		Field			2/17/20 14:45	BGS	F
pH, Field (SM4500B)	5.73		pH_Units		Field			2/17/20 14:45	BGS	F
Sample Depth	25.85		Feet		Field			2/17/20 14:45	BGS	F
Specific Conductance, Field	586		umhos/cm	1	Field			2/17/20 14:45	BGS	F
Temperature	10.77		Deg. C		Field			2/17/20 14:45	BGS	F
Total Well Depth	121.00		Feet		Field			2/17/20 14:45	BGS	F
Volume in Water Column	164.64		Gallons		Field			2/17/20 14:45	BGS	F
Water Level After Purge	17.38		Feet		Field			2/17/20 14:45	BGS	F
Well Volumes Purged	0.85		Vol		Field			2/17/20 14:45	BGS	F

Susan J. Scherer
Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3086975001	1	FFMP034W	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3086975001	2	FFMP034W	S4500HB-11	pH
The pH analysis is an "analyze immediately" analysis. Parameters identified as "analyze immediately" require analysis within 15 minutes of collection, and are therefore analyzed outside of the method holding time when analyzed in the laboratory.				
3086975001	3	FFMP034W	SW846 9066	Phenolics
The QC sample type MSD for method 420.4/9066 was outside the control limits for the analyte Phenolics. The RPD was reported as 10.6 and the upper control limit is 10.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3086975 1st QTR 2020 GWMP-FORM 8

Lab ID	Sample ID	Analysis Method	Prep Method
3086975001	FFMP034W	ASTM D6919-09	
3086975001	FFMP034W	EPA 300.0	
3086975001	FFMP034W	EPA 410.4	
3086975001	FFMP034W	Field	
3086975001	FFMP034W	Lib Search VOC	
3086975001	FFMP034W	S2540C-11	
3086975001	FFMP034W	S4500HB-11	
3086975001	FFMP034W	SM2130B-2011	
3086975001	FFMP034W	SM2320B-2011	
3086975001	FFMP034W	SM2510B-2011	
3086975001	FFMP034W	SM5310B-2011	
3086975001	FFMP034W	SW846 6020A	SW846 3015
3086975001	FFMP034W	SW846 7470A	SW846 7470A
3086975001	FFMP034W	SW846 8260B	
3086975001	FFMP034W	SW846 9066	420.4/9066