LCSWMA

1299 HARRISBURG PIKE | PO BOX 4425 | LANCASTER, PA 17604
PHONE: 717-397-9968 | FAX: 717-397-9973
www.lcswma.org

December 11, 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: 3rd 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.

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 (quarterly parameters), 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

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systems encompass approximately 93 acres of drainage area including the Stage 1 of the Vertical Expansion.

- 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 3rd Quarter 2020 Frey Farm Landfill (FFLF) secondary flow was noted at 1.26 gallons per day per acre (gpdpa); which is below the regulatory limit of 100 gpdpa. The 3rd Quarter 2020 secondary flow was 1.07% 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

December 7, 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
Third 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 Third Quarter 2020 water quality monitoring results for Frey Farm Landfill (FFLF). As part of this evaluation, ARM reviewed the historic and Third 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, leachate, and contiguous private well samples collected by LCSWMA during the Third Quarter 2020 were analyzed for quarterly Form 19, Form 50, and Form 52 parameters, respectively. The following narrative provides a summary of noteworthy observations of the results for the Third 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 (Third 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 Third 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 Third 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 quarterly volatile organic compounds (VOCs), chemical oxygen demand (COD), dissolved iron, 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 Third Quarter 2020. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the Third 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 Third 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 since 2014 but appears to have a stable 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, specific conductance (SpC), total dissolved solids (TDS), and total organic carbon (TOC). Concentrations 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. 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 – Chloride, magnesium, and nitrate were observed above background in this well. These concentrations appear to be increasing since early 2018 along with those of other parameters (calcium, potassium, sodium, SpC, and TDS) which still remain below background levels. 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 – Parameters observed above background in this well include chloride, magnesium, sodium, SpC, and TDS. Concentrations of these parameters appear to have a long-term stable trend with short-term fluctuations since approximately 2012. 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, TDS, TOC, and total phenolics. 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 stabilized. Total phenolics have been sporadically detected in this well, although no long-term trend is apparent. 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 near-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 was observed above background in this well and appears to be increasing slowly in concentration over time. pH appears to mimic the trend observed in the upgradient well at levels approximately 1.5 units higher, on average.

- MP-25 – Chloride and magnesium 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 0.9 unit higher than background.

- MP-28 – Parameters observed above background in this well include chloride, magnesium, sodium, and TDS. Chloride, sodium, and TDS 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 0.6 unit higher, on average, while fluctuating over a slightly wider range.

- MP-29 – Chloride was observed above background in this well and appears to fluctuate between 20-160 mg/L in a seasonal pattern. However, there does not appear to be a long-term increasing or decreasing trend. 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, magnesium, sodium, SpC, TDS, and turbidity. These parameter concentrations appear to have increased from 2017-2018 but have since stabilized, apart from minor fluctuations, during the last several quarters. pH appears to mimic the trend observed in the upgradient well at levels approximately 2.1 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, total phenolics, and turbidity were observed above background in this well. Iron and turbidity levels appear to be increasing slowly since the First Quarter 2018 sampling event. Total phenolics have been detected sporadically in this well, although no long-term trend is apparent. 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, and iron. 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, apart from minor fluctuations. pH appears to be increasing slowly over time and is currently approximately 0.3 unit higher than background.

- MP-4A – Parameters observed above background in this well include alkalinity (bicarbonate and total), calcium, chloride, sodium, SpC, and TDS. All these parameter concentrations appear to be either stable over time or decreasing. Several metals concentrations observed in the Third Quarter 2020 (calcium, magnesium, and sodium) appear anomalously low relative to historical results. ARM will reassess these results in future quarters to determine if any apparent trends develop. 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 chloride, magnesium, manganese, sodium, SpC, sulfate, and TDS. 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 0.4 unit higher, on average.

- MP-30R – Parameters observed above background in this well include chemical oxygen demand (COD), chloride, magnesium, manganese, sodium, SpC, and TDS. Most of these parameter concentrations appear to be fluctuating across a relatively wide range of values with no apparent long-term trends. COD has been detected sporadically in this well, although no long-term trend is apparent. The Third Quarter 2020 result for COD appears to be anomalously high relative to historical results. ARM will reassess COD in future quarters to determine if any apparent trends develop. 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 generally 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 Third 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).

The combined primary leachate flow from FFLEINS tends to range between approximately 100-400 gallons per day per acre (gpd/ac) but does not appear to be increasing over time. 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. Flow from FFMH01SS tends to range between approximately 5-25 gpd/ac and appears to be decreasing since 2014. Flow from FFMH03SS tends to range between approximately 0.1-4.0 gpd/ac and appears to be increasing since 2018. Flow from FFMH05SS tends to range between approximately 0.1-2.0 gpd/ac and appears to be generally stable except for a short-term spike in the flow rate to 15 gpd/ac in early 2018; FFMH05SS flows have since returned to near-historical levels. Flow from FFMH06SS tends to fluctuate seasonally between approximately 0.2-5.8 gpd/ac but does not appear to be increasing over time.

Form 50 VOC Detections and Apparent Trends

2-butanone (MEK), 4-methyl-2-pentanone, and acetone were observed in FFLEINS in the Third Quarter 2020 and have been historically present in the primary leachate samples. MEK appears to fluctuate between approximately 30-1,300 µg/L and appears to be gradually decreasing over time. 4-methyl-2-pentanone has been only been detected sporadically since 2014, and no long-term trend is apparent. Acetone appears to fluctuate between approximately 50-3,300 µg/L and appears to be gradually decreasing over time.

1,1-dichloroethane, 1,4-dichlorobenzene, acetone, and ethylbenzene were detected in FFMH01SS and have historically been present at low levels (between 1-7 µg/L). 1,4-dichlorobenzene and ethylbenzene levels appear to be very gradually increasing over time, and 1,1-dichloroethane and acetone appear to be stable over time apart from minor fluctuations.

Acetone was detected in FFMH03SS for the third time since 2016. These recent detections have all ranged between 10.5-14.5 µg/L, which is only slightly greater than the laboratory detection limit of 10 µg/L. ARM will continue to assess further detections to determine if any concentration trends become apparent.

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 Third Quarter 2020, MCL exceedances were noted in the analyses for the secondary leachate samples collected from FFMH01SS (barium and cadmium) and FFMH03SS (nitrate). All wells downgradient of these zones should therefore be sampled for Subtitle D Form 19 parameters during the 2021 annual sampling event.

Form 52 Contiguous Private Wells Summary

ARM reviewed the historic and Third Quarter 2020 groundwater monitoring results for ten (10) contiguous privately-owned wells. Samples collected from these wells were analyzed for quarterly Form 52 parameters. The attached **Table 2** summarizes the background exceedances in the downgradient Form 52 wells during the Third 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 – Total magnesium was detected above background but appears 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.

- 3052RIVERRD – No parameters were observed above background in this well. pH appears to be slowly increasing since 2017 and is currently approximately 0.3 unit higher than the upgradient well.

- 3056RIVERRD – Total and dissolved magnesium were detected above background in this well. 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 approximately equal levels, on average, while fluctuating over a slightly wider range.

- 3060RIVERRD – COD and magnesium (total and dissolved) were detected above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Magnesium concentrations appear to be decreasing over time. pH appears to mimic the trend observed in the upgradient well at approximately equal levels, on average, while fluctuating over a slightly wider range.

- 3076RIVERRD – Chloride, COD, dissolved sodium, and total organic halogen (TOX) were detected above background in this well. Chloride and sodium concentrations appear to be stable and not increasing over time. COD has only been detected twice in the historical record, and this is the first detection of TOX. No trends are apparent for either parameter. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.3 unit higher, on average.

- 3079RIVERRD – Chloride and COD were detected above background in this well. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be increasing over time. COD has been detected sporadically in this well, and no long-term trend is apparent. pH appears to be slowly increasing since 2017 and is currently approximately 0.9 unit higher than the upgradient well.

- 3088RIVERRD – Parameters observed above background in this well include total and bicarbonate alkalinity, chloride, COD, sodium (total and dissolved), SpC, TDS, and total phenolics. 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 (i.e., an increase in alkalinity, chloride, sodium, SpC, and TDS; and a decrease in calcium, magnesium, potassium, and sulfate). COD and total phenolics have been detected sporadically in this well, and no long-term trends are apparent. 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 and COD were detected above background in this well. Chloride appears to be decreasing after a peak in late 2016. COD has been detected sporadically in this well, and no long-term trend is apparent. pH appears to mimic the trend observed in the upgradient well at levels approximately 0.5 unit higher, on average.

- 3106RIVERRD – Chloride, COD, magnesium (total and dissolved), and sodium (total and dissolved) were observed above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Concentrations of the remaining parameters appear to be decreasing over the last three quarters after increasing to a relative peak in the Fourth Quarter 2019. Since late 2015, pH appears to mimic the trend observed in the upgradient well at levels approximately 0.8 unit higher, on average.

- 3125RIVERRD – Chloride, COD, and sodium (total and dissolved) were observed above background in this well. COD has been detected sporadically in this well, and no long-term trend is apparent. Chloride levels fluctuate in an apparently seasonal manner but do not appear to be trending toward an increase over time. Sodium appears to be decreasing since the Second Quarter 2018. pH also appears to be increasing since early 2018 and is currently approximately 1.6 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, P.G.
Project Manager

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 - 3rd 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
Quarterly Analytes																					
AMMONIA-NITROGEN	**0.303**	mg/L	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	0.737	0.612	< 0.100	< 0.100	< 0.100	< 0.100
BICARBONATE	**132**	mg/L	< 5	47	15	30	75	24	63	23	26	10	109	18	68	68	42	14	192	44	28
CALCIUM, TOTAL	**72.5**	mg/L	18.5	75.9	18.3	43.6	99.8	32.0	58.8	22.8	39.5	13.1	127	15.3	39.5	14.4	26.8	17.7	34.9	69.0	37.2
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	61
CHLORIDE	**30.9**	mg/L	16.1	187	31.5	129	352	99.8	84.9	57.9	82.3	58.6	334	52.2	21.8	16.9	43.4	28.6	300	181	191
FLUORIDE	**0.50**	mg/L	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
IRON, TOTAL	**0.70**	mg/L	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	< 0.067	0.47	1.0	3.2	9.7	6.8	< 0.067	0.25	< 0.067	0.069
MAGNESIUM, TOTAL	**10.3**	mg/L	7.9	18.5	24.0	19.1	42.8	15.8	5.7	12.4	16.6	9.4	20.0	5.7	4.0	5.3	9.1	12.9	10.1	18.5	16.2
MANGANESE, TOTAL	**0.47**	mg/L	0.22	0.092	0.064	0.043	1.7	0.24	< 0.0056	0.0096	< 0.0056	0.027	0.46	0.021	0.30	0.59	0.39	0.29	0.11	0.56	2.2
NITRATE-NITROGEN	**28.6**	mg/L	20.8	2.3	32.7	9.9	1.8	4.9	0.24	9.5	17.3	3.7	7.9	10.8	< 0.20	< 0.20	11.6	23.6	0.24	1.7	5.2
pH-FIELD	**None****	S.U.	4.40	5.31	5.18	4.20	5.34	5.26	6.28	3.37	4.15	4.47	6.91	5.44	7.78	6.68	4.77	4.73	6.78	5.28	5.13
pH-LAB	**None****	S.U.	5.25	6.14	5.87	5.88	6.47	6.14	7.07	6.16	6.08	6.39	8.06	6.33	7.86	7.48	6.30	5.52	7.77	6.13	6.41
POTASSIUM, TOTAL	**13.4**	mg/L	1.1	3.5	2.8	3.7	7.6	5.4	1.1	2.7	2.5	2.2	2.7	6.1	1.2	1.3	1.9	1.6	3.8	8.4	7.1
SODIUM, TOTAL	**26.5**	mg/L	14	49.3	23.9	42.4	94.6	34.4	10.8	20.0	27.5	21.7	127	42.6	10.7	13.6	13.8	12.5	26.6	59.6	95.5
SPEC. COND., FIELD	**636**	µmhos/cm	294	894	487	680	1,524	551	471	389	563	317	1,473	426	325	220	363	326	1,472	904	852
SPEC. COND., LAB	**743**	µmhos/cm	266	835	462	581	1,370	504	435	372	538	282	1,390	374	281	179	340	308	1,390	899	802
SULFATE	**69.9**	mg/L	10.8	60.9	31.5	30.8	69.7	39.8	15.3	2.8	25.1	6.1	31.5	25.8	42.1	< 2.0	6.4	12.9	45.1	78.8	24.8
ALKALINITY	**140**	mg/L	< 5	47	15	30	75	24	63	23	26	10	109	18	68	68	42	14	192	44	28
TDS (TOTAL DISSOLVED SOLIDS)	**387**	mg/L	222	596	272	432	936	330	282	230	400	166	712	152	150	90	242	194	830	634	390
TOC (TOTAL ORGANIC CARBON)	**1.33**	mg/L	0.53	1.5	1.3	1.1	2.6	0.86	1.3	0.74	1.3	< 0.50	0.81	6.9	< 0.50	< 0.50	< 0.50	0.82	1.0	1.1	0.93
TOTAL PHENOLICS	**0.005***	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
TURBIDITY	**4.60**	NTU	0.22	0.12	0.22	0.12	0.28	0.18	0.23	0.26	0.24	0.29	5.50	47.6	11.9	105	3.69	0.13	0.46	0.71	0.91
BENZENE	**1.0***	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)	**1.0***	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	**1.0***	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	**1.0***	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	**1.0***	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
cis 1,2-DICHLOROETHENE	**1.0***	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
trans 1,2-DICHLOROETHENE	**1.0***	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
ETHYLBENZENE	**1.0***	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
METHYLENE CHLORIDE	**1.0***	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
TETRACHLOROETHENE	**1.0***	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
TOLUENE	**1.0***	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
1,1,1-TRICHLOROETHANE	**1.0***	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	**1.0***	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
VINYL CHLORIDE	**1.0***	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)	**3.0***	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.

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

Table 2. LCSWMA Frey Farm Landfill Form 52 Groundwater Monitoring Well Background Standard Comparisons - 3rd 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, TOTAL	**140**	mg/L	6	6			6	32	168	11	12	124
BICARBONATE	**132**	mg/L	6	6			6	32	168	11	12	124
CALCIUM, DISSOLVED	**79.4**	mg/L	13.7	16.6	11.6	11	14.7	10.5	0.14	14.5	22.2	0.28
CALCIUM, TOTAL	**72.5**	mg/L	13.4	16.4	11.5	10.8	14.2	10.3	0.16	14.0	21.4	0.30
CHLORIDE	**30.9**	mg/L	20.8	21.2	26.7	21.0	48.8	32.7	222	41.8	109	85.0
COD (CHEMICAL OXYGEN DEMAND)	**15***	mg/L				23	22	22	22	23	24	21
IRON, TOTAL	**0.70**	mg/L		0.040							0.052	
MAGNESIUM, DISSOLVED	**10.9**	mg/L	10.8	9.0	13.7	11.9	8.9	5.7		6.4	14.9	
MAGNESIUM, TOTAL	**10.3**	mg/L	10.7	8.8	13.6	11.6	8.5	5.6	0.055	6.2	14.6	0.056
MANGANESE, DISSOLVED	**0.53**	mg/L	0.029	0.037	0.10	0.11	0.18	0.12		0.0082	0.045	
MANGANESE, TOTAL	**0.47**	mg/L	0.030	0.037	0.10	0.11	0.18	0.12		0.0081	0.044	
NITRATE-NITROGEN	**28.6**	mg/L	18.3	17.6	22.6	16.2	9.8		5.7	4.7	10.8	4.7
pH-FIELD	**None****	S.U.	4.86	4.89	3.74	4.09	4.90	5.38	6.33	5.09	5.24	6.16
pH-LAB	**None****	S.U.	5.61	5.59	4.03	4.54	5.52	6.13	6.94	5.64	6.04	6.89
POTASSIUM, DISSOLVED	**11.4**	mg/L	1.7	2.0	2.3	2.6	3.5	2.1	2.8	1.6	2.3	2.0
POTASSIUM, TOTAL	**13.4**	mg/L	1.9	2.0	2.5	2.7	3.6	2.2	3.1	1.6	2.3	2.3
SODIUM, DISSOLVED	**21.6**	mg/L	9.1	8.2	9.2	9.0	25.3	14.6	226	16.9	46.2	125.0
SODIUM, TOTAL	**26.5**	mg/L	8.9	7.9	8.9	8.5	23.8	14.2	209	16.2	43.4	120.0
SPEC. COND., FIELD	**636**	µmhos/cm	282	259	322	264	328	207	328	259	452	554
SPEC. COND., LAB	**743**	µmhos/cm	230	218	277	226	284	192	1,010	216	469	563
SULFATE	**69.9**	mg/L		2.3		9.8	11.1	10.8	8.4	8.7	5.6	9.8
TDS (TOT. DISSOLVED SOLIDS)	**387**	mg/L	180	170	202	152	182	150	522	162	296	300
TOC (TOTAL ORGANIC CARBON)	**1.33**	mg/L										0.61
TOTAL ORGANIC HALOGEN	**20.0***	µg/L					20.1					
TOTAL PHENOLICS	**0.005***	mg/L	0.005	0.005				0.005	0.006	0.005		
TURBIDITY	**4.60**	NTU		0.69	0.14	0.14	0.23	0.19	0.23	0.15	0.29	0.16

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.

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

ATTACHMENT 1

BACKGROUND UPPER PREDICTION LIMITS

Attachment 1

LCSWMA FREY FARM LANDFILL 3rd Quarter 2020 - Background Upper Prediction Limits (FFMP002W) *Form 19 Quarterly Parameters*			
Parameter	**Distribution**	**Upper Prediction Limit**	**Unit**
AMMONIA-NITROGEN	Normal	0.303	mg/L
BICARBONATE	No Distribution	132	mg/L
CALCIUM, TOTAL	No Distribution	72.5	mg/L
CALCIUM, DISSOLVED	No Distribution	79.4	mg/L
COD (CHEMICAL OXYGEN DEMAND)	NA	15*	mg/L
CHLORIDE	Normal	30.9	mg/L
FLUORIDE	No Distribution	0.50	mg/L
IRON, TOTAL	No Distribution	0.70	mg/L
IRON, DISSOLVED	NA	0.056*	mg/L
MAGNESIUM, TOTAL	No Distribution	10.3	mg/L
MAGNESIUM, DISSOLVED	Normal	10.9	mg/L
MANGANESE, TOTAL	No Distribution	0.47	mg/L
MANGANESE, DISSOLVED	Lognormal	0.53	mg/L
NITRATE-NITROGEN	No Distribution	28.6	mg/L
pH-FIELD	NA	None**	S.U.
pH-LAB	NA	None**	S.U.
POTASSIUM, TOTAL	No Distribution	13.4	mg/L
POTASSIUM, DISSOLVED	No Distribution	11.4	mg/L
SODIUM, TOTAL	No Distribution	26.5	mg/L
SODIUM, DISSOLVED	Normal	21.6	mg/L
SPEC. COND., FIELD	No Distribution	636	µmhos/cm
SPEC. COND., LAB	No Distribution	743	µmhos/cm
SULFATE	No Distribution	69.9	mg/L
TOTAL ALKALINITY	No Distribution	140	mg/L
TDS (TOTAL DISSOLVED SOLIDS)	Lognormal	387	mg/L
TOC (TOTAL ORGANIC CARBON)	Normal	1.33	mg/L
TOTAL PHENOLICS	NA	0.005*	mg/L
TURBIDITY	No Distribution	4.60	NTU
BENZENE	NA	1.0*	µg/L
1,2-DIBROMOETHANE	NA	1.0*	µg/L
1,1-DICHLOROETHANE	NA	1.0*	µg/L
1,1-DICHLOROETHENE	NA	1.0*	µg/L
1,2-DICHLOROETHANE	NA	1.0*	µg/L
cis 1,2-DICHLOROETHENE	NA	1.0*	µg/L
trans 1,2-DICHLOROETHENE	NA	1.0*	µg/L
ETHYLBENZENE	NA	1.0*	µg/L
METHYLENE CHLORIDE	NA	1.0*	µg/L
TETRACHLOROETHENE	NA	1.0*	µg/L
TOLUENE	NA	1.0*	µg/L
1,1,1-TRICHLOROETHANE	NA	1.0*	µg/L
TRICHLOROETHENE	NA	1.0*	µg/L
VINYL CHLORIDE	NA	1.0*	µg/L
XYLENES (TOTAL)	NA	3.0*	µg/L

Notes:

"NA" denotes parameter not detected or not enough detections in upgradient well 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

1				Background Statistics for Data Sets with Non-Detects								
2		User Selected Options										
3		Date/Time of Computation		ProUCL 5.111/24/2020 4:23:37 PM								
4		From File		FFMP002W ProUCL Input 20Q3.xls								
5		Full Precision		OFF								
6		Confidence Coefficient		95%								
7		Coverage		95%								
8		Different or Future K Observations		1								
9		Number of Bootstrap Operations		2000								
10												
11	AMMONIA-NITROGEN											
12												
13					General Statistics							
14				Total Number of Observations	47			Number of Missing Observations	0			
15				Number of Distinct Observations	7							
16				Number of Detects	7			Number of Non-Detects	40			
17				Number of Distinct Detects	7			Number of Distinct Non-Detects	1			
18				Minimum Detect	0.1			Minimum Non-Detect	0.1			
19				Maximum Detect	0.63			Maximum Non-Detect	0.1			
20				Variance Detected	0.0395			Percent Non-Detects	85.11%			
21				Mean Detected	0.304			SD Detected	0.199			
22				Mean of Detected Logged Data	-1.389			SD of Detected Logged Data	0.699			
23												
24					Critical Values for Background Threshold Values (BTVs)							
25				Tolerance Factor K (For UTL)	2.074			d2max (for USL)	2.933			
26												
27					Normal GOF Test on Detects Only							
28				Shapiro Wilk Test Statistic	0.904			Shapiro Wilk GOF Test				
29				5% Shapiro Wilk Critical Value	0.803			Detected Data appear Normal at 5% Significance Level				
30				Lilliefors Test Statistic	0.254			Lilliefors GOF Test				
31				5% Lilliefors Critical Value	0.304			Detected Data appear Normal at 5% Significance Level				
32					Detected Data appear Normal at 5% Significance Level							
33												
34					Kaplan Meier (KM) Background Statistics Assuming Normal Distribution							
35				KM Mean	0.13			KM SD	0.102			
36				95% UTL95% Coverage	0.341			95% KM UPL (t)	0.303			
37				90% KM Percentile (z)	0.261			95% KM Percentile (z)	0.298			
38				99% KM Percentile (z)	0.367			95% KM USL	0.429			
39												
40					DL/2 Substitution Background Statistics Assuming Normal Distribution							
41				Mean	0.0879			SD	0.116			
42				95% UTL95% Coverage	0.329			95% UPL (t)	0.285			
43				90% Percentile (z)	0.237			95% Percentile (z)	0.279			
44				99% Percentile (z)	0.358			95% USL	0.429			
45					DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons							
46												
47					Gamma GOF Tests on Detected Observations Only							
48				A-D Test Statistic	0.319			Anderson-Darling GOF Test				
49				5% A-D Critical Value	0.713			Detected data appear Gamma Distributed at 5% Significance Level				
50				K-S Test Statistic	0.212			Kolmogorov-Smirnov GOF				

51	5% K-S Critical Value				0.314	Detected data appear Gamma Distributed at 5% Significance Level						
52	Detected data appear Gamma Distributed at 5% Significance Level											
53												
54	**Gamma Statistics on Detected Data Only**											
55	k hat (MLE)				2.665	k star (bias corrected MLE)						1.618
56	Theta hat (MLE)				0.114	Theta star (bias corrected MLE)						0.188
57	nu hat (MLE)				37.3	nu star (bias corrected)						22.65
58	MLE Mean (bias corrected)				0.304							
59	MLE Sd (bias corrected)				0.239	95% Percentile of Chisquare (2kstar)						8.22
60												
61	**Gamma ROS Statistics using Imputed Non-Detects**											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
63	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)											
64	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
65	This is especially true when the sample size is small.											
66	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
67	Minimum				0.01	Mean						0.0538
68	Maximum				0.63	Median						0.01
69	SD				0.128	CV						2.377
70	k hat (MLE)				0.524	k star (bias corrected MLE)						0.504
71	Theta hat (MLE)				0.103	Theta star (bias corrected MLE)						0.107
72	nu hat (MLE)				49.23	nu star (bias corrected)						47.42
73	MLE Mean (bias corrected)				0.0538	MLE Sd (bias corrected)						0.0758
74	95% Percentile of Chisquare (2kstar)				3.863	90% Percentile						0.145
75	95% Percentile				0.206	99% Percentile						0.355
76	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
77	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
78			WH	HW					WH	HW		
79	95% Approx. Gamma UTL with 95% Coverage		0.236	0.224		95% Approx. Gamma UPL			0.172	0.159		
80	95% Gamma USL		0.436	0.447								
81												
82	**Estimates of Gamma Parameters using KM Estimates**											
83	Mean (KM)				0.13	SD (KM)						0.102
84	Variance (KM)				0.0103	SE of Mean (KM)						0.016
85	k hat (KM)				1.646	k star (KM)						1.556
86	nu hat (KM)				154.8	nu star (KM)						146.2
87	theta hat (KM)				0.0792	theta star (KM)						0.0838
88	80% gamma percentile (KM)				0.201	90% gamma percentile (KM)						0.269
89	95% gamma percentile (KM)				0.336	99% gamma percentile (KM)						0.485
90												
91	**The following statistics are computed using gamma distribution and KM estimates**											
92	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
93			WH	HW					WH	HW		
94	95% Approx. Gamma UTL with 95% Coverage		0.292	0.286		95% Approx. Gamma UPL			0.253	0.247		
95	95% KM Gamma Percentile		0.248	0.242		95% Gamma USL			0.397	0.393		
96												
97	**Lognormal GOF Test on Detected Observations Only**											
98	Shapiro Wilk Test Statistic				0.935	**Shapiro Wilk GOF Test**						
99	5% Shapiro Wilk Critical Value				0.803	Detected Data appear Lognormal at 5% Significance Level						
100	Lilliefors Test Statistic				0.19	**Lilliefors GOF Test**						

101	5% Lilliefors Critical Value					0.304	Detected Data appear Lognormal at 5% Significance Level					
102	Detected Data appear Lognormal at 5% Significance Level											
103												
104	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
105	Mean in Original Scale					0.0601	Mean in Log Scale					-4.377
106	SD in Original Scale					0.127	SD in Log Scale					1.894
107	95% UTL95% Coverage					0.638	95% BCA UTL95% Coverage					0.564
108	95% Bootstrap (%) UTL95% Coverage					0.564	95% UPL (t)					0.312
109	90% Percentile (z)					0.142	95% Percentile (z)					0.283
110	99% Percentile (z)					1.029	95% USL					3.245
111												
112	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
113	KM Mean of Logged Data					-2.167	95% KM UTL (Lognormal)95% Coverage					0.268
114	KM SD of Logged Data					0.41	95% KM UPL (Lognormal)					0.23
115	95% KM Percentile Lognormal (z)					0.225	95% KM USL (Lognormal)					0.381
116												
117	**Background DL/2 Statistics Assuming Lognormal Distribution**											
118	Mean in Original Scale					0.0879	Mean in Log Scale					-2.756
119	SD in Original Scale					0.116	SD in Log Scale					0.631
120	95% UTL95% Coverage					0.235	95% UPL (t)					0.185
121	90% Percentile (z)					0.143	95% Percentile (z)					0.179
122	99% Percentile (z)					0.276	95% USL					0.404
123	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
124												
125	**Nonparametric Distribution Free Background Statistics**											
126	Data appear to follow a Discernible Distribution at 5% Significance Level											
127												
128	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
129	Order of Statistic, r					46	95% UTL with95% Coverage					0.46
130	Approx, f used to compute achieved CC					1.211	Approximate Actual Confidence Coefficient achieved by UTL					0.688
131	Approximate Sample Size needed to achieve specified CC					93	95% UPL					0.44
132	95% USL					0.63	95% KM Chebyshev UPL					0.578
133												
134	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
135	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
136	and consists of observations collected from clean unimpacted locations.											
137	The use of USL tends to provide a balance between false positives and false negatives provided the data											
138	represents a background data set and when many onsite observations need to be compared with the BTV.											
139												
140	**BICARBONATE**											
141												
142	**General Statistics**											
143	Total Number of Observations					47	Number of Missing Observations					0
144	Number of Distinct Observations					14						
145	Number of Detects					20	Number of Non-Detects					27
146	Number of Distinct Detects					14	Number of Distinct Non-Detects					1
147	Minimum Detect					5	Minimum Non-Detect					5
148	Maximum Detect					182	Maximum Non-Detect					5
149	Variance Detected					2624	Percent Non-Detects					57.45%
150	Mean Detected					36.65	SD Detected					51.23

151	Mean of Detected Logged Data					2.823	SD of Detected Logged Data					1.241
152												
153	**Critical Values for Background Threshold Values (BTVs)**											
154	Tolerance Factor K (For UTL)					2.074	d2max (for USL)					2.933
155												
156	**Normal GOF Test on Detects Only**											
157	Shapiro Wilk Test Statistic					0.673	**Shapiro Wilk GOF Test**					
158	5% Shapiro Wilk Critical Value					0.905	Data Not Normal at 5% Significance Level					
159	Lilliefors Test Statistic					0.268	**Lilliefors GOF Test**					
160	5% Lilliefors Critical Value					0.192	Data Not Normal at 5% Significance Level					
161	Data Not Normal at 5% Significance Level											
162												
163	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
164	KM Mean					18.47	KM SD					36.13
165	95% UTL95% Coverage					93.41	95% KM UPL (t)					79.77
166	90% KM Percentile (z)					64.78	95% KM Percentile (z)					77.9
167	99% KM Percentile (z)					102.5	95% KM USL					124.4
168												
169	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
170	Mean					17.03	SD					37.08
171	95% UTL95% Coverage					93.94	95% UPL (t)					79.94
172	90% Percentile (z)					64.56	95% Percentile (z)					78.03
173	99% Percentile (z)					103.3	95% USL					125.8
174	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
175												
176	**Gamma GOF Tests on Detected Observations Only**											
177	A-D Test Statistic					1.343	**Anderson-Darling GOF Test**					
178	5% A-D Critical Value					0.779	Data Not Gamma Distributed at 5% Significance Level					
179	K-S Test Statistic					0.251	**Kolmogorov-Smirnov GOF**					
180	5% K-S Critical Value					0.201	Data Not Gamma Distributed at 5% Significance Level					
181	Data Not Gamma Distributed at 5% Significance Level											
182												
183	**Gamma Statistics on Detected Data Only**											
184	k hat (MLE)					0.767	k star (bias corrected MLE)					0.685
185	Theta hat (MLE)					47.81	Theta star (bias corrected MLE)					53.51
186	nu hat (MLE)					30.66	nu star (bias corrected)					27.4
187	MLE Mean (bias corrected)					36.65						
188	MLE Sd (bias corrected)					44.28	95% Percentile of Chisquare (2kstar)					4.699
189												
190	**Gamma ROS Statistics using Imputed Non-Detects**											
191	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
192	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)											
193	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
194	This is especially true when the sample size is small.											
195	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
196	Minimum					0.01	Mean					15.6
197	Maximum					182	Median					0.01
198	SD					37.67	CV					2.415
199	k hat (MLE)					0.179	k star (bias corrected MLE)					0.181
200	Theta hat (MLE)					87.33	Theta star (bias corrected MLE)					85.99

201					nu hat (MLE)	16.79				nu star (bias corrected)		17.05
202					MLE Mean (bias corrected)	15.6				MLE Sd (bias corrected)		36.63
203					95% Percentile of Chisquare (2kstar)	1.916				90% Percentile		47.07
204					95% Percentile	82.38				99% Percentile		181.2
205	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
206	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
207					WH	HW					WH	HW
208				95% Approx. Gamma UTL with 95% Coverage	89.78	103.2				95% Approx. Gamma UPL	59.4	61.9
209				95% Gamma USL	193.9	271.1						
210												
211	**Estimates of Gamma Parameters using KM Estimates**											
212					Mean (KM)	18.47				SD (KM)		36.13
213					Variance (KM)	1306				SE of Mean (KM)		5.408
214					k hat (KM)	0.261				k star (KM)		0.259
215					nu hat (KM)	24.55				nu star (KM)		24.32
216					theta hat (KM)	70.7				theta star (KM)		71.38
217					80% gamma percentile (KM)	27.14				90% gamma percentile (KM)		55.29
218					95% gamma percentile (KM)	88.48				99% gamma percentile (KM)		176.4
219												
220	**The following statistics are computed using gamma distribution and KM estimates**											
221	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
222					WH	HW					WH	HW
223				95% Approx. Gamma UTL with 95% Coverage	73.23	71.03				95% Approx. Gamma UPL	55.63	52.8
224				95% KM Gamma Percentile	53.47	50.62				95% Gamma USL	126.3	129.8
225												
226	**Lognormal GOF Test on Detected Observations Only**											
227					Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**					
228					5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level					
229					Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**					
230					5% Lilliefors Critical Value	0.192	Data Not Lognormal at 5% Significance Level					
231	**Data Not Lognormal at 5% Significance Level**											
232												
233	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
234					Mean in Original Scale	16.05				Mean in Log Scale		0.681
235					SD in Original Scale	37.49				SD in Log Scale		2.285
236					95% UTL95% Coverage	225.9				95% BCA UTL95% Coverage		157.4
237					95% Bootstrap (%) UTL95% Coverage	173.6				95% UPL (t)		95.34
238					90% Percentile (z)	36.94				95% Percentile (z)		84.74
239					99% Percentile (z)	402.2				95% USL		1607
240												
241	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
242					KM Mean of Logged Data	2.126				95% KM UTL (Lognormal)95% Coverage		65.46
243					KM SD of Logged Data	0.991				95% KM UPL (Lognormal)		45.03
244					95% KM Percentile Lognormal (z)	42.79				95% KM USL (Lognormal)		153.4
245												
246	**Background DL/2 Statistics Assuming Lognormal Distribution**											
247					Mean in Original Scale	17.03				Mean in Log Scale		1.728
248					SD in Original Scale	37.08				SD in Log Scale		1.243
249					95% UTL95% Coverage	74.04				95% UPL (t)		46.32
250					90% Percentile (z)	27.66				95% Percentile (z)		43.45

251				99% Percentile (z)	101.3					95% USL	215.2	
252	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
253												
254	Nonparametric Distribution Free Background Statistics											
255	Data do not follow a Discernible Distribution (0.05)											
256												
257	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
258				Order of Statistic, r	46					95% UTL with95% Coverage	154	
259				Approx, f used to compute achieved CC	1.211					Approximate Actual Confidence Coefficient achieved by UTL	0.688	
260				Approximate Sample Size needed to achieve specified CC	93					95% UPL	132.4	
261				95% USL	182					95% KM Chebyshev UPL	177.6	
262												
263	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
264	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
265	and consists of observations collected from clean unimpacted locations.											
266	The use of USL tends to provide a balance between false positives and false negatives provided the data											
267	represents a background data set and when many onsite observations need to be compared with the BTV.											
268												
269	CALCIUM, TOTAL											
270												
271	General Statistics											
272				Total Number of Observations	46					Number of Distinct Observations	40	
273										Number of Missing Observations	1	
274				Minimum	18.4					First Quartile	20.83	
275				Second Largest	74.7					Median	23.1	
276				Maximum	93					Third Quartile	24.85	
277				Mean	27.46					SD	15.03	
278				Coefficient of Variation	0.547					Skewness	3.173	
279				Mean of logged Data	3.231					SD of logged Data	0.356	
280												
281	Critical Values for Background Threshold Values (BTVs)											
282				Tolerance Factor K (For UTL)	2.079					d2max (for USL)	2.924	
283												
284	Normal GOF Test											
285				Shapiro Wilk Test Statistic	0.533					Shapiro Wilk GOF Test		
286				5% Shapiro Wilk Critical Value	0.945					Data Not Normal at 5% Significance Level		
287				Lilliefors Test Statistic	0.352					Lilliefors GOF Test		
288				5% Lilliefors Critical Value	0.129					Data Not Normal at 5% Significance Level		
289	Data Not Normal at 5% Significance Level											
290												
291	Background Statistics Assuming Normal Distribution											
292				95% UTL with 95% Coverage	58.71					90% Percentile (z)	46.72	
293				95% UPL (t)	52.98					95% Percentile (z)	52.18	
294				95% USL	71.41					99% Percentile (z)	62.43	
295												
296	Gamma GOF Test											
297				A-D Test Statistic	6.376					Anderson-Darling Gamma GOF Test		
298				5% A-D Critical Value	0.752					Data Not Gamma Distributed at 5% Significance Level		
299				K-S Test Statistic	0.308					Kolmogorov-Smirnov Gamma GOF Test		
300				5% K-S Critical Value	0.131					Data Not Gamma Distributed at 5% Significance Level		

301	Data Not Gamma Distributed at 5% Significance Level											
302												
303	Gamma Statistics											
304						k hat (MLE)	6.269			k star (bias corrected MLE)	5.875	
305						Theta hat (MLE)	4.381			Theta star (bias corrected MLE)	4.675	
306						nu hat (MLE)	576.8			nu star (bias corrected)	540.5	
307						MLE Mean (bias corrected)	27.46			MLE Sd (bias corrected)	11.33	
308												
309	Background Statistics Assuming Gamma Distribution											
310						95% Wilson Hilferty (WH) Approx. Gamma UPL	48.36			90% Percentile	42.61	
311						95% Hawkins Wixley (HW) Approx. Gamma UPL	47.82			95% Percentile	48.36	
312						95% WH Approx. Gamma UTL with 95% Coverage	54.76			99% Percentile	60.41	
313						95% HW Approx. Gamma UTL with 95% Coverage	54.3					
314						95% WH USL	70.88			95% HW USL	70.97	
315												
316	Lognormal GOF Test											
317						Shapiro Wilk Test Statistic	0.683			Shapiro Wilk Lognormal GOF Test		
318						5% Shapiro Wilk Critical Value	0.945			Data Not Lognormal at 5% Significance Level		
319						Lilliefors Test Statistic	0.279			Lilliefors Lognormal GOF Test		
320						5% Lilliefors Critical Value	0.129			Data Not Lognormal at 5% Significance Level		
321	Data Not Lognormal at 5% Significance Level											
322												
323	Background Statistics assuming Lognormal Distribution											
324						95% UTL with 95% Coverage	53			90% Percentile (z)	39.91	
325						95% UPL (t)	46.27			95% Percentile (z)	45.42	
326						95% USL	71.57			99% Percentile (z)	57.87	
327												
328	Nonparametric Distribution Free Background Statistics											
329	Data do not follow a Discernible Distribution (0.05)											
330												
331	Nonparametric Upper Limits for Background Threshold Values											
332						Order of Statistic, r	45			95% UTL with 95% Coverage	74.7	
333						Approx, f used to compute achieved CC	1.184			Approximate Actual Confidence Coefficient achieved by UTL	0.677	
334										Approximate Sample Size needed to achieve specified CC	93	
335						95% Percentile Bootstrap UTL with 95% Coverage	88.43			95% BCA Bootstrap UTL with 95% Coverage	86.83	
336						95% UPL	72.46			90% Percentile	34.45	
337						90% Chebyshev UPL	73.04			95% Percentile	64.4	
338						95% Chebyshev UPL	93.68			99% Percentile	84.76	
339						95% USL	93					
340												
341	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
342	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
343	and consists of observations collected from clean unimpacted locations.											
344	The use of USL tends to provide a balance between false positives and false negatives provided the data											
345	represents a background data set and when many onsite observations need to be compared with the BTV.											
346												
347	CALCIUM, DISSOLVED											
348												
349	General Statistics											
350						Total Number of Observations	12			Number of Distinct Observations	11	

351											Number of Missing Observations	34
352					Minimum	18.3					First Quartile	20.73
353					Second Largest	26.6					Median	23.4
354					Maximum	79.4					Third Quartile	24.9
355					Mean	27.18					SD	16.69
356					Coefficient of Variation	0.614					Skewness	3.285
357					Mean of logged Data	3.208					SD of logged Data	0.389
358												
359					**Critical Values for Background Threshold Values (BTVs)**							
360					Tolerance Factor K (For UTL)	2.736					d2max (for USL)	2.285
361												
362					**Normal GOF Test**							
363					Shapiro Wilk Test Statistic	0.487	**Shapiro Wilk GOF Test**					
364					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
365					Lilliefors Test Statistic	0.43	**Lilliefors GOF Test**					
366					5% Lilliefors Critical Value	0.243	Data Not Normal at 5% Significance Level					
367					Data Not Normal at 5% Significance Level							
368												
369					**Background Statistics Assuming Normal Distribution**							
370					95% UTL with 95% Coverage	72.84					90% Percentile (z)	48.56
371					95% UPL (t)	58.37					95% Percentile (z)	54.63
372					95% USL	65.31					99% Percentile (z)	66
373												
374					**Gamma GOF Test**							
375					A-D Test Statistic	1.988	**Anderson-Darling Gamma GOF Test**					
376					5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level					
377					K-S Test Statistic	0.379	**Kolmogorov-Smirnov Gamma GOF Test**					
378					5% K-S Critical Value	0.246	Data Not Gamma Distributed at 5% Significance Level					
379					Data Not Gamma Distributed at 5% Significance Level							
380												
381					**Gamma Statistics**							
382					k hat (MLE)	5.469					k star (bias corrected MLE)	4.157
383					Theta hat (MLE)	4.969					Theta star (bias corrected MLE)	6.537
384					nu hat (MLE)	131.3					nu star (bias corrected)	99.78
385					MLE Mean (bias corrected)	27.18					MLE Sd (bias corrected)	13.33
386												
387					**Background Statistics Assuming Gamma Distribution**							
388					95% Wilson Hilferty (WH) Approx. Gamma UPL	53.58					90% Percentile	45.04
389					95% Hawkins Wixley (HW) Approx. Gamma UPL	52.97					95% Percentile	52.14
390					95% WH Approx. Gamma UTL with 95% Coverage	71.75					99% Percentile	67.29
391					95% HW Approx. Gamma UTL with 95% Coverage	71.69						
392					95% WH USL	61.85					95% HW USL	61.42
393												
394					**Lognormal GOF Test**							
395					Shapiro Wilk Test Statistic	0.643	**Shapiro Wilk Lognormal GOF Test**					
396					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
397					Lilliefors Test Statistic	0.342	**Lilliefors Lognormal GOF Test**					
398					5% Lilliefors Critical Value	0.243	Data Not Lognormal at 5% Significance Level					
399					Data Not Lognormal at 5% Significance Level							
400												

401	**Background Statistics assuming Lognormal Distribution**											
402					95% UTL with 95% Coverage	71.76				90% Percentile (z)	40.73	
403					95% UPL (t)	51.21				95% Percentile (z)	46.92	
404					95% USL	60.2				99% Percentile (z)	61.18	
405												
406	**Nonparametric Distribution Free Background Statistics**											
407	Data do not follow a Discernible Distribution (0.05)											
408												
409	**Nonparametric Upper Limits for Background Threshold Values**											
410					Order of Statistic, r	12				95% UTL with 95% Coverage	79.4	
411					Approx, f used to compute achieved CC	0.632				Approximate Actual Confidence Coefficient achieved by UTL	0.46	
412										Approximate Sample Size needed to achieve specified CC	59	
413					95% Percentile Bootstrap UTL with 95% Coverage	79.4				95% BCA Bootstrap UTL with 95% Coverage	79.4	
414					95% UPL	79.4				90% Percentile	26.55	
415					90% Chebyshev UPL	79.29				95% Percentile	50.36	
416					95% Chebyshev UPL	102.9				99% Percentile	73.59	
417					95% USL	79.4						
418												
419	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
420	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
421	and consists of observations collected from clean unimpacted locations.											
422	The use of USL tends to provide a balance between false positives and false negatives provided the data											
423	represents a background data set and when many onsite observations need to be compared with the BTV.											
424												
425	**COD (CHEMICAL OXYGEN DEMAND)**											
426												
427	**General Statistics**											
428					Total Number of Observations	47				Number of Missing Observations	0	
429					Number of Distinct Observations	4						
430					Number of Detects	0				Number of Non-Detects	47	
431					Number of Distinct Detects	0				Number of Distinct Non-Detects	4	
432					Minimum Detect	N/A				Minimum Non-Detect	5	
433					Maximum Detect	N/A				Maximum Non-Detect	75	
434					Variance Detected	N/A				Percent Non-Detects	100%	
435					Mean Detected	N/A				SD Detected	N/A	
436					Mean of Detected Logged Data	N/A				SD of Detected Logged Data	N/A	
437												
438	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
439	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
440	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
441												
442	The data set for variable COD (CHEMICAL OXYGEN DEMAND) was not processed!											
443												
444												
445	**CHLORIDE**											
446												
447	**General Statistics**											
448					Total Number of Observations	47				Number of Distinct Observations	41	
449					Minimum	16.1				First Quartile	22.2	
450					Second Largest	34.3				Median	24.8	

451					Maximum	34.5					Third Quartile	26.45
452					Mean	24.73					SD	3.635
453					Coefficient of Variation	0.147					Skewness	0.643
454					Mean of logged Data	3.197					SD of logged Data	0.145
455												
456					**Critical Values for Background Threshold Values (BTVs)**							
457					Tolerance Factor K (For UTL)	2.074					d2max (for USL)	2.933
458												
459					**Normal GOF Test**							
460					Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**					
461					5% Shapiro Wilk Critical Value	0.946	Data appear Normal at 5% Significance Level					
462					Lilliefors Test Statistic	0.105	**Lilliefors GOF Test**					
463					5% Lilliefors Critical Value	0.128	Data appear Normal at 5% Significance Level					
464					Data appear Normal at 5% Significance Level							
465												
466					**Background Statistics Assuming Normal Distribution**							
467				95% UTL with	95% Coverage	32.26					90% Percentile (z)	29.38
468					95% UPL (t)	30.89					95% Percentile (z)	30.7
469					95% USL	35.38					99% Percentile (z)	33.18
470												
471					**Gamma GOF Test**							
472					A-D Test Statistic	0.465	**Anderson-Darling Gamma GOF Test**					
473					5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level					
474					K-S Test Statistic	0.0899	**Kolmogorov-Smirnov Gamma GOF Test**					
475					5% K-S Critical Value	0.129	Detected data appear Gamma Distributed at 5% Significance Level					
476					Detected data appear Gamma Distributed at 5% Significance Level							
477												
478					**Gamma Statistics**							
479					k hat (MLE)	48.52					k star (bias corrected MLE)	45.44
480					Theta hat (MLE)	0.51					Theta star (bias corrected MLE)	0.544
481					nu hat (MLE)	4561					nu star (bias corrected)	4271
482					MLE Mean (bias corrected)	24.73					MLE Sd (bias corrected)	3.668
483												
484					**Background Statistics Assuming Gamma Distribution**							
485				95% Wilson Hilferty (WH) Approx. Gamma UPL		31.13					90% Percentile	29.53
486				95% Hawkins Wixley (HW) Approx. Gamma UPL		31.16					95% Percentile	31.05
487				95% WH Approx. Gamma UTL with	95% Coverage	32.73					99% Percentile	34.05
488				95% HW Approx. Gamma UTL with	95% Coverage	32.81						
489					95% WH USL	36.59					95% HW USL	36.78
490												
491					**Lognormal GOF Test**							
492					Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk Lognormal GOF Test**					
493					5% Shapiro Wilk Critical Value	0.946	Data appear Lognormal at 5% Significance Level					
494					Lilliefors Test Statistic	0.0869	**Lilliefors Lognormal GOF Test**					
495					5% Lilliefors Critical Value	0.128	Data appear Lognormal at 5% Significance Level					
496					Data appear Lognormal at 5% Significance Level							
497												
498					**Background Statistics assuming Lognormal Distribution**							
499				95% UTL with	95% Coverage	33.06					90% Percentile (z)	29.47
500					95% UPL (t)	31.3					95% Percentile (z)	31.07

501					95% USL	37.45				99% Percentile (z)		34.3
502												
503					Nonparametric Distribution Free Background Statistics							
504					Data appear Normal at 5% Significance Level							
505												
506					Nonparametric Upper Limits for Background Threshold Values							
507					Order of Statistic, r	46				95% UTL with 95% Coverage		34.3
508					Approx, f used to compute achieved CC	1.211				Approximate Actual Confidence Coefficient achieved by UTL		0.688
509										Approximate Sample Size needed to achieve specified CC		93
510					95% Percentile Bootstrap UTL with 95% Coverage	34.44				95% BCA Bootstrap UTL with 95% Coverage		34.44
511					95% UPL	33.62				90% Percentile		28.42
512					90% Chebyshev UPL	35.74				95% Percentile		31.85
513					95% Chebyshev UPL	40.74				99% Percentile		34.41
514					95% USL	34.5						
515												
516					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
517					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
518					and consists of observations collected from clean unimpacted locations.							
519					The use of USL tends to provide a balance between false positives and false negatives provided the data							
520					represents a background data set and when many onsite observations need to be compared with the BTV.							
521												
522	FLUORIDE											
523												
524					General Statistics							
525					Total Number of Observations	46				Number of Missing Observations		1
526					Number of Distinct Observations	7						
527					Number of Detects	15				Number of Non-Detects		31
528					Number of Distinct Detects	6				Number of Distinct Non-Detects		2
529					Minimum Detect	0.12				Minimum Non-Detect		0.2
530					Maximum Detect	0.24				Maximum Non-Detect		0.5
531					Variance Detected	0.00157				Percent Non-Detects		67.39%
532					Mean Detected	0.157				SD Detected		0.0396
533					Mean of Detected Logged Data	-1.881				SD of Detected Logged Data		0.237
534												
535					Critical Values for Background Threshold Values (BTVs)							
536					Tolerance Factor K (For UTL)	2.079				d2max (for USL)		2.924
537												
538					Normal GOF Test on Detects Only							
539					Shapiro Wilk Test Statistic	0.807				Shapiro Wilk GOF Test		
540					5% Shapiro Wilk Critical Value	0.881				Data Not Normal at 5% Significance Level		
541					Lilliefors Test Statistic	0.263				Lilliefors GOF Test		
542					5% Lilliefors Critical Value	0.22				Data Not Normal at 5% Significance Level		
543					Data Not Normal at 5% Significance Level							
544												
545					Kaplan Meier (KM) Background Statistics Assuming Normal Distribution							
546					KM Mean	0.142				KM SD		0.0293
547					95% UTL95% Coverage	0.203				95% KM UPL (t)		0.192
548					90% KM Percentile (z)	0.18				95% KM Percentile (z)		0.19
549					99% KM Percentile (z)	0.21				95% KM USL		0.228
550												

	A	B	C	D	E	F	G	H	I	J	K	L
551	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
552					Mean	0.158				SD		0.0645
553					95% UTL95% Coverage	0.292				95% UPL (t)		0.267
554					90% Percentile (z)	0.24				95% Percentile (z)		0.264
555					99% Percentile (z)	0.308				95% USL		0.346
556	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
557												
558	**Gamma GOF Tests on Detected Observations Only**											
559					A-D Test Statistic	1.282	**Anderson-Darling GOF Test**					
560					5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level					
561					K-S Test Statistic	0.254	**Kolmogorov-Smirnov GOF**					
562					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
563	Data Not Gamma Distributed at 5% Significance Level											
564												
565	**Gamma Statistics on Detected Data Only**											
566					k hat (MLE)	18.4				k star (bias corrected MLE)		14.76
567					Theta hat (MLE)	0.00852				Theta star (bias corrected MLE)		0.0106
568					nu hat (MLE)	551.9				nu star (bias corrected)		442.9
569					MLE Mean (bias corrected)	0.157						
570					MLE Sd (bias corrected)	0.0408				95% Percentile of Chisquare (2kstar)		43.19
571												
572	**Gamma ROS Statistics using Imputed Non-Detects**											
573	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
574	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)											
575	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
576	This is especially true when the sample size is small.											
577	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
578					Minimum	0.0906				Mean		0.144
579					Maximum	0.24				Median		0.139
580					SD	0.0318				CV		0.22
581					k hat (MLE)	22.55				k star (bias corrected MLE)		21.09
582					Theta hat (MLE)	0.0064				Theta star (bias corrected MLE)		0.00684
583					nu hat (MLE)	2075				nu star (bias corrected)		1941
584					MLE Mean (bias corrected)	0.144				MLE Sd (bias corrected)		0.0314
585					95% Percentile of Chisquare (2kstar)	58.34				90% Percentile		0.186
586					95% Percentile	0.2				99% Percentile		0.227
587	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
588	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
589					WH	HW					WH	HW
590				95% Approx. Gamma UTL with 95% Coverage	0.215	0.216				95% Approx. Gamma UPL	0.2	0.201
591				95% Gamma USL	0.251	0.253						
592												
593	**Estimates of Gamma Parameters using KM Estimates**											
594					Mean (KM)	0.142				SD (KM)		0.0293
595					Variance (KM)	8.5725E-4				SE of Mean (KM)		0.00562
596					k hat (KM)	23.63				k star (KM)		22.1
597					nu hat (KM)	2174				nu star (KM)		2033
598					theta hat (KM)	0.00602				theta star (KM)		0.00644
599					80% gamma percentile (KM)	0.167				90% gamma percentile (KM)		0.182
600					95% gamma percentile (KM)	0.196				99% gamma percentile (KM)		0.222

601												
602	**The following statistics are computed using gamma distribution and KM estimates**											
603	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
604					WH	HW					WH	HW
605				95% Approx. Gamma UTL with 95% Coverage	0.203	0.203				95% Approx. Gamma UPL	0.19	0.19
606				95% KM Gamma Percentile	0.189	0.188				95% Gamma USL	0.232	0.233
607												
608	**Lognormal GOF Test on Detected Observations Only**											
609				Shapiro Wilk Test Statistic	0.828		**Shapiro Wilk GOF Test**					
610				5% Shapiro Wilk Critical Value	0.881		Data Not Lognormal at 5% Significance Level					
611				Lilliefors Test Statistic	0.24		**Lilliefors GOF Test**					
612				5% Lilliefors Critical Value	0.22		Data Not Lognormal at 5% Significance Level					
613	Data Not Lognormal at 5% Significance Level											
614												
615	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
616				Mean in Original Scale	0.145					Mean in Log Scale	-1.953	
617				SD in Original Scale	0.0302					SD in Log Scale	0.197	
618				95% UTL95% Coverage	0.214					95% BCA UTL95% Coverage	0.2	
619				95% Bootstrap (%) UTL95% Coverage	0.23					95% UPL (t)	0.198	
620				90% Percentile (z)	0.183					95% Percentile (z)	0.196	
621				99% Percentile (z)	0.224					95% USL	0.252	
622												
623	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
624				KM Mean of Logged Data	-1.967					95% KM UTL (Lognormal)95% Coverage	0.203	
625				KM SD of Logged Data	0.179					95% KM UPL (Lognormal)	0.189	
626				95% KM Percentile Lognormal (z)	0.188					95% KM USL (Lognormal)	0.236	
627												
628	**Background DL/2 Statistics Assuming Lognormal Distribution**											
629				Mean in Original Scale	0.158					Mean in Log Scale	-1.926	
630				SD in Original Scale	0.0645					SD in Log Scale	0.395	
631				95% UTL95% Coverage	0.331					95% UPL (t)	0.285	
632				90% Percentile (z)	0.242					95% Percentile (z)	0.279	
633				99% Percentile (z)	0.365					95% USL	0.462	
634	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
635												
636	**Nonparametric Distribution Free Background Statistics**											
637	Data do not follow a Discernible Distribution (0.05)											
638												
639	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
640				Order of Statistic, r	45					95% UTL with95% Coverage	0.5	
641				Approx, f used to compute achieved CC	1.184					Approximate Actual Confidence Coefficient achieved by UTL	0.677	
642				Approximate Sample Size needed to achieve specified CC	93					95% UPL	0.5	
643				95% USL	0.5					95% KM Chebyshev UPL	0.271	
644												
645	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
646	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
647	and consists of observations collected from clean unimpacted locations.											
648	The use of USL tends to provide a balance between false positives and false negatives provided the data											
649	represents a background data set and when many onsite observations need to be compared with the BTV.											
650												

	A	B	C	D	E	F	G	H	I	J	K	L
651	**IRON, TOTAL**											
652												
653	**General Statistics**											
654	Total Number of Observations					47	Number of Missing Observations					0
655	Number of Distinct Observations					14						
656	Number of Detects					16	Number of Non-Detects					31
657	Number of Distinct Detects					12	Number of Distinct Non-Detects					2
658	Minimum Detect					0.07	Minimum Non-Detect					0.05
659	Maximum Detect					1.8	Maximum Non-Detect					0.06
660	Variance Detected					0.201	Percent Non-Detects					65.96%
661	Mean Detected					0.311	SD Detected					0.448
662	Mean of Detected Logged Data					-1.672	SD of Detected Logged Data					0.883
663												
664	**Critical Values for Background Threshold Values (BTVs)**											
665	Tolerance Factor K (For UTL)					2.074	d2max (for USL)					2.933
666												
667	**Normal GOF Test on Detects Only**											
668	Shapiro Wilk Test Statistic					0.548	**Shapiro Wilk GOF Test**					
669	5% Shapiro Wilk Critical Value					0.887	Data Not Normal at 5% Significance Level					
670	Lilliefors Test Statistic					0.347	**Lilliefors GOF Test**					
671	5% Lilliefors Critical Value					0.213	Data Not Normal at 5% Significance Level					
672	**Data Not Normal at 5% Significance Level**											
673												
674	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
675	KM Mean					0.139	KM SD					0.282
676	95% UTL95% Coverage					0.723	95% KM UPL (t)					0.617
677	90% KM Percentile (z)					0.5	95% KM Percentile (z)					0.602
678	99% KM Percentile (z)					0.794	95% KM USL					0.965
679												
680	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
681	Mean					0.125	SD					0.289
682	95% UTL95% Coverage					0.725	95% UPL (t)					0.616
683	90% Percentile (z)					0.496	95% Percentile (z)					0.601
684	99% Percentile (z)					0.798	95% USL					0.973
685	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
686												
687	**Gamma GOF Tests on Detected Observations Only**											
688	A-D Test Statistic					1.779	**Anderson-Darling GOF Test**					
689	5% A-D Critical Value					0.761	Data Not Gamma Distributed at 5% Significance Level					
690	K-S Test Statistic					0.294	**Kolmogorov-Smirnov GOF**					
691	5% K-S Critical Value					0.221	Data Not Gamma Distributed at 5% Significance Level					
692	**Data Not Gamma Distributed at 5% Significance Level**											
693												
694	**Gamma Statistics on Detected Data Only**											
695	k hat (MLE)					1.131	k star (bias corrected MLE)					0.961
696	Theta hat (MLE)					0.275	Theta star (bias corrected MLE)					0.323
697	nu hat (MLE)					36.2	nu star (bias corrected)					30.74
698	MLE Mean (bias corrected)					0.311						
699	MLE Sd (bias corrected)					0.317	95% Percentile of Chisquare (2kstar)					5.838
700												

	A	B	C	D	E	F	G	H	I	J	K	L
701	**Gamma ROS Statistics using Imputed Non-Detects**											
702	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
703	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)											
704	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
705	This is especially true when the sample size is small.											
706	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
707				Minimum	0.01			Mean	0.112			
708				Maximum	1.8			Median	0.01			
709				SD	0.294			CV	2.614			
710				k hat (MLE)	0.454			k star (bias corrected MLE)	0.439			
711				Theta hat (MLE)	0.247			Theta star (bias corrected MLE)	0.256			
712				nu hat (MLE)	42.67			nu star (bias corrected)	41.28			
713				MLE Mean (bias corrected)	0.112			MLE Sd (bias corrected)	0.17			
714				95% Percentile of Chisquare (2kstar)	3.533			90% Percentile	0.312			
715				95% Percentile	0.452			99% Percentile	0.8			
716	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
717	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
718					WH	HW				WH	HW	
719				95% Approx. Gamma UTL with 95% Coverage	0.522	0.521		95% Approx. Gamma UPL		0.376	0.36	
720				95% Gamma USL	0.986	1.082						
721												
722	**Estimates of Gamma Parameters using KM Estimates**											
723				Mean (KM)	0.139			SD (KM)	0.282			
724				Variance (KM)	0.0794			SE of Mean (KM)	0.0424			
725				k hat (KM)	0.242			k star (KM)	0.241			
726				nu hat (KM)	22.79			nu star (KM)	22.67			
727				theta hat (KM)	0.572			theta star (KM)	0.575			
728				80% gamma percentile (KM)	0.199			90% gamma percentile (KM)	0.417			
729				95% gamma percentile (KM)	0.679			99% gamma percentile (KM)	1.378			
730												
731	**The following statistics are computed using gamma distribution and KM estimates**											
732	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
733					WH	HW				WH	HW	
734				95% Approx. Gamma UTL with 95% Coverage	0.487	0.465		95% Approx. Gamma UPL		0.381	0.359	
735				95% KM Gamma Percentile	0.368	0.346		95% Gamma USL		0.797	0.791	
736												
737	**Lognormal GOF Test on Detected Observations Only**											
738				Shapiro Wilk Test Statistic	0.834			**Shapiro Wilk GOF Test**				
739				5% Shapiro Wilk Critical Value	0.887			Data Not Lognormal at 5% Significance Level				
740				Lilliefors Test Statistic	0.255			**Lilliefors GOF Test**				
741				5% Lilliefors Critical Value	0.213			Data Not Lognormal at 5% Significance Level				
742	Data Not Lognormal at 5% Significance Level											
743												
744	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
745				Mean in Original Scale	0.117			Mean in Log Scale	-3.592			
746				SD in Original Scale	0.292			SD in Log Scale	1.747			
747				95% UTL95% Coverage	1.031			95% BCA UTL95% Coverage	1.32			
748				95% Bootstrap (%) UTL95% Coverage	1.536			95% UPL (t)	0.533			
749				90% Percentile (z)	0.258			95% Percentile (z)	0.487			
750				99% Percentile (z)	1.602			95% USL	4.62			

751												
752	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
753				KM Mean of Logged Data		-2.545		95% KM UTL (Lognormal)95% Coverage				0.413
754				KM SD of Logged Data		0.801		95% KM UPL (Lognormal)				0.306
755				95% KM Percentile Lognormal (z)		0.293		95% KM USL (Lognormal)				0.823
756												
757	**Background DL/2 Statistics Assuming Lognormal Distribution**											
758				Mean in Original Scale		0.125		Mean in Log Scale				-2.886
759				SD in Original Scale		0.289		SD in Log Scale				1.016
760				95% UTL95% Coverage		0.459		95% UPL (t)				0.313
761				90% Percentile (z)		0.205		95% Percentile (z)				0.297
762				99% Percentile (z)		0.593		95% USL				1.098
763	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
764												
765	**Nonparametric Distribution Free Background Statistics**											
766	Data do not follow a Discernible Distribution (0.05)											
767												
768	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
769				Order of Statistic, r		46		95% UTL with95% Coverage				0.92
770				Approx, f used to compute achieved CC		1.211		Approximate Actual Confidence Coefficient achieved by UTL				0.688
771				Approximate Sample Size needed to achieve specified CC		93		95% UPL				0.7
772				95% USL		1.8		95% KM Chebyshev UPL				1.38
773												
774	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
775	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
776	and consists of observations collected from clean unimpacted locations.											
777	The use of USL tends to provide a balance between false positives and false negatives provided the data											
778	represents a background data set and when many onsite observations need to be compared with the BTV.											
779												
780	**IRON, DISSOLVED**											
781												
782	**General Statistics**											
783				Total Number of Observations		12		Number of Missing Observations				34
784				Number of Distinct Observations		2						
785				Number of Detects		0		Number of Non-Detects				12
786				Number of Distinct Detects		0		Number of Distinct Non-Detects				2
787				Minimum Detect		N/A		Minimum Non-Detect				0.05
788				Maximum Detect		N/A		Maximum Non-Detect				0.06
789				Variance Detected		N/A		Percent Non-Detects				100%
790				Mean Detected		N/A		SD Detected				N/A
791				Mean of Detected Logged Data		N/A		SD of Detected Logged Data				N/A
792												
793	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
794	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
795	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
796												
797	The data set for variable IRON, DISSOLVED was not processed!											
798												
799												
800	**MAGNESIUM, TOTAL**											

	A	B	C	D	E	F	G	H	I	J	K	L
801												
802	**General Statistics**											
803					Total Number of Observations	46				Number of Distinct Observations		25
804										Number of Missing Observations		1
805					Minimum	4.6				First Quartile		8.425
806					Second Largest	10.4				Median		8.9
807					Maximum	10.6				Third Quartile		9.45
808					Mean	8.75				SD		1.106
809					Coefficient of Variation	0.126				Skewness		-1.966
810					Mean of logged Data	2.159				SD of logged Data		0.151
811												
812					**Critical Values for Background Threshold Values (BTVs)**							
813					Tolerance Factor K (For UTL)	2.079				d2max (for USL)		2.924
814												
815					**Normal GOF Test**							
816					Shapiro Wilk Test Statistic	0.833				**Shapiro Wilk GOF Test**		
817					5% Shapiro Wilk Critical Value	0.945				Data Not Normal at 5% Significance Level		
818					Lilliefors Test Statistic	0.15				**Lilliefors GOF Test**		
819					5% Lilliefors Critical Value	0.129				Data Not Normal at 5% Significance Level		
820					**Data Not Normal at 5% Significance Level**							
821												
822					**Background Statistics Assuming Normal Distribution**							
823					95% UTL with 95% Coverage	11.05				90% Percentile (z)		10.17
824					95% UPL (t)	10.63				95% Percentile (z)		10.57
825					95% USL	11.98				99% Percentile (z)		11.32
826												
827					**Gamma GOF Test**							
828					A-D Test Statistic	2.714				**Anderson-Darling Gamma GOF Test**		
829					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
830					K-S Test Statistic	0.179				**Kolmogorov-Smirnov Gamma GOF Test**		
831					5% K-S Critical Value	0.13				Data Not Gamma Distributed at 5% Significance Level		
832					**Data Not Gamma Distributed at 5% Significance Level**							
833												
834					**Gamma Statistics**							
835					k hat (MLE)	50.94				k star (bias corrected MLE)		47.63
836					Theta hat (MLE)	0.172				Theta star (bias corrected MLE)		0.184
837					nu hat (MLE)	4687				nu star (bias corrected)		4382
838					MLE Mean (bias corrected)	8.75				MLE Sd (bias corrected)		1.268
839												
840					**Background Statistics Assuming Gamma Distribution**							
841					95% Wilson Hilferty (WH) Approx. Gamma UPL	10.96				90% Percentile		10.41
842					95% Hawkins Wixley (HW) Approx. Gamma UPL	11.01				95% Percentile		10.93
843					95% WH Approx. Gamma UTL with 95% Coverage	11.52				99% Percentile		11.97
844					95% HW Approx. Gamma UTL with 95% Coverage	11.6						
845					95% WH USL	12.82				95% HW USL		12.96
846												
847					**Lognormal GOF Test**							
848					Shapiro Wilk Test Statistic	0.723				**Shapiro Wilk Lognormal GOF Test**		
849					5% Shapiro Wilk Critical Value	0.945				Data Not Lognormal at 5% Significance Level		
850					Lilliefors Test Statistic	0.198				**Lilliefors Lognormal GOF Test**		

851					5% Lilliefors Critical Value	0.129	Data Not Lognormal at 5% Significance Level					
852	Data Not Lognormal at 5% Significance Level											
853												
854	**Background Statistics assuming Lognormal Distribution**											
855					95% UTL with 95% Coverage	11.87				90% Percentile (z)	10.52	
856					95% UPL (t)	11.2				95% Percentile (z)	11.11	
857					95% USL	13.48				99% Percentile (z)	12.32	
858												
859	**Nonparametric Distribution Free Background Statistics**											
860	Data do not follow a Discernible Distribution (0.05)											
861												
862	**Nonparametric Upper Limits for Background Threshold Values**											
863					Order of Statistic, r	45				95% UTL with 95% Coverage	10.4	
864					Approx, f used to compute achieved CC	1.184				Approximate Actual Confidence Coefficient achieved by UTL	0.677	
865										Approximate Sample Size needed to achieve specified CC	93	
866					95% Percentile Bootstrap UTL with 95% Coverage	10.55				95% BCA Bootstrap UTL with 95% Coverage	10.45	
867					95% UPL	10.26				90% Percentile	9.7	
868					90% Chebyshev UPL	12.1				95% Percentile	9.95	
869					95% Chebyshev UPL	13.62				99% Percentile	10.51	
870					95% USL	10.6						
871												
872	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
873	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
874	and consists of observations collected from clean unimpacted locations.											
875	The use of USL tends to provide a balance between false positives and false negatives provided the data											
876	represents a background data set and when many onsite observations need to be compared with the BTV.											
877												
878	**MAGNESIUM, DISSOLVED**											
879												
880	**General Statistics**											
881					Total Number of Observations	12				Number of Distinct Observations	10	
882										Number of Missing Observations	34	
883					Minimum	7.3				First Quartile	8.525	
884					Second Largest	9.8				Median	9.25	
885					Maximum	10.7				Third Quartile	9.6	
886					Mean	9.033				SD	0.992	
887					Coefficient of Variation	0.11				Skewness	-0.491	
888					Mean of logged Data	2.195				SD of logged Data	0.114	
889												
890	**Critical Values for Background Threshold Values (BTVs)**											
891					Tolerance Factor K (For UTL)	2.736				d2max (for USL)	2.285	
892												
893	**Normal GOF Test**											
894					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**					
895					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
896					Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**					
897					5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level					
898	Data appear Normal at 5% Significance Level											
899												
900	**Background Statistics Assuming Normal Distribution**											

901				95% UTL with	95% Coverage	11.75				90% Percentile (z)		10.3
902					95% UPL (t)	10.89				95% Percentile (z)		10.67
903					95% USL	11.3				99% Percentile (z)		11.34
904												
905						**Gamma GOF Test**							
906					A-D Test Statistic	0.486	**Anderson-Darling Gamma GOF Test**					
907					5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level					
908					K-S Test Statistic	0.167	**Kolmogorov-Smirnov Gamma GOF Test**					
909					5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level					
910						Detected data appear Gamma Distributed at 5% Significance Level							
911												
912						**Gamma Statistics**							
913					k hat (MLE)	86.71				k star (bias corrected MLE)		65.09
914					Theta hat (MLE)	0.104				Theta star (bias corrected MLE)		0.139
915					nu hat (MLE)	2081				nu star (bias corrected)		1562
916					MLE Mean (bias corrected)	9.033				MLE Sd (bias corrected)		1.12
917												
918						**Background Statistics Assuming Gamma Distribution**							
919					95% Wilson Hilferty (WH) Approx. Gamma UPL	11.02				90% Percentile		10.49
920					95% Hawkins Wixley (HW) Approx. Gamma UPL	11.04				95% Percentile		10.95
921				95% WH Approx. Gamma UTL with	95% Coverage	12.06				99% Percentile		11.84
922				95% HW Approx. Gamma UTL with	95% Coverage	12.1						
923					95% WH USL	11.51				95% HW USL		11.54
924												
925						**Lognormal GOF Test**							
926					Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk Lognormal GOF Test**					
927					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
928					Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**					
929					5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level					
930						Data appear Lognormal at 5% Significance Level							
931												
932						**Background Statistics assuming Lognormal Distribution**							
933				95% UTL with	95% Coverage	12.26				90% Percentile (z)		10.39
934					95% UPL (t)	11.11				95% Percentile (z)		10.83
935					95% USL	11.64				99% Percentile (z)		11.7
936												
937						**Nonparametric Distribution Free Background Statistics**							
938						Data appear Normal at 5% Significance Level							
939												
940						**Nonparametric Upper Limits for Background Threshold Values**							
941					Order of Statistic, r	12				95% UTL with	95% Coverage	10.7
942					Approx, f used to compute achieved CC	0.632	Approximate Actual Confidence Coefficient achieved by UTL					0.46
943							Approximate Sample Size needed to achieve specified CC					59
944				95% Percentile Bootstrap UTL with	95% Coverage	10.7				95% BCA Bootstrap UTL with	95% Coverage	10.7
945					95% UPL	10.7				90% Percentile		9.78
946					90% Chebyshev UPL	12.13				95% Percentile		10.21
947					95% Chebyshev UPL	13.53				99% Percentile		10.6
948					95% USL	10.7						
949												
950						Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							

951	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
952	and consists of observations collected from clean unimpacted locations.											
953	The use of USL tends to provide a balance between false positives and false negatives provided the data											
954	represents a background data set and when many onsite observations need to be compared with the BTV.											
955												
956	**MANGANESE, TOTAL**											
957												
958	**General Statistics**											
959						Total Number of Observations	47			Number of Missing Observations	0	
960						Number of Distinct Observations	21					
961						Number of Detects	45			Number of Non-Detects	2	
962						Number of Distinct Detects	19			Number of Distinct Non-Detects	2	
963						Minimum Detect	0.04			Minimum Non-Detect	0.0056	
964						Maximum Detect	0.58			Maximum Non-Detect	0.1	
965						Variance Detected	0.00759			Percent Non-Detects	4.255%	
966						Mean Detected	0.27			SD Detected	0.0871	
967						Mean of Detected Logged Data	-1.37			SD of Detected Logged Data	0.4	
968												
969	**Critical Values for Background Threshold Values (BTVs)**											
970						Tolerance Factor K (For UTL)	2.074			d2max (for USL)	2.933	
971												
972	**Normal GOF Test on Detects Only**											
973						Shapiro Wilk Test Statistic	0.818			**Shapiro Wilk GOF Test**		
974						5% Shapiro Wilk Critical Value	0.945			Data Not Normal at 5% Significance Level		
975						Lilliefors Test Statistic	0.188			**Lilliefors GOF Test**		
976						5% Lilliefors Critical Value	0.131			Data Not Normal at 5% Significance Level		
977	Data Not Normal at 5% Significance Level											
978												
979	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
980						KM Mean	0.259			KM SD	0.0989	
981						95% UTL95% Coverage	0.465			95% KM UPL (t)	0.427	
982						90% KM Percentile (z)	0.386			95% KM Percentile (z)	0.422	
983						99% KM Percentile (z)	0.489			95% KM USL	0.549	
984												
985	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
986						Mean	0.26			SD	0.0988	
987						95% UTL95% Coverage	0.465			95% UPL (t)	0.427	
988						90% Percentile (z)	0.386			95% Percentile (z)	0.422	
989						99% Percentile (z)	0.49			95% USL	0.55	
990	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
991												
992	**Gamma GOF Tests on Detected Observations Only**											
993						A-D Test Statistic	3.542			**Anderson-Darling GOF Test**		
994						5% A-D Critical Value	0.75			Data Not Gamma Distributed at 5% Significance Level		
995						K-S Test Statistic	0.237			**Kolmogorov-Smirnov GOF**		
996						5% K-S Critical Value	0.132			Data Not Gamma Distributed at 5% Significance Level		
997	Data Not Gamma Distributed at 5% Significance Level											
998												
999	**Gamma Statistics on Detected Data Only**											
1000						k hat (MLE)	8.247			k star (bias corrected MLE)	7.712	

1001					Theta hat (MLE)	0.0328			Theta star (bias corrected MLE)			0.035
1002					nu hat (MLE)	742.2			nu star (bias corrected)			694.1
1003					MLE Mean (bias corrected)	0.27						
1004					MLE Sd (bias corrected)	0.0973			95% Percentile of Chisquare (2kstar)			25.55
1005												
1006	**Gamma ROS Statistics using Imputed Non-Detects**											
1007	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1008	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)											
1009	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1010	This is especially true when the sample size is small.											
1011	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1012					Minimum	0.04			Mean			0.264
1013					Maximum	0.58			Median			0.26
1014					SD	0.0902			CV			0.342
1015					k hat (MLE)	7.425			k star (bias corrected MLE)			6.965
1016					Theta hat (MLE)	0.0356			Theta star (bias corrected MLE)			0.0379
1017					nu hat (MLE)	697.9			nu star (bias corrected)			654.7
1018					MLE Mean (bias corrected)	0.264			MLE Sd (bias corrected)			0.1
1019					95% Percentile of Chisquare (2kstar)	23.59			90% Percentile			0.398
1020					95% Percentile	0.447			99% Percentile			0.551
1021	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
1022	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
1023					WH	HW					WH	HW
1024				95% Approx. Gamma UTL with 95% Coverage	0.504	0.518			95% Approx. Gamma UPL		0.449	0.458
1025				95% Gamma USL	0.643	0.675						
1026												
1027	**Estimates of Gamma Parameters using KM Estimates**											
1028					Mean (KM)	0.259			SD (KM)			0.0989
1029					Variance (KM)	0.00979			SE of Mean (KM)			0.0146
1030					k hat (KM)	6.87			k star (KM)			6.446
1031					nu hat (KM)	645.8			nu star (KM)			605.9
1032					theta hat (KM)	0.0377			theta star (KM)			0.0402
1033					80% gamma percentile (KM)	0.339			90% gamma percentile (KM)			0.396
1034					95% gamma percentile (KM)	0.447			99% gamma percentile (KM)			0.554
1035												
1036	**The following statistics are computed using gamma distribution and KM estimates**											
1037	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
1038					WH	HW					WH	HW
1039				95% Approx. Gamma UTL with 95% Coverage	0.623	0.683			95% Approx. Gamma UPL		0.534	0.574
1040				95% KM Gamma Percentile	0.523	0.56			95% Gamma USL		0.859	0.99
1041												
1042	**Lognormal GOF Test on Detected Observations Only**											
1043					Shapiro Wilk Test Statistic	0.738			**Shapiro Wilk GOF Test**			
1044					5% Shapiro Wilk Critical Value	0.945			Data Not Lognormal at 5% Significance Level			
1045					Lilliefors Test Statistic	0.262			**Lilliefors GOF Test**			
1046					5% Lilliefors Critical Value	0.131			Data Not Lognormal at 5% Significance Level			
1047	Data Not Lognormal at 5% Significance Level											
1048												
1049	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
1050					Mean in Original Scale	0.264			Mean in Log Scale			-1.403

1051					SD in Original Scale	0.0907					SD in Log Scale	0.421
1052					95% UTL95% Coverage	0.589					95% BCA UTL95% Coverage	0.55
1053					95% Bootstrap (%) UTL95% Coverage	0.571					95% UPL (t)	0.502
1054					90% Percentile (z)	0.422					95% Percentile (z)	0.491
1055					99% Percentile (z)	0.655					95% USL	0.845
1056												
1057					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1058					KM Mean of Logged Data	-1.512					95% KM UTL (Lognormal)95% Coverage	1.144
1059					KM SD of Logged Data	0.794					95% KM UPL (Lognormal)	0.848
1060					95% KM Percentile Lognormal (z)	0.814					95% KM USL (Lognormal)	2.262
1061												
1062					**Background DL/2 Statistics Assuming Lognormal Distribution**							
1063					Mean in Original Scale	0.26					Mean in Log Scale	-1.501
1064					SD in Original Scale	0.0988					SD in Log Scale	0.797
1065					95% UTL95% Coverage	1.163					95% UPL (t)	0.861
1066					90% Percentile (z)	0.619					95% Percentile (z)	0.826
1067					99% Percentile (z)	1.422					95% USL	2.305
1068					DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.							
1069												
1070					**Nonparametric Distribution Free Background Statistics**							
1071					Data do not follow a Discernible Distribution (0.05)							
1072												
1073					**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**							
1074					Order of Statistic, r	46					95% UTL with95% Coverage	0.55
1075					Approx, f used to compute achieved CC	1.211					Approximate Actual Confidence Coefficient achieved by UTL	0.688
1076					Approximate Sample Size needed to achieve specified CC	93					95% UPL	0.466
1077					95% USL	0.58					95% KM Chebyshev UPL	0.695
1078												
1079					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
1080					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
1081					and consists of observations collected from clean unimpacted locations.							
1082					The use of USL tends to provide a balance between false positives and false negatives provided the data							
1083					represents a background data set and when many onsite observations need to be compared with the BTV.							
1084												
1085	**MANGANESE, DISSOLVED**											
1086												
1087	**General Statistics**											
1088					Total Number of Observations	12					Number of Distinct Observations	9
1089											Number of Missing Observations	34
1090					Minimum	0.11					First Quartile	0.238
1091					Second Largest	0.32					Median	0.255
1092					Maximum	0.57					Third Quartile	0.31
1093					Mean	0.281					SD	0.108
1094					Coefficient of Variation	0.385					Skewness	1.616
1095					Mean of logged Data	-1.333					SD of logged Data	0.377
1096												
1097					**Critical Values for Background Threshold Values (BTVs)**							
1098					Tolerance Factor K (For UTL)	2.736					d2max (for USL)	2.285
1099												
1100					**Normal GOF Test**							

1101					Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**					
1102					5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level					
1103					Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**					
1104					5% Lilliefors Critical Value	0.243	Data Not Normal at 5% Significance Level					
1105					Data Not Normal at 5% Significance Level							
1106												
1107					**Background Statistics Assuming Normal Distribution**							
1108					95% UTL with 95% Coverage	0.577				90% Percentile (z)	0.419	
1109					95% UPL (t)	0.483				95% Percentile (z)	0.459	
1110					95% USL	0.528				99% Percentile (z)	0.532	
1111												
1112					**Gamma GOF Test**							
1113					A-D Test Statistic	0.71	**Anderson-Darling Gamma GOF Test**					
1114					5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level					
1115					K-S Test Statistic	0.227	**Kolmogorov-Smirnov Gamma GOF Test**					
1116					5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level					
1117					Detected data appear Gamma Distributed at 5% Significance Level							
1118												
1119					**Gamma Statistics**							
1120					k hat (MLE)	8.062				k star (bias corrected MLE)	6.102	
1121					Theta hat (MLE)	0.0348				Theta star (bias corrected MLE)	0.046	
1122					nu hat (MLE)	193.5				nu star (bias corrected)	146.5	
1123					MLE Mean (bias corrected)	0.281				MLE Sd (bias corrected)	0.114	
1124												
1125					**Background Statistics Assuming Gamma Distribution**							
1126					95% Wilson Hilferty (WH) Approx. Gamma UPL	0.503				90% Percentile	0.433	
1127					95% Hawkins Wixley (HW) Approx. Gamma UPL	0.509				95% Percentile	0.49	
1128					95% WH Approx. Gamma UTL with 95% Coverage	0.647				99% Percentile	0.61	
1129					95% HW Approx. Gamma UTL with 95% Coverage	0.664						
1130					95% WH USL	0.569				95% HW USL	0.58	
1131												
1132					**Lognormal GOF Test**							
1133					Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk Lognormal GOF Test**					
1134					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
1135					Lilliefors Test Statistic	0.22	**Lilliefors Lognormal GOF Test**					
1136					5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level					
1137					Data appear Lognormal at 5% Significance Level							
1138												
1139					**Background Statistics assuming Lognormal Distribution**							
1140					95% UTL with 95% Coverage	0.739				90% Percentile (z)	0.427	
1141					95% UPL (t)	0.533				95% Percentile (z)	0.49	
1142					95% USL	0.623				99% Percentile (z)	0.633	
1143												
1144					**Nonparametric Distribution Free Background Statistics**							
1145					Data appear Gamma Distributed at 5% Significance Level							
1146												
1147					**Nonparametric Upper Limits for Background Threshold Values**							
1148					Order of Statistic, r	12				95% UTL with 95% Coverage	0.57	
1149					Approx, f used to compute achieved CC	0.632				Approximate Actual Confidence Coefficient achieved by UTL	0.46	
1150										Approximate Sample Size needed to achieve specified CC	59	

1151	95% Percentile Bootstrap UTL with 95% Coverage					0.57	95% BCA Bootstrap UTL with 95% Coverage					0.57
1152	95% UPL					0.57	90% Percentile					0.319
1153	90% Chebyshev UPL					0.618	95% Percentile					0.433
1154	95% Chebyshev UPL					0.771	99% Percentile					0.543
1155	95% USL					0.57						
1156												
1157	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1158	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1159	and consists of observations collected from clean unimpacted locations.											
1160	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1161	represents a background data set and when many onsite observations need to be compared with the BTV.											
1162												
1163	**NITRATE-NITROGEN**											
1164												
1165	**General Statistics**											
1166	Total Number of Observations					46	Number of Distinct Observations					38
1167							Number of Missing Observations					1
1168	Minimum					4.9	First Quartile					19.85
1169	Second Largest					29	Median					22.5
1170	Maximum					31.7	Third Quartile					25.88
1171	Mean					21.06	SD					6.261
1172	Coefficient of Variation					0.297	Skewness					-1.009
1173	Mean of logged Data					2.983	SD of logged Data					0.406
1174												
1175	**Critical Values for Background Threshold Values (BTVs)**											
1176	Tolerance Factor K (For UTL)					2.079	d2max (for USL)					2.924
1177												
1178	**Normal GOF Test**											
1179	Shapiro Wilk Test Statistic					0.898	**Shapiro Wilk GOF Test**					
1180	5% Shapiro Wilk Critical Value					0.945	Data Not Normal at 5% Significance Level					
1181	Lilliefors Test Statistic					0.181	**Lilliefors GOF Test**					
1182	5% Lilliefors Critical Value					0.129	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					34.08	90% Percentile (z)					29.09
1187	95% UPL (t)					31.69	95% Percentile (z)					31.36
1188	95% USL					39.37	99% Percentile (z)					35.63
1189												
1190	**Gamma GOF Test**											
1191	A-D Test Statistic					3.025	**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					0.131	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)					7.935	k star (bias corrected MLE)					7.432
1199	Theta hat (MLE)					2.655	Theta star (bias corrected MLE)					2.834
1200	nu hat (MLE)					730	nu star (bias corrected)					683.7

1201	MLE Mean (bias corrected)					21.06	MLE Sd (bias corrected)					7.726
1202												
1203	**Background Statistics Assuming Gamma Distribution**											
1204	95% Wilson Hilferty (WH) Approx. Gamma UPL					35.42	90% Percentile					31.37
1205	95% Hawkins Wixley (HW) Approx. Gamma UPL					36.2	95% Percentile					35.17
1206	95% WH Approx. Gamma UTL with 95% Coverage					39.65	99% Percentile					43.06
1207	95% HW Approx. Gamma UTL with 95% Coverage					40.86						
1208	95% WH USL					50.16	95% HW USL					52.74
1209												
1210	**Lognormal GOF Test**											
1211	Shapiro Wilk Test Statistic					0.782	**Shapiro Wilk Lognormal GOF Test**					
1212	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
1213	Lilliefors Test Statistic					0.263	**Lilliefors Lognormal GOF Test**					
1214	5% Lilliefors Critical Value					0.129	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					45.97	90% Percentile (z)					33.24
1219	95% UPL (t)					39.36	95% Percentile (z)					38.53
1220	95% USL					64.79	99% Percentile (z)					50.82
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					45	95% UTL with 95% Coverage					29
1227	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
1228							Approximate Sample Size needed to achieve specified CC					93
1229	95% Percentile Bootstrap UTL with 95% Coverage					31.03	95% BCA Bootstrap UTL with 95% Coverage					30.73
1230	95% UPL					28.58	90% Percentile					26.7
1231	90% Chebyshev UPL					40.05	95% Percentile					27.63
1232	95% Chebyshev UPL					48.65	99% Percentile					30.49
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**											
1242												
1243	**General Statistics**											
1244	Total Number of Observations					46	Number of Distinct Observations					39
1245							Number of Missing Observations					1
1246	Minimum					3.91	First Quartile					4.55
1247	Second Largest					6.55	Median					4.66
1248	Maximum					7.44	Third Quartile					5.143
1249	Mean					4.963	SD					0.669
1250	Coefficient of Variation					0.135	Skewness					1.711

	A	B	C	D	E	F	G	H	I	J	K	L
1251					Mean of logged Data	1.594				SD of logged Data		0.124
1252												
1253					Critical Values for Background Threshold Values (BTVs)							
1254					Tolerance Factor K (For UTL)	2.079				d2max (for USL)		2.924
1255												
1256					Normal GOF Test							
1257					Shapiro Wilk Test Statistic	0.834			Shapiro Wilk GOF Test			
1258					5% Shapiro Wilk Critical Value	0.945			Data Not Normal at 5% Significance Level			
1259					Lilliefors Test Statistic	0.196			Lilliefors GOF Test			
1260					5% Lilliefors Critical Value	0.129			Data Not Normal at 5% Significance Level			
1261					Data Not Normal at 5% Significance Level							
1262												
1263					Background Statistics Assuming Normal Distribution							
1264				95% UTL with	95% Coverage	6.353				90% Percentile (z)		5.82
1265					95% UPL (t)	6.098				95% Percentile (z)		6.063
1266					95% USL	6.918				99% Percentile (z)		6.518
1267												
1268					Gamma GOF Test							
1269					A-D Test Statistic	2.374			Anderson-Darling Gamma GOF Test			
1270					5% A-D Critical Value	0.747			Data Not Gamma Distributed at 5% Significance Level			
1271					K-S Test Statistic	0.197			Kolmogorov-Smirnov Gamma GOF Test			
1272					5% K-S Critical Value	0.13			Data Not Gamma Distributed at 5% Significance Level			
1273					Data Not Gamma Distributed at 5% Significance Level							
1274												
1275					Gamma Statistics							
1276					k hat (MLE)	63.2				k star (bias corrected MLE)		59.09
1277					Theta hat (MLE)	0.0785				Theta star (bias corrected MLE)		0.084
1278					nu hat (MLE)	5814				nu star (bias corrected)		5436
1279					MLE Mean (bias corrected)	4.963				MLE Sd (bias corrected)		0.646
1280												
1281					Background Statistics Assuming Gamma Distribution							
1282					95% Wilson Hilferty (WH) Approx. Gamma UPL	6.082				90% Percentile		5.806
1283					95% Hawkins Wixley (HW) Approx. Gamma UPL	6.081				95% Percentile		6.07
1284				95% WH Approx. Gamma UTL with	95% Coverage	6.362				99% Percentile		6.587
1285				95% HW Approx. Gamma UTL with	95% Coverage	6.365						
1286					95% WH USL	7.013				95% HW USL		7.027
1287												
1288					Lognormal GOF Test							
1289					Shapiro Wilk Test Statistic	0.879			Shapiro Wilk Lognormal GOF Test			
1290					5% Shapiro Wilk Critical Value	0.945			Data Not Lognormal at 5% Significance Level			
1291					Lilliefors Test Statistic	0.193			Lilliefors Lognormal GOF Test			
1292					5% Lilliefors Critical Value	0.129			Data Not Lognormal at 5% Significance Level			
1293					Data Not Lognormal at 5% Significance Level							
1294												
1295					Background Statistics assuming Lognormal Distribution							
1296				95% UTL with	95% Coverage	6.372				90% Percentile (z)		5.772
1297					95% UPL (t)	6.078				95% Percentile (z)		6.038
1298					95% USL	7.076				99% Percentile (z)		6.571
1299												
1300					Nonparametric Distribution Free Background Statistics							

1301	Data do not follow a Discernible Distribution (0.05)											
1302												
1303	Nonparametric Upper Limits for Background Threshold Values											
1304					Order of Statistic, r	45			95% UTL with 95% Coverage			6.55
1305					Approx, f used to compute achieved CC	1.184			Approximate Actual Confidence Coefficient achieved by UTL			0.677
1306									Approximate Sample Size needed to achieve specified CC			93
1307					95% Percentile Bootstrap UTL with 95% Coverage	7.175			95% BCA Bootstrap UTL with 95% Coverage			7.068
1308					95% UPL	6.491			90% Percentile			5.8
1309					90% Chebyshev UPL	6.99			95% Percentile			6.273
1310					95% Chebyshev UPL	7.909			99% Percentile			7.04
1311					95% USL	7.44						
1312												
1313	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1314	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1315	and consists of observations collected from clean unimpacted locations.											
1316	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1317	represents a background data set and when many onsite observations need to be compared with the BTV.											
1318												
1319	pH-LAB											
1320												
1321	General Statistics											
1322					Total Number of Observations	46			Number of Distinct Observations			41
1323									Number of Missing Observations			1
1324					Minimum	4.81			First Quartile			5.36
1325					Second Largest	9.33			Median			5.57
1326					Maximum	9.42			Third Quartile			5.763
1327					Mean	5.817			SD			0.968
1328					Coefficient of Variation	0.166			Skewness			2.521
1329					Mean of logged Data	1.75			SD of logged Data			0.143
1330												
1331	Critical Values for Background Threshold Values (BTVs)											
1332					Tolerance Factor K (For UTL)	2.079			d2max (for USL)			2.924
1333												
1334	Normal GOF Test											
1335					Shapiro Wilk Test Statistic	0.694			Shapiro Wilk GOF Test			
1336					5% Shapiro Wilk Critical Value	0.945			Data Not Normal at 5% Significance Level			
1337					Lilliefors Test Statistic	0.291			Lilliefors GOF Test			
1338					5% Lilliefors Critical Value	0.129			Data Not Normal at 5% Significance Level			
1339	Data Not Normal at 5% Significance Level											
1340												
1341	Background Statistics Assuming Normal Distribution											
1342					95% UTL with 95% Coverage	7.83			90% Percentile (z)			7.058
1343					95% UPL (t)	7.46			95% Percentile (z)			7.409
1344					95% USL	8.648			99% Percentile (z)			8.069
1345												
1346	Gamma GOF Test											
1347					A-D Test Statistic	4.126			Anderson-Darling Gamma GOF Test			
1348					5% A-D Critical Value	0.748			Data Not Gamma Distributed at 5% Significance Level			
1349					K-S Test Statistic	0.269			Kolmogorov-Smirnov Gamma GOF Test			
1350					5% K-S Critical Value	0.13			Data Not Gamma Distributed at 5% Significance Level			

1351	Data Not Gamma Distributed at 5% Significance Level											
1352												
1353	Gamma Statistics											
1354						k hat (MLE)	45.34			k star (bias corrected MLE)	42.4	
1355						Theta hat (MLE)	0.128			Theta star (bias corrected MLE)	0.137	
1356						nu hat (MLE)	4171			nu star (bias corrected)	3900	
1357						MLE Mean (bias corrected)	5.817			MLE Sd (bias corrected)	0.893	
1358												
1359	Background Statistics Assuming Gamma Distribution											
1360						95% Wilson Hilferty (WH) Approx. Gamma UPL	7.376			90% Percentile	6.987	
1361						95% Hawkins Wixley (HW) Approx. Gamma UPL	7.366			95% Percentile	7.36	
1362						95% WH Approx. Gamma UTL with 95% Coverage	7.773			99% Percentile	8.094	
1363						95% HW Approx. Gamma UTL with 95% Coverage	7.767					
1364						95% WH USL	8.702			95% HW USL	8.712	
1365												
1366	Lognormal GOF Test											
1367						Shapiro Wilk Test Statistic	0.769			Shapiro Wilk Lognormal GOF Test		
1368						5% Shapiro Wilk Critical Value	0.945			Data Not Lognormal at 5% Significance Level		
1369						Lilliefors Test Statistic	0.258			Lilliefors Lognormal GOF Test		
1370						5% Lilliefors Critical Value	0.129			Data Not Lognormal at 5% Significance Level		
1371	Data Not Lognormal at 5% Significance Level											
1372												
1373	Background Statistics assuming Lognormal Distribution											
1374						95% UTL with 95% Coverage	7.751			90% Percentile (z)	6.913	
1375						95% UPL (t)	7.338			95% Percentile (z)	7.283	
1376						95% USL	8.749			99% Percentile (z)	8.03	
1377												
1378	Nonparametric Distribution Free Background Statistics											
1379	Data do not follow a Discernible Distribution (0.05)											
1380												
1381	Nonparametric Upper Limits for Background Threshold Values											
1382						Order of Statistic, r	45			95% UTL with 95% Coverage	9.33	
1383						Approx, f used to compute achieved CC	1.184			Approximate Actual Confidence Coefficient achieved by UTL	0.677	
1384										Approximate Sample Size needed to achieve specified CC	93	
1385						95% Percentile Bootstrap UTL with 95% Coverage	9.398			95% BCA Bootstrap UTL with 95% Coverage	9.33	
1386						95% UPL	8.798			90% Percentile	6.845	
1387						90% Chebyshev UPL	8.753			95% Percentile	7.668	
1388						95% Chebyshev UPL	10.08			99% Percentile	9.38	
1389						95% USL	9.42					
1390												
1391	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1392	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1393	and consists of observations collected from clean unimpacted locations.											
1394	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1395	represents a background data set and when many onsite observations need to be compared with the BTV.											
1396												
1397	POTASSIUM, TOTAL											
1398												
1399	General Statistics											
1400						Total Number of Observations	45			Number of Distinct Observations	17	

1401											Number of Missing Observations	2
1402					Minimum	0.95					First Quartile	1.2
1403					Second Largest	14.4					Median	1.3
1404					Maximum	132					Third Quartile	1.9
1405					Mean	5.066					SD	19.53
1406					Coefficient of Variation	3.855					Skewness	6.529
1407					Mean of logged Data	0.583					SD of logged Data	0.901
1408												
1409					**Critical Values for Background Threshold Values (BTVs)**							
1410					Tolerance Factor K (For UTL)	2.085					d2max (for USL)	2.915
1411												
1412					**Normal GOF Test**							
1413					Shapiro Wilk Test Statistic	0.214	**Shapiro Wilk GOF Test**					
1414					5% Shapiro Wilk Critical Value	0.945	Data Not Normal at 5% Significance Level					
1415					Lilliefors Test Statistic	0.429	**Lilliefors GOF Test**					
1416					5% Lilliefors Critical Value	0.131	Data Not Normal at 5% Significance Level					
1417					Data Not Normal at 5% Significance Level							
1418												
1419					**Background Statistics Assuming Normal Distribution**							
1420					95% UTL with 95% Coverage	45.78					90% Percentile (z)	30.09
1421					95% UPL (t)	38.24					95% Percentile (z)	37.19
1422					95% USL	62					99% Percentile (z)	50.49
1423												
1424					**Gamma GOF Test**							
1425					A-D Test Statistic	10.08	**Anderson-Darling Gamma GOF Test**					
1426					5% A-D Critical Value	0.804	Data Not Gamma Distributed at 5% Significance Level					
1427					K-S Test Statistic	0.377	**Kolmogorov-Smirnov Gamma GOF Test**					
1428					5% K-S Critical Value	0.138	Data Not Gamma Distributed at 5% Significance Level					
1429					Data Not Gamma Distributed at 5% Significance Level							
1430												
1431					**Gamma Statistics**							
1432					k hat (MLE)	0.595					k star (bias corrected MLE)	0.57
1433					Theta hat (MLE)	8.512					Theta star (bias corrected MLE)	8.883
1434					nu hat (MLE)	53.56					nu star (bias corrected)	51.32
1435					MLE Mean (bias corrected)	5.066					MLE Sd (bias corrected)	6.708
1436												
1437					**Background Statistics Assuming Gamma Distribution**							
1438					95% Wilson Hilferty (WH) Approx. Gamma UPL	13.99					90% Percentile	13.32
1439					95% Hawkins Wixley (HW) Approx. Gamma UPL	12.1					95% Percentile	18.56
1440					95% WH Approx. Gamma UTL with 95% Coverage	18.9					99% Percentile	31.29
1441					95% HW Approx. Gamma UTL with 95% Coverage	16.58						
1442					95% WH USL	33.08					95% HW USL	30.28
1443												
1444					**Lognormal GOF Test**							
1445					Shapiro Wilk Test Statistic	0.62	**Shapiro Wilk Lognormal GOF Test**					
1446					5% Shapiro Wilk Critical Value	0.945	Data Not Lognormal at 5% Significance Level					
1447					Lilliefors Test Statistic	0.274	**Lilliefors Lognormal GOF Test**					
1448					5% Lilliefors Critical Value	0.131	Data Not Lognormal at 5% Significance Level					
1449					Data Not Lognormal at 5% Significance Level							
1450												

1451	**Background Statistics assuming Lognormal Distribution**											
1452				95% UTL with	95% Coverage	11.73				90% Percentile (z)	5.685	
1453					95% UPL (t)	8.28				95% Percentile (z)	7.887	
1454					95% USL	24.78				99% Percentile (z)	14.58	
1455												
1456	**Nonparametric Distribution Free Background Statistics**											
1457	Data do not follow a Discernible Distribution (0.05)											
1458												
1459	**Nonparametric Upper Limits for Background Threshold Values**											
1460					Order of Statistic, r	44				95% UTL with 95% Coverage	14.4	
1461					Approx, f used to compute achieved CC	1.158				Approximate Actual Confidence Coefficient achieved by UTL	0.665	
1462										Approximate Sample Size needed to achieve specified CC	93	
1463				95% Percentile Bootstrap UTL with	95% Coverage	108.5				95% BCA Bootstrap UTL with 95% Coverage	107.8	
1464					95% UPL	13.41				90% Percentile	5.02	
1465					90% Chebyshev UPL	64.3				95% Percentile	10.28	
1466					95% Chebyshev UPL	91.13				99% Percentile	80.26	
1467					95% USL	132						
1468												
1469	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1470	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1471	and consists of observations collected from clean unimpacted locations.											
1472	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1473	represents a background data set and when many onsite observations need to be compared with the BTV.											
1474												
1475	**POTASSIUM, DISSOLVED**											
1476												
1477	**General Statistics**											
1478					Total Number of Observations	12				Number of Distinct Observations	8	
1479										Number of Missing Observations	34	
1480					Minimum	0.95				First Quartile	1.075	
1481					Second Largest	1.6				Median	1.2	
1482					Maximum	11.4				Third Quartile	1.45	
1483					Mean	2.071				SD	2.946	
1484					Coefficient of Variation	1.423				Skewness	3.43	
1485					Mean of logged Data	0.373				SD of logged Data	0.672	
1486												
1487	**Critical Values for Background Threshold Values (BTVs)**											
1488					Tolerance Factor K (For UTL)	2.736				d2max (for USL)	2.285	
1489												
1490	**Normal GOF Test**											
1491					Shapiro Wilk Test Statistic	0.393				**Shapiro Wilk GOF Test**		
1492					5% Shapiro Wilk Critical Value	0.859				Data Not Normal at 5% Significance Level		
1493					Lilliefors Test Statistic	0.48				**Lilliefors GOF Test**		
1494					5% Lilliefors Critical Value	0.243				Data Not Normal at 5% Significance Level		
1495	Data Not Normal at 5% Significance Level											
1496												
1497	**Background Statistics Assuming Normal Distribution**											
1498				95% UTL with	95% Coverage	10.13				90% Percentile (z)	5.846	
1499					95% UPL (t)	7.578				95% Percentile (z)	6.917	
1500					95% USL	8.802				99% Percentile (z)	8.924	

1501												
1502	**Gamma GOF Test**											
1503					A-D Test Statistic	2.705	**Anderson-Darling Gamma GOF Test**					
1504					5% A-D Critical Value	0.745	Data Not Gamma Distributed at 5% Significance Level					
1505					K-S Test Statistic	0.43	**Kolmogorov-Smirnov Gamma GOF Test**					
1506					5% K-S Critical Value	0.249	Data Not Gamma Distributed at 5% Significance Level					
1507	Data Not Gamma Distributed at 5% Significance Level											
1508												
1509	**Gamma Statistics**											
1510					k hat (MLE)	1.554	k star (bias corrected MLE)	1.221				
1511					Theta hat (MLE)	1.332	Theta star (bias corrected MLE)	1.695				
1512					nu hat (MLE)	37.31	nu star (bias corrected)	29.31				
1513					MLE Mean (bias corrected)	2.071	MLE Sd (bias corrected)	1.874				
1514												
1515	**Background Statistics Assuming Gamma Distribution**											
1516				95% Wilson Hilferty (WH) Approx. Gamma UPL		5.973	90% Percentile	4.538				
1517				95% Hawkins Wixley (HW) Approx. Gamma UPL		5.75	95% Percentile	5.785				
1518				95% WH Approx. Gamma UTL with	95% Coverage	9.471	99% Percentile	8.638				
1519				95% HW Approx. Gamma UTL with	95% Coverage	9.378						
1520					95% WH USL	7.517	95% HW USL	7.325				
1521												
1522	**Lognormal GOF Test**											
1523					Shapiro Wilk Test Statistic	0.569	**Shapiro Wilk Lognormal GOF Test**					
1524					5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level					
1525					Lilliefors Test Statistic	0.359	**Lilliefors Lognormal GOF Test**					
1526					5% Lilliefors Critical Value	0.243	Data Not Lognormal at 5% Significance Level					
1527	Data Not Lognormal at 5% Significance Level											
1528												
1529	**Background Statistics assuming Lognormal Distribution**											
1530				95% UTL with	95% Coverage	9.124	90% Percentile (z)	3.435				
1531					95% UPL (t)	5.097	95% Percentile (z)	4.384				
1532					95% USL	6.739	99% Percentile (z)	6.929				
1533												
1534	**Nonparametric Distribution Free Background Statistics**											
1535	Data do not follow a Discernible Distribution (0.05)											
1536												
1537	**Nonparametric Upper Limits for Background Threshold Values**											
1538					Order of Statistic, r	12	95% UTL with	95% Coverage	11.4			
1539					Approx, f used to compute achieved CC	0.632	Approximate Actual Confidence Coefficient achieved by UTL		0.46			
1540							Approximate Sample Size needed to achieve specified CC		59			
1541				95% Percentile Bootstrap UTL with	95% Coverage	11.4	95% BCA Bootstrap UTL with	95% Coverage	11.4			
1542					95% UPL	11.4	90% Percentile	1.6				
1543					90% Chebyshev UPL	11.27	95% Percentile	6.01				
1544					95% Chebyshev UPL	15.44	99% Percentile	10.32				
1545					95% USL	11.4						
1546												
1547	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1548	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1549	and consists of observations collected from clean unimpacted locations.											
1550	The use of USL tends to provide a balance between false positives and false negatives provided the data											

	A	B	C	D	E	F	G	H	I	J	K	L
1551	represents a background data set and when many onsite observations need to be compared with the BTV.											
1552												
1553	**SODIUM, TOTAL**											
1554												
1555	**General Statistics**											
1556					Total Number of Observations	45				Number of Distinct Observations	35	
1557										Number of Missing Observations	2	
1558					Minimum	13.3				First Quartile	14.4	
1559					Second Largest	27.5				Median	15.5	
1560					Maximum	54.2				Third Quartile	18.5	
1561					Mean	17.5				SD	6.329	
1562					Coefficient of Variation	0.362				Skewness	4.712	
1563					Mean of logged Data	2.826				SD of logged Data	0.24	
1564												
1565	**Critical Values for Background Threshold Values (BTVs)**											
1566					Tolerance Factor K (For UTL)	2.085				d2max (for USL)	2.915	
1567												
1568	**Normal GOF Test**											
1569					Shapiro Wilk Test Statistic	0.524				**Shapiro Wilk GOF Test**		
1570					5% Shapiro Wilk Critical Value	0.945				Data Not Normal at 5% Significance Level		
1571					Lilliefors Test Statistic	0.253				**Lilliefors GOF Test**		
1572					5% Lilliefors Critical Value	0.131				Data Not Normal at 5% Significance Level		
1573	Data Not Normal at 5% Significance Level											
1574												
1575	**Background Statistics Assuming Normal Distribution**											
1576					95% UTL with 95% Coverage	30.7				90% Percentile (z)	25.61	
1577					95% UPL (t)	28.25				95% Percentile (z)	27.91	
1578					95% USL	35.95				99% Percentile (z)	32.22	
1579												
1580	**Gamma GOF Test**											
1581					A-D Test Statistic	3.717				**Anderson-Darling Gamma GOF Test**		
1582					5% A-D Critical Value	0.748				Data Not Gamma Distributed at 5% Significance Level		
1583					K-S Test Statistic	0.193				**Kolmogorov-Smirnov Gamma GOF Test**		
1584					5% K-S Critical Value	0.132				Data Not Gamma Distributed at 5% Significance Level		
1585	Data Not Gamma Distributed at 5% Significance Level											
1586												
1587	**Gamma Statistics**											
1588					k hat (MLE)	14				k star (bias corrected MLE)	13.08	
1589					Theta hat (MLE)	1.25				Theta star (bias corrected MLE)	1.338	
1590					nu hat (MLE)	1260				nu star (bias corrected)	1178	
1591					MLE Mean (bias corrected)	17.5				MLE Sd (bias corrected)	4.838	
1592												
1593	**Background Statistics Assuming Gamma Distribution**											
1594					95% Wilson Hilferty (WH) Approx. Gamma UPL	26.16				90% Percentile	23.92	
1595					95% Hawkins Wixley (HW) Approx. Gamma UPL	25.95				95% Percentile	26.14	
1596					95% WH Approx. Gamma UTL with 95% Coverage	28.61				99% Percentile	30.67	
1597					95% HW Approx. Gamma UTL with 95% Coverage	28.4						
1598					95% WH USL	34.37				95% HW USL	34.24	
1599												
1600	**Lognormal GOF Test**											

1601					Shapiro Wilk Test Statistic	0.733	**Shapiro Wilk Lognormal GOF Test**					
1602					5% Shapiro Wilk Critical Value	0.945	Data Not Lognormal at 5% Significance Level					
1603					Lilliefors Test Statistic	0.17	**Lilliefors Lognormal GOF Test**					
1604					5% Lilliefors Critical Value	0.131	Data Not Lognormal at 5% Significance Level					
1605	Data Not Lognormal at 5% Significance Level											
1606												
1607	**Background Statistics assuming Lognormal Distribution**											
1608				95% UTL with	95% Coverage	27.84	90% Percentile (z)	22.96				
1609					95% UPL (t)	25.38	95% Percentile (z)	25.05				
1610					95% USL	33.99	99% Percentile (z)	29.51				
1611												
1612	**Nonparametric Distribution Free Background Statistics**											
1613	Data do not follow a Discernible Distribution (0.05)											
1614												
1615	**Nonparametric Upper Limits for Background Threshold Values**											
1616					Order of Statistic, r	44	95% UTL with	95% Coverage	27.5			
1617					Approx, f used to compute achieved CC	1.158	Approximate Actual Confidence Coefficient achieved by UTL		0.665			
1618							Approximate Sample Size needed to achieve specified CC		93			
1619				95% Percentile Bootstrap UTL with	95% Coverage	48.86	95% BCA Bootstrap UTL with	95% Coverage	48.86			
1620					95% UPL	26.45	90% Percentile		20.18			
1621					90% Chebyshev UPL	36.7	95% Percentile		23.66			
1622					95% Chebyshev UPL	45.39	99% Percentile		42.45			
1623					95% USL	54.2						
1624												
1625	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1626	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1627	and consists of observations collected from clean unimpacted locations.											
1628	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1629	represents a background data set and when many onsite observations need to be compared with the BTV.											
1630												
1631	**SODIUM, DISSOLVED**											
1632												
1633	**General Statistics**											
1634					Total Number of Observations	12	Number of Distinct Observations		10			
1635							Number of Missing Observations		34			
1636					Minimum	13	First Quartile		14.1			
1637					Second Largest	20.6	Median		16.2			
1638					Maximum	20.9	Third Quartile		18.38			
1639					Mean	16.45	SD		2.765			
1640					Coefficient of Variation	0.168	Skewness		0.485			
1641					Mean of logged Data	2.788	SD of logged Data		0.165			
1642												
1643	**Critical Values for Background Threshold Values (BTVs)**											
1644					Tolerance Factor K (For UTL)	2.736	d2max (for USL)		2.285			
1645												
1646	**Normal GOF Test**											
1647					Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**					
1648					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
1649					Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**					
1650					5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level					

1651	Data appear Normal at 5% Significance Level											
1652												
1653	Background Statistics Assuming Normal Distribution											
1654				95% UTL with	95% Coverage	24.02			90% Percentile (z)	19.99		
1655				95% UPL (t)		21.62			95% Percentile (z)	21		
1656				95% USL		22.77			99% Percentile (z)	22.88		
1657												
1658	Gamma GOF Test											
1659				A-D Test Statistic		0.45	Anderson-Darling Gamma GOF Test					
1660				5% A-D Critical Value		0.73	Detected data appear Gamma Distributed at 5% Significance Level					
1661				K-S Test Statistic		0.207	Kolmogorov-Smirnov Gamma GOF Test					
1662				5% K-S Critical Value		0.245	Detected data appear Gamma Distributed at 5% Significance Level					
1663	Detected data appear Gamma Distributed at 5% Significance Level											
1664												
1665	Gamma Statistics											
1666				k hat (MLE)		39.71			k star (bias corrected MLE)	29.84		
1667				Theta hat (MLE)		0.414			Theta star (bias corrected MLE)	0.551		
1668				nu hat (MLE)		953.1			nu star (bias corrected)	716.1		
1669				MLE Mean (bias corrected)		16.45			MLE Sd (bias corrected)	3.011		
1670												
1671	Background Statistics Assuming Gamma Distribution											
1672				95% Wilson Hilferty (WH) Approx. Gamma UPL		21.92			90% Percentile	20.41		
1673				95% Hawkins Wixley (HW) Approx. Gamma UPL		21.97			95% Percentile	21.7		
1674				95% WH Approx. Gamma UTL with	95% Coverage	24.91			99% Percentile	24.25		
1675				95% HW Approx. Gamma UTL with	95% Coverage	25.05						
1676				95% WH USL		23.33			95% HW USL	23.41		
1677												
1678	Lognormal GOF Test											
1679				Shapiro Wilk Test Statistic		0.92	Shapiro Wilk Lognormal GOF Test					
1680				5% Shapiro Wilk Critical Value		0.859	Data appear Lognormal at 5% Significance Level					
1681				Lilliefors Test Statistic		0.196	Lilliefors Lognormal GOF Test					
1682				5% Lilliefors Critical Value		0.243	Data appear Lognormal at 5% Significance Level					
1683	Data appear Lognormal at 5% Significance Level											
1684												
1685	Background Statistics assuming Lognormal Distribution											
1686				95% UTL with	95% Coverage	25.52			90% Percentile (z)	20.07		
1687				95% UPL (t)		22.12			95% Percentile (z)	21.31		
1688				95% USL		23.69			99% Percentile (z)	23.85		
1689												
1690	Nonparametric Distribution Free Background Statistics											
1691	Data appear Normal at 5% Significance Level											
1692												
1693	Nonparametric Upper Limits for Background Threshold Values											
1694				Order of Statistic, r		12			95% UTL with	95% Coverage	20.9	
1695				Approx, f used to compute achieved CC		0.632	Approximate Actual Confidence Coefficient achieved by UTL				0.46	
1696							Approximate Sample Size needed to achieve specified CC				59	
1697				95% Percentile Bootstrap UTL with	95% Coverage	20.9			95% BCA Bootstrap UTL with	95% Coverage	20.9	
1698				95% UPL		20.9			90% Percentile		20.49	
1699				90% Chebyshev UPL		25.08			95% Percentile		20.74	
1700				95% Chebyshev UPL		29			99% Percentile		20.87	

1701					95% USL	20.9						
1702												
1703	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1704	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1705	and consists of observations collected from clean unimpacted locations.											
1706	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1707	represents a background data set and when many onsite observations need to be compared with the BTV.											
1708												
1709	**SPEC. COND., FIELD**											
1710												
1711	**General Statistics**											
1712					Total Number of Observations	46			Number of Distinct Observations	37		
1713									Number of Missing Observations	1		
1714					Minimum	5			First Quartile	303		
1715					Second Largest	661			Median	330		
1716					Maximum	684			Third Quartile	350		
1717					Mean	336			SD	104.6		
1718					Coefficient of Variation	0.311			Skewness	1.072		
1719					Mean of logged Data	5.719			SD of logged Data	0.659		
1720												
1721	**Critical Values for Background Threshold Values (BTVs)**											
1722					Tolerance Factor K (For UTL)	2.079			d2max (for USL)	2.924		
1723												
1724	**Normal GOF Test**											
1725					Shapiro Wilk Test Statistic	0.774			**Shapiro Wilk GOF Test**			
1726					5% Shapiro Wilk Critical Value	0.945			Data Not Normal at 5% Significance Level			
1727					Lilliefors Test Statistic	0.279			**Lilliefors GOF Test**			
1728					5% Lilliefors Critical Value	0.129			Data Not Normal at 5% Significance Level			
1729	Data Not Normal at 5% Significance Level											
1730												
1731	**Background Statistics Assuming Normal Distribution**											
1732					95% UTL with 95% Coverage	553.4			90% Percentile (z)	470		
1733					95% UPL (t)	513.5			95% Percentile (z)	508		
1734					95% USL	641.8			99% Percentile (z)	579.3		
1735												
1736	**Gamma GOF Test**											
1737					A-D Test Statistic	5.969			**Anderson-Darling Gamma GOF Test**			
1738					5% A-D Critical Value	0.753			Data Not Gamma Distributed at 5% Significance Level			
1739					K-S Test Statistic	0.284			**Kolmogorov-Smirnov Gamma GOF Test**			
1740					5% K-S Critical Value	0.131			Data Not Gamma Distributed at 5% Significance Level			
1741	Data Not Gamma Distributed at 5% Significance Level											
1742												
1743	**Gamma Statistics**											
1744					k hat (MLE)	5.282			k star (bias corrected MLE)	4.952		
1745					Theta hat (MLE)	63.61			Theta star (bias corrected MLE)	67.84		
1746					nu hat (MLE)	485.9			nu star (bias corrected)	455.6		
1747					MLE Mean (bias corrected)	336			MLE Sd (bias corrected)	151		
1748												
1749	**Background Statistics Assuming Gamma Distribution**											
1750					95% Wilson Hilferty (WH) Approx. Gamma UPL	604			90% Percentile	538.1		

1751	95% Hawkins Wixley (HW) Approx. Gamma UPL					643.7					95% Percentile	616.5
1752	95% WH Approx. Gamma UTL with 95% Coverage					685					99% Percentile	782.3
1753	95% HW Approx. Gamma UTL with 95% Coverage					742.8						
1754					95% WH USL	889.3					95% HW USL	1002
1755												
1756	**Lognormal GOF Test**											
1757					Shapiro Wilk Test Statistic	0.426	**Shapiro Wilk Lognormal GOF Test**					
1758					5% Shapiro Wilk Critical Value	0.945	Data Not Lognormal at 5% Significance Level					
1759					Lilliefors Test Statistic	0.324	**Lilliefors Lognormal GOF Test**					
1760					5% Lilliefors Critical Value	0.129	Data Not Lognormal at 5% Significance Level					
1761	Data Not Lognormal at 5% Significance Level											
1762												
1763	**Background Statistics assuming Lognormal Distribution**											
1764					95% UTL with 95% Coverage	1199					90% Percentile (z)	708.9
1765					95% UPL (t)	932.5					95% Percentile (z)	900.7
1766					95% USL	2092					99% Percentile (z)	1411
1767												
1768	**Nonparametric Distribution Free Background Statistics**											
1769	Data do not follow a Discernible Distribution (0.05)											
1770												
1771	**Nonparametric Upper Limits for Background Threshold Values**											
1772					Order of Statistic, r	45					95% UTL with 95% Coverage	661
1773					Approx, f used to compute achieved CC	1.184					Approximate Actual Confidence Coefficient achieved by UTL	0.677
1774											Approximate Sample Size needed to achieve specified CC	93
1775	95% Percentile Bootstrap UTL with 95% Coverage					678.3					95% BCA Bootstrap UTL with 95% Coverage	661
1776					95% UPL	636.2					90% Percentile	376
1777					90% Chebyshev UPL	653.1					95% Percentile	559
1778					95% Chebyshev UPL	796.8					99% Percentile	673.7
1779					95% USL	684						
1780												
1781	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1782	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1783	and consists of observations collected from clean unimpacted locations.											
1784	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1785	represents a background data set and when many onsite observations need to be compared with the BTV.											
1786												
1787	**SPEC. COND., LAB**											
1788												
1789	**General Statistics**											
1790					Total Number of Observations	46					Number of Distinct Observations	38
1791											Number of Missing Observations	1
1792					Minimum	242					First Quartile	273.3
1793					Second Largest	790					Median	302
1794					Maximum	1020					Third Quartile	337.5
1795					Mean	345.1					SD	145.8
1796					Coefficient of Variation	0.422					Skewness	3.239
1797					Mean of logged Data	5.79					SD of logged Data	0.295
1798												
1799	**Critical Values for Background Threshold Values (BTVs)**											
1800					Tolerance Factor K (For UTL)	2.079					d2max (for USL)	2.924

1801												
1802	**Normal GOF Test**											
1803					Shapiro Wilk Test Statistic	0.587	**Shapiro Wilk GOF Test**					
1804					5% Shapiro Wilk Critical Value	0.945	Data Not Normal at 5% Significance Level					
1805					Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**					
1806					5% Lilliefors Critical Value	0.129	Data Not Normal at 5% Significance Level					
1807	Data Not Normal at 5% Significance Level											
1808												
1809	**Background Statistics Assuming Normal Distribution**											
1810				95% UTL with	95% Coverage	648.2			90% Percentile (z)	531.9		
1811					95% UPL (t)	592.5			95% Percentile (z)	584.9		
1812					95% USL	771.3			99% Percentile (z)	684.2		
1813												
1814	**Gamma GOF Test**											
1815					A-D Test Statistic	4.86	**Anderson-Darling Gamma GOF Test**					
1816					5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level					
1817					K-S Test Statistic	0.243	**Kolmogorov-Smirnov Gamma GOF Test**					
1818					5% K-S Critical Value	0.13	Data Not Gamma Distributed at 5% Significance Level					
1819	Data Not Gamma Distributed at 5% Significance Level											
1820												
1821	**Gamma Statistics**											
1822					k hat (MLE)	9.494			k star (bias corrected MLE)	8.889		
1823					Theta hat (MLE)	36.35			Theta star (bias corrected MLE)	38.82		
1824					nu hat (MLE)	873.4			nu star (bias corrected)	817.8		
1825					MLE Mean (bias corrected)	345.1			MLE Sd (bias corrected)	115.7		
1826												
1827	**Background Statistics Assuming Gamma Distribution**											
1828					95% Wilson Hilferty (WH) Approx. Gamma UPL	555.8			90% Percentile	499.2		
1829					95% Hawkins Wixley (HW) Approx. Gamma UPL	551.7			95% Percentile	554.8		
1830				95% WH Approx. Gamma UTL with	95% Coverage	617.1			99% Percentile	669.6		
1831				95% HW Approx. Gamma UTL with	95% Coverage	613.7						
1832					95% WH USL	768.3			95% HW USL	769.4		
1833												
1834	**Lognormal GOF Test**											
1835					Shapiro Wilk Test Statistic	0.738	**Shapiro Wilk Lognormal GOF Test**					
1836					5% Shapiro Wilk Critical Value	0.945	Data Not Lognormal at 5% Significance Level					
1837					Lilliefors Test Statistic	0.217	**Lilliefors Lognormal GOF Test**					
1838					5% Lilliefors Critical Value	0.129	Data Not Lognormal at 5% Significance Level					
1839	Data Not Lognormal at 5% Significance Level											
1840												
1841	**Background Statistics assuming Lognormal Distribution**											
1842				95% UTL with	95% Coverage	604.6			90% Percentile (z)	477.6		
1843					95% UPL (t)	540.1			95% Percentile (z)	531.7		
1844					95% USL	776			99% Percentile (z)	650.3		
1845												
1846	**Nonparametric Distribution Free Background Statistics**											
1847	Data do not follow a Discernible Distribution (0.05)											
1848												
1849	**Nonparametric Upper Limits for Background Threshold Values**											
1850					Order of Statistic, r	45			95% UTL with	95% Coverage	790	

1851	Approx, f used to compute achieved CC					1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
1852							Approximate Sample Size needed to achieve specified CC					93
1853	95% Percentile Bootstrap UTL with 95% Coverage					962.5	95% BCA Bootstrap UTL with 95% Coverage					912.3
1854	95% UPL					743.1	90% Percentile					425
1855	90% Chebyshev UPL					787.1	95% Percentile					639.3
1856	95% Chebyshev UPL					987.4	99% Percentile					916.5
1857	95% USL					1020						
1858												
1859	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
1860	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
1861	and consists of observations collected from clean unimpacted locations.											
1862	The use of USL tends to provide a balance between false positives and false negatives provided the data											
1863	represents a background data set and when many onsite observations need to be compared with the BTV.											
1864												
1865	**SULFATE**											
1866												
1867	**General Statistics**											
1868	Total Number of Observations					45	Number of Distinct Observations					40
1869							Number of Missing Observations					2
1870	Minimum					6.9	First Quartile					9.8
1871	Second Largest					74	Median					12.3
1872	Maximum					188	Third Quartile					23.3
1873	Mean					23.37	SD					29.46
1874	Coefficient of Variation					1.26	Skewness					4.309
1875	Mean of logged Data					2.807	SD of logged Data					0.728
1876												
1877	**Critical Values for Background Threshold Values (BTVs)**											
1878	Tolerance Factor K (For UTL)					2.085	d2max (for USL)					2.915
1879												
1880	**Normal GOF Test**											
1881	Shapiro Wilk Test Statistic					0.534	**Shapiro Wilk GOF Test**					
1882	5% Shapiro Wilk Critical Value					0.945	Data Not Normal at 5% Significance Level					
1883	Lilliefors Test Statistic					0.288	**Lilliefors GOF Test**					
1884	5% Lilliefors Critical Value					0.131	Data Not Normal at 5% Significance Level					
1885	Data Not Normal at 5% Significance Level											
1886												
1887	**Background Statistics Assuming Normal Distribution**											
1888	95% UTL with 95% Coverage					84.79	90% Percentile (z)					61.12
1889	95% UPL (t)					73.41	95% Percentile (z)					71.82
1890	95% USL					109.2	99% Percentile (z)					91.9
1891												
1892	**Gamma GOF Test**											
1893	A-D Test Statistic					3.024	**Anderson-Darling Gamma GOF Test**					
1894	5% A-D Critical Value					0.766	Data Not Gamma Distributed at 5% Significance Level					
1895	K-S Test Statistic					0.239	**Kolmogorov-Smirnov Gamma GOF Test**					
1896	5% K-S Critical Value					0.134	Data Not Gamma Distributed at 5% Significance Level					
1897	Data Not Gamma Distributed at 5% Significance Level											
1898												
1899	**Gamma Statistics**											
1900	k hat (MLE)					1.597	k star (bias corrected MLE)					1.505

1901					Theta hat (MLE)	14.63				Theta star (bias corrected MLE)		15.53
1902					nu hat (MLE)	143.7				nu star (bias corrected)		135.5
1903					MLE Mean (bias corrected)	23.37				MLE Sd (bias corrected)		19.05
1904												
1905					**Background Statistics Assuming Gamma Distribution**							
1906					95% Wilson Hilferty (WH) Approx. Gamma UPL	59.58				90% Percentile		48.66
1907					95% Hawkins Wixley (HW) Approx. Gamma UPL	58.64				95% Percentile		60.81
1908					95% WH Approx. Gamma UTL with 95% Coverage	73.86				99% Percentile		88.23
1909					95% HW Approx. Gamma UTL with 95% Coverage	73.67						
1910					95% WH USL	111.9				95% HW USL		115.6
1911												
1912					**Lognormal GOF Test**							
1913					Shapiro Wilk Test Statistic	0.877				**Shapiro Wilk Lognormal GOF Test**		
1914					5% Shapiro Wilk Critical Value	0.945				Data Not Lognormal at 5% Significance Level		
1915					Lilliefors Test Statistic	0.216				**Lilliefors Lognormal GOF Test**		
1916					5% Lilliefors Critical Value	0.131				Data Not Lognormal at 5% Significance Level		
1917					Data Not Lognormal at 5% Significance Level							
1918												
1919					**Background Statistics assuming Lognormal Distribution**							
1920					95% UTL with 95% Coverage	75.55				90% Percentile (z)		42.09
1921					95% UPL (t)	57.03				95% Percentile (z)		54.84
1922					95% USL	138.3				99% Percentile (z)		90.06
1923												
1924					**Nonparametric Distribution Free Background Statistics**							
1925					Data do not follow a Discernible Distribution (0.05)							
1926												
1927					**Nonparametric Upper Limits for Background Threshold Values**							
1928					Order of Statistic, r	44				95% UTL with 95% Coverage		74
1929					Approx, f used to compute achieved CC	1.158				Approximate Actual Confidence Coefficient achieved by UTL		0.665
1930										Approximate Sample Size needed to achieve specified CC		93
1931					95% Percentile Bootstrap UTL with 95% Coverage	165.2				95% BCA Bootstrap UTL with 95% Coverage		160.7
1932					95% UPL	69.92				90% Percentile		45.2
1933					90% Chebyshev UPL	112.7				95% Percentile		58.66
1934					95% Chebyshev UPL	153.2				99% Percentile		137.8
1935					95% USL	188						
1936												
1937					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
1938					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
1939					and consists of observations collected from clean unimpacted locations.							
1940					The use of USL tends to provide a balance between false positives and false negatives provided the data							
1941					represents a background data set and when many onsite observations need to be compared with the BTV.							
1942												
1943	**ALKALINITY**											
1944												
1945					**General Statistics**							
1946					Total Number of Observations	46				Number of Missing Observations		1
1947					Number of Distinct Observations	14						
1948					Number of Detects	20				Number of Non-Detects		26
1949					Number of Distinct Detects	14				Number of Distinct Non-Detects		1
1950					Minimum Detect	5				Minimum Non-Detect		5

1951					Maximum Detect	182				Maximum Non-Detect		5
1952					Variance Detected	3029				Percent Non-Detects		56.52%
1953					Mean Detected	42.2				SD Detected		55.03
1954					Mean of Detected Logged Data	2.904				SD of Detected Logged Data		1.329
1955												
1956					**Critical Values for Background Threshold Values (BTVs)**							
1957					Tolerance Factor K (For UTL)	2.079				d2max (for USL)		2.924
1958												
1959					**Normal GOF Test on Detects Only**							
1960					Shapiro Wilk Test Statistic	0.725				**Shapiro Wilk GOF Test**		
1961					5% Shapiro Wilk Critical Value	0.905				Data Not Normal at 5% Significance Level		
1962					Lilliefors Test Statistic	0.283				**Lilliefors GOF Test**		
1963					5% Lilliefors Critical Value	0.192				Data Not Normal at 5% Significance Level		
1964					**Data Not Normal at 5% Significance Level**							
1965												
1966					**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**							
1967					KM Mean	21.17				KM SD		39.89
1968					95% UTL95% Coverage	104.1				95% KM UPL (t)		88.89
1969					90% KM Percentile (z)	72.29				95% KM Percentile (z)		86.78
1970					99% KM Percentile (z)	114				95% KM USL		137.8
1971												
1972					**DL/2 Substitution Background Statistics Assuming Normal Distribution**							
1973					Mean	19.76				SD		40.92
1974					95% UTL95% Coverage	104.9				95% UPL (t)		89.23
1975					90% Percentile (z)	72.21				95% Percentile (z)		87.07
1976					99% Percentile (z)	115				95% USL		139.4
1977					**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**							
1978												
1979					**Gamma GOF Tests on Detected Observations Only**							
1980					A-D Test Statistic	1.479				**Anderson-Darling GOF Test**		
1981					5% A-D Critical Value	0.782				Data Not Gamma Distributed at 5% Significance Level		
1982					K-S Test Statistic	0.263				**Kolmogorov-Smirnov GOF**		
1983					5% K-S Critical Value	0.202				Data Not Gamma Distributed at 5% Significance Level		
1984					**Data Not Gamma Distributed at 5% Significance Level**							
1985												
1986					**Gamma Statistics on Detected Data Only**							
1987					k hat (MLE)	0.718				k star (bias corrected MLE)		0.644
1988					Theta hat (MLE)	58.77				Theta star (bias corrected MLE)		65.56
1989					nu hat (MLE)	28.72				nu star (bias corrected)		25.75
1990					MLE Mean (bias corrected)	42.2						
1991					MLE Sd (bias corrected)	52.6				95% Percentile of Chisquare (2kstar)		4.516
1992												
1993					**Gamma ROS Statistics using Imputed Non-Detects**							
1994					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1995					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)							
1996					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1997					This is especially true when the sample size is small.							
1998					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1999					Minimum	0.01				Mean		18.35
2000					Maximum	182				Median		0.01

2001					SD	41.54				CV		2.264
2002					k hat (MLE)	0.177				k star (bias corrected MLE)		0.179
2003					Theta hat (MLE)	104				Theta star (bias corrected MLE)		102.3
2004					nu hat (MLE)	16.24				nu star (bias corrected)		16.51
2005					MLE Mean (bias corrected)	18.35				MLE Sd (bias corrected)		43.32
2006					95% Percentile of Chisquare (2kstar)	1.9				90% Percentile		55.34
2007					95% Percentile	97.16				99% Percentile		214.4
2008	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
2009	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2010					WH	HW					WH	HW
2011				95% Approx. Gamma UTL with 95% Coverage	107.1	123.6				95% Approx. Gamma UPL	70.53	73.64
2012				95% Gamma USL	228.9	320.5						
2013												
2014	**Estimates of Gamma Parameters using KM Estimates**											
2015					Mean (KM)	21.17				SD (KM)		39.89
2016					Variance (KM)	1591				SE of Mean (KM)		6.034
2017					k hat (KM)	0.282				k star (KM)		0.278
2018					nu hat (KM)	25.92				nu star (KM)		25.57
2019					theta hat (KM)	75.14				theta star (KM)		76.19
2020					80% gamma percentile (KM)	31.81				90% gamma percentile (KM)		62.98
2021					95% gamma percentile (KM)	99.23				99% gamma percentile (KM)		194.4
2022												
2023	**The following statistics are computed using gamma distribution and KM estimates**											
2024	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2025					WH	HW					WH	HW
2026				95% Approx. Gamma UTL with 95% Coverage	87.89	85.95				95% Approx. Gamma UPL	65.89	62.81
2027				95% KM Gamma Percentile	63.18	60.03				95% Gamma USL	152.9	159.3
2028												
2029	**Lognormal GOF Test on Detected Observations Only**											
2030					Shapiro Wilk Test Statistic	0.844				**Shapiro Wilk GOF Test**		
2031					5% Shapiro Wilk Critical Value	0.905				Data Not Lognormal at 5% Significance Level		
2032					Lilliefors Test Statistic	0.225				**Lilliefors GOF Test**		
2033					5% Lilliefors Critical Value	0.192				Data Not Lognormal at 5% Significance Level		
2034	**Data Not Lognormal at 5% Significance Level**											
2035												
2036	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
2037					Mean in Original Scale	18.78				Mean in Log Scale		0.695
2038					SD in Original Scale	41.36				SD in Log Scale		2.401
2039					95% UTL95% Coverage	295				95% BCA UTL95% Coverage		164.8
2040					95% Bootstrap (%) UTL95% Coverage	175				95% UPL (t)		118
2041					90% Percentile (z)	43.46				95% Percentile (z)		104
2042					99% Percentile (z)	533.8				95% USL		2242
2043												
2044	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2045					KM Mean of Logged Data	2.172				95% KM UTL (Lognormal)95% Coverage		80.91
2046					KM SD of Logged Data	1.068				95% KM UPL (Lognormal)		53.81
2047					95% KM Percentile Lognormal (z)	50.87				95% KM USL (Lognormal)		199.5
2048												
2049	**Background DL/2 Statistics Assuming Lognormal Distribution**											
2050					Mean in Original Scale	19.76				Mean in Log Scale		1.78

2051				SD in Original Scale		40.92				SD in Log Scale		1.318
2052				95% UTL95% Coverage		91.98				95% UPL (t)		55.6
2053				90% Percentile (z)		32.13				95% Percentile (z)		51.87
2054				99% Percentile (z)		127.4				95% USL		280.1
2055	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2056												
2057	**Nonparametric Distribution Free Background Statistics**											
2058	Data do not follow a Discernible Distribution (0.05)											
2059												
2060	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
2061				Order of Statistic, r		45				95% UTL with95% Coverage		154
2062				Approx, f used to compute achieved CC		1.184				Approximate Actual Confidence Coefficient achieved by UTL		0.677
2063				Approximate Sample Size needed to achieve specified CC		93				95% UPL		139.7
2064				95% USL		182				95% KM Chebyshev UPL		196.9
2065												
2066	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2067	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2068	and consists of observations collected from clean unimpacted locations.											
2069	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2070	represents a background data set and when many onsite observations need to be compared with the BTV.											
2071												
2072	**TDS (TOTAL DISSOLVED SOLIDS)**											
2073												
2074	**General Statistics**											
2075				Total Number of Observations		46				Number of Distinct Observations		43
2076										Number of Missing Observations		1
2077				Minimum		135				First Quartile		201.8
2078				Second Largest		447				Median		237
2079				Maximum		619				Third Quartile		264.3
2080				Mean		247.3				SD		85.49
2081				Coefficient of Variation		0.346				Skewness		2.332
2082				Mean of logged Data		5.466				SD of logged Data		0.29
2083												
2084	**Critical Values for Background Threshold Values (BTVs)**											
2085				Tolerance Factor K (For UTL)		2.079				d2max (for USL)		2.924
2086												
2087	**Normal GOF Test**											
2088				Shapiro Wilk Test Statistic		0.795				**Shapiro Wilk GOF Test**		
2089				5% Shapiro Wilk Critical Value		0.945				Data Not Normal at 5% Significance Level		
2090				Lilliefors Test Statistic		0.195				**Lilliefors GOF Test**		
2091				5% Lilliefors Critical Value		0.129				Data Not Normal at 5% Significance Level		
2092	Data Not Normal at 5% Significance Level											
2093												
2094	**Background Statistics Assuming Normal Distribution**											
2095				95% UTL with 95% Coverage		425.1				90% Percentile (z)		356.9
2096				95% UPL (t)		392.5				95% Percentile (z)		388
2097				95% USL		497.3				99% Percentile (z)		446.2
2098												
2099	**Gamma GOF Test**											
2100				A-D Test Statistic		1.421				**Anderson-Darling Gamma GOF Test**		

2101				5% A-D Critical Value		0.749	Data Not Gamma Distributed at 5% Significance Level					
2102				K-S Test Statistic		0.147	**Kolmogorov-Smirnov Gamma GOF Test**					
2103				5% K-S Critical Value		0.13	Data Not Gamma Distributed at 5% Significance Level					
2104	Data Not Gamma Distributed at 5% Significance Level											
2105												
2106	**Gamma Statistics**											
2107				k hat (MLE)		11.23	k star (bias corrected MLE)					10.51
2108				Theta hat (MLE)		22.03	Theta star (bias corrected MLE)					23.53
2109				nu hat (MLE)		1033	nu star (bias corrected)					967
2110				MLE Mean (bias corrected)		247.3	MLE Sd (bias corrected)					76.29
2111												
2112	**Background Statistics Assuming Gamma Distribution**											
2113				95% Wilson Hilferty (WH) Approx. Gamma UPL		386.2	90% Percentile					348.8
2114				95% Hawkins Wixley (HW) Approx. Gamma UPL		386.1	95% Percentile					384.7
2115				95% WH Approx. Gamma UTL with 95% Coverage		425.8	99% Percentile					458.4
2116				95% HW Approx. Gamma UTL with 95% Coverage		426.8						
2117				95% WH USL		522.7	95% HW USL					528.5
2118												
2119	**Lognormal GOF Test**											
2120				Shapiro Wilk Test Statistic		0.934	**Shapiro Wilk Lognormal GOF Test**					
2121				5% Shapiro Wilk Critical Value		0.945	Data Not Lognormal at 5% Significance Level					
2122				Lilliefors Test Statistic		0.125	**Lilliefors Lognormal GOF Test**					
2123				5% Lilliefors Critical Value		0.129	Data appear Lognormal at 5% Significance Level					
2124	Data appear Approximate Lognormal at 5% Significance Level											
2125												
2126	**Background Statistics assuming Lognormal Distribution**											
2127				95% UTL with 95% Coverage		431.8	90% Percentile (z)					342.7
2128				95% UPL (t)		386.6	95% Percentile (z)					380.7
2129				95% USL		551.5	99% Percentile (z)					463.8
2130												
2131	**Nonparametric Distribution Free Background Statistics**											
2132	Data appear Approximate Lognormal at 5% Significance Level											
2133												
2134	**Nonparametric Upper Limits for Background Threshold Values**											
2135				Order of Statistic, r		45	95% UTL with 95% Coverage					447
2136				Approx, f used to compute achieved CC		1.184	Approximate Actual Confidence Coefficient achieved by UTL					0.677
2137							Approximate Sample Size needed to achieve specified CC					93
2138				95% Percentile Bootstrap UTL with 95% Coverage		576	95% BCA Bootstrap UTL with 95% Coverage					572.5
2139				95% UPL		442.1	90% Percentile					320.5
2140				90% Chebyshev UPL		506.6	95% Percentile					420
2141				95% Chebyshev UPL		624	99% Percentile					541.6
2142				95% USL		619						
2143												
2144	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2145	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2146	and consists of observations collected from clean unimpacted locations.											
2147	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2148	represents a background data set and when many onsite observations need to be compared with the BTV.											
2149												
2150	**TOC (TOTAL ORGANIC CARBON)**											

	A	B	C	D	E	F	G	H	I	J	K	L
2151												
2152	**General Statistics**											
2153	Total Number of Observations					46	Number of Missing Observations					1
2154	Number of Distinct Observations					16						
2155	Number of Detects					15	Number of Non-Detects					31
2156	Number of Distinct Detects					14	Number of Distinct Non-Detects					2
2157	Minimum Detect					0.53	Minimum Non-Detect					0.5
2158	Maximum Detect					2.4	Maximum Non-Detect					1
2159	Variance Detected					0.244	Percent Non-Detects					67.39%
2160	Mean Detected					1.011	SD Detected					0.494
2161	Mean of Detected Logged Data					-0.078	SD of Detected Logged Data					0.418
2162												
2163	**Critical Values for Background Threshold Values (BTVs)**											
2164	Tolerance Factor K (For UTL)					2.079	d2max (for USL)					2.924
2165												
2166	**Normal GOF Test on Detects Only**											
2167	Shapiro Wilk Test Statistic					0.826	**Shapiro Wilk GOF Test**					
2168	5% Shapiro Wilk Critical Value					0.881	Data Not Normal at 5% Significance Level					
2169	Lilliefors Test Statistic					0.205	**Lilliefors GOF Test**					
2170	5% Lilliefors Critical Value					0.22	Detected Data appear Normal at 5% Significance Level					
2171	**Detected Data appear Approximate Normal at 5% Significance Level**											
2172												
2173	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
2174	KM Mean					0.734	KM SD					0.35
2175	95% UTL95% Coverage					1.463	95% KM UPL (t)					1.329
2176	90% KM Percentile (z)					1.183	95% KM Percentile (z)					1.311
2177	99% KM Percentile (z)					1.549	95% KM USL					1.759
2178												
2179	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
2180	Mean					0.634	SD					0.391
2181	95% UTL95% Coverage					1.448	95% UPL (t)					1.298
2182	90% Percentile (z)					1.136	95% Percentile (z)					1.278
2183	99% Percentile (z)					1.544	95% USL					1.778
2184	**DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons**											
2185												
2186	**Gamma GOF Tests on Detected Observations Only**											
2187	A-D Test Statistic					0.469	**Anderson-Darling GOF Test**					
2188	5% A-D Critical Value					0.738	Detected data appear Gamma Distributed at 5% Significance Level					
2189	K-S Test Statistic					0.174	**Kolmogorov-Smirnov GOF**					
2190	5% K-S Critical Value					0.222	Detected data appear Gamma Distributed at 5% Significance Level					
2191	**Detected data appear Gamma Distributed at 5% Significance Level**											
2192												
2193	**Gamma Statistics on Detected Data Only**											
2194	k hat (MLE)					5.764	k star (bias corrected MLE)					4.656
2195	Theta hat (MLE)					0.175	Theta star (bias corrected MLE)					0.217
2196	nu hat (MLE)					172.9	nu star (bias corrected)					139.7
2197	MLE Mean (bias corrected)					1.011						
2198	MLE Sd (bias corrected)					0.469	95% Percentile of Chisquare (2kstar)					17.35
2199												
2200	**Gamma ROS Statistics using Imputed Non-Detects**											

	A	B	C	D	E	F	G	H	I	J	K	L
2201	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2202	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)											
2203	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2204	This is especially true when the sample size is small.											
2205	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2206					Minimum	0.01				Mean	0.601	
2207					Maximum	2.4				Median	0.586	
2208					SD	0.479				CV	0.797	
2209					k hat (MLE)	1.01				k star (bias corrected MLE)	0.958	
2210					Theta hat (MLE)	0.595				Theta star (bias corrected MLE)	0.627	
2211					nu hat (MLE)	92.9				nu star (bias corrected)	88.17	
2212					MLE Mean (bias corrected)	0.601				MLE Sd (bias corrected)	0.614	
2213					95% Percentile of Chisquare (2kstar)	5.829				90% Percentile	1.398	
2214					95% Percentile	1.828				99% Percentile	2.828	
2215	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
2216	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2217					WH	HW				WH	HW	
2218				95% Approx. Gamma UTL with 95% Coverage	2.349	2.718			95% Approx. Gamma UPL	1.841	2.047	
2219				95% Gamma USL	3.789	4.774						
2220												
2221	**Estimates of Gamma Parameters using KM Estimates**											
2222					Mean (KM)	0.734				SD (KM)	0.35	
2223					Variance (KM)	0.123				SE of Mean (KM)	0.0588	
2224					k hat (KM)	4.396				k star (KM)	4.124	
2225					nu hat (KM)	404.5				nu star (KM)	379.4	
2226					theta hat (KM)	0.167				theta star (KM)	0.178	
2227					80% gamma percentile (KM)	1.009				90% gamma percentile (KM)	1.219	
2228					95% gamma percentile (KM)	1.412				99% gamma percentile (KM)	1.824	
2229												
2230	**The following statistics are computed using gamma distribution and KM estimates**											
2231	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2232					WH	HW				WH	HW	
2233				95% Approx. Gamma UTL with 95% Coverage	1.423	1.422			95% Approx. Gamma UPL	1.263	1.257	
2234				95% KM Gamma Percentile	1.242	1.236			95% Gamma USL	1.823	1.841	
2235												
2236	**Lognormal GOF Test on Detected Observations Only**											
2237					Shapiro Wilk Test Statistic	0.944				**Shapiro Wilk GOF Test**		
2238					5% Shapiro Wilk Critical Value	0.881				Detected Data appear Lognormal at 5% Significance Level		
2239					Lilliefors Test Statistic	0.147				**Lilliefors GOF Test**		
2240					5% Lilliefors Critical Value	0.22				Detected Data appear Lognormal at 5% Significance Level		
2241	Detected Data appear Lognormal at 5% Significance Level											
2242												
2243	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
2244					Mean in Original Scale	0.682				Mean in Log Scale	-0.52	
2245					SD in Original Scale	0.402				SD in Log Scale	0.52	
2246					95% UTL95% Coverage	1.754				95% BCA UTL95% Coverage	2.15	
2247					95% Bootstrap (%) UTL95% Coverage	2.2				95% UPL (t)	1.438	
2248					90% Percentile (z)	1.158				95% Percentile (z)	1.399	
2249					99% Percentile (z)	1.995				95% USL	2.723	
2250												

2251	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2252				KM Mean of Logged Data		-0.383			95% KM UTL (Lognormal)95% Coverage			1.424
2253				KM SD of Logged Data		0.354			95% KM UPL (Lognormal)			1.244
2254				95% KM Percentile Lognormal (z)		1.221			95% KM USL (Lognormal)			1.921
2255												
2256	**Background DL/2 Statistics Assuming Lognormal Distribution**											
2257				Mean in Original Scale		0.634			Mean in Log Scale			-0.583
2258				SD in Original Scale		0.391			SD in Log Scale			0.482
2259				95% UTL95% Coverage		1.52			95% UPL (t)			1.265
2260				90% Percentile (z)		1.035			95% Percentile (z)			1.233
2261				99% Percentile (z)		1.712			95% USL			2.284
2262	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
2263												
2264	**Nonparametric Distribution Free Background Statistics**											
2265	Data appear to follow a Discernible Distribution at 5% Significance Level											
2266												
2267	**Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)**											
2268				Order of Statistic, r		45			95% UTL with95% Coverage			1.6
2269				Approx, f used to compute achieved CC		1.184			Approximate Actual Confidence Coefficient achieved by UTL			0.677
2270				Approximate Sample Size needed to achieve specified CC		93			95% UPL			1.53
2271				95% USL		2.4			95% KM Chebyshev UPL			2.278
2272												
2273	Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.											
2274	Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers											
2275	and consists of observations collected from clean unimpacted locations.											
2276	The use of USL tends to provide a balance between false positives and false negatives provided the data											
2277	represents a background data set and when many onsite observations need to be compared with the BTV.											
2278												
2279	**TOTAL PHENOLICS**											
2280												
2281	**General Statistics**											
2282				Total Number of Observations		47			Number of Missing Observations			0
2283				Number of Distinct Observations		2						
2284				Number of Detects		2			Number of Non-Detects			45
2285				Number of Distinct Detects		1			Number of Distinct Non-Detects			2
2286				Minimum Detect		0.01			Minimum Non-Detect			0.005
2287				Maximum Detect		0.01			Maximum Non-Detect			0.01
2288				Variance Detected		0			Percent Non-Detects			95.74%
2289				Mean Detected		0.01			SD Detected			0
2290				Mean of Detected Logged Data		-4.605			SD of Detected Logged Data			0
2291												
2292	Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!											
2293	It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).											
2294												
2295	The data set for variable TOTAL PHENOLICS was not processed!											
2296												
2297												
2298	**TURBIDITY**											
2299												
2300	**General Statistics**											

2301	Total Number of Observations					47	Number of Missing Observations					0
2302	Number of Distinct Observations					29						
2303	Number of Detects					39	Number of Non-Detects					8
2304	Number of Distinct Detects					28	Number of Distinct Non-Detects					1
2305	Minimum Detect					0.11	Minimum Non-Detect					0.1
2306	Maximum Detect					10.1	Maximum Non-Detect					0.1
2307	Variance Detected					3.275	Percent Non-Detects					17.02%
2308	Mean Detected					0.792	SD Detected					1.81
2309	Mean of Detected Logged Data					-1.078	SD of Detected Logged Data					1.04
2310												
2311	**Critical Values for Background Threshold Values (BTVs)**											
2312	Tolerance Factor K (For UTL)					2.074	d2max (for USL)					2.933
2313												
2314	**Normal GOF Test on Detects Only**											
2315	Shapiro Wilk Test Statistic					0.397	**Shapiro Wilk GOF Test**					
2316	5% Shapiro Wilk Critical Value					0.939	Data Not Normal at 5% Significance Level					
2317	Lilliefors Test Statistic					0.401	**Lilliefors GOF Test**					
2318	5% Lilliefors Critical Value					0.14	Data Not Normal at 5% Significance Level					
2319	Data Not Normal at 5% Significance Level											
2320												
2321	**Kaplan Meier (KM) Background Statistics Assuming Normal Distribution**											
2322	KM Mean					0.674	KM SD					1.648
2323	95% UTL95% Coverage					4.092	95% KM UPL (t)					3.47
2324	90% KM Percentile (z)					2.786	95% KM Percentile (z)					3.385
2325	99% KM Percentile (z)					4.508	95% KM USL					5.507
2326												
2327	**DL/2 Substitution Background Statistics Assuming Normal Distribution**											
2328	Mean					0.666	SD					1.669
2329	95% UTL95% Coverage					4.127	95% UPL (t)					3.497
2330	90% Percentile (z)					2.805	95% Percentile (z)					3.411
2331	99% Percentile (z)					4.548	95% USL					5.56
2332	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
2333												
2334	**Gamma GOF Tests on Detected Observations Only**											
2335	A-D Test Statistic					4.524	**Anderson-Darling GOF Test**					
2336	5% A-D Critical Value					0.792	Data Not Gamma Distributed at 5% Significance Level					
2337	K-S Test Statistic					0.271	**Kolmogorov-Smirnov GOF**					
2338	5% K-S Critical Value					0.147	Data Not Gamma Distributed at 5% Significance Level					
2339	Data Not Gamma Distributed at 5% Significance Level											
2340												
2341	**Gamma Statistics on Detected Data Only**											
2342	k hat (MLE)					0.713	k star (bias corrected MLE)					0.676
2343	Theta hat (MLE)					1.11	Theta star (bias corrected MLE)					1.173
2344	nu hat (MLE)					55.65	nu star (bias corrected)					52.7
2345	MLE Mean (bias corrected)					0.792						
2346	MLE Sd (bias corrected)					0.964	95% Percentile of Chisquare (2kstar)					4.659
2347												
2348	**Gamma ROS Statistics using Imputed Non-Detects**											
2349	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2350	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)											

	A	B	C	D	E	F	G	H	I	J	K	L
2351	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2352	This is especially true when the sample size is small.											
2353	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2354					Minimum	0.01				Mean		0.659
2355					Maximum	10.1				Median		0.22
2356					SD	1.672				CV		2.536
2357					k hat (MLE)	0.503				k star (bias corrected MLE)		0.485
2358					Theta hat (MLE)	1.31				Theta star (bias corrected MLE)		1.358
2359					nu hat (MLE)	47.3				nu star (bias corrected)		45.61
2360					MLE Mean (bias corrected)	0.659				MLE Sd (bias corrected)		0.946
2361					95% Percentile of Chisquare (2kstar)	3.768				90% Percentile		1.794
2362					95% Percentile	2.559				99% Percentile		4.446
2363	**The following statistics are computed using Gamma ROS Statistics on Imputed Data**											
2364	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2365					WH	HW					WH	HW
2366				95% Approx. Gamma UTL with 95% Coverage	2.977	3.073				95% Approx. Gamma UPL	2.18	2.162
2367				95% Gamma USL	5.469	6.191						
2368												
2369	**Estimates of Gamma Parameters using KM Estimates**											
2370					Mean (KM)	0.674				SD (KM)		1.648
2371					Variance (KM)	2.716				SE of Mean (KM)		0.244
2372					k hat (KM)	0.168				k star (KM)		0.171
2373					nu hat (KM)	15.75				nu star (KM)		16.07
2374					theta hat (KM)	4.027				theta star (KM)		3.944
2375					80% gamma percentile (KM)	0.809				90% gamma percentile (KM)		2.028
2376					95% gamma percentile (KM)	3.611				99% gamma percentile (KM)		8.09
2377												
2378	**The following statistics are computed using gamma distribution and KM estimates**											
2379	**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**											
2380					WH	HW					WH	HW
2381				95% Approx. Gamma UTL with 95% Coverage	2.674	2.557				95% Approx. Gamma UPL	2.014	1.884
2382				95% KM Gamma Percentile	1.933	1.804				95% Gamma USL	4.679	4.746
2383												
2384	**Lognormal GOF Test on Detected Observations Only**											
2385					Shapiro Wilk Test Statistic	0.848				**Shapiro Wilk GOF Test**		
2386					5% Shapiro Wilk Critical Value	0.939				Data Not Lognormal at 5% Significance Level		
2387					Lilliefors Test Statistic	0.151				**Lilliefors GOF Test**		
2388					5% Lilliefors Critical Value	0.14				Data Not Lognormal at 5% Significance Level		
2389	Data Not Lognormal at 5% Significance Level											
2390												
2391	**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**											
2392					Mean in Original Scale	0.664				Mean in Log Scale		-1.47
2393					SD in Original Scale	1.67				SD in Log Scale		1.302
2394					95% UTL95% Coverage	3.418				95% BCA UTL95% Coverage		8.051
2395					95% Bootstrap (%) UTL95% Coverage	8.714				95% UPL (t)		2.091
2396					90% Percentile (z)	1.219				95% Percentile (z)		1.956
2397					99% Percentile (z)	4.748				95% USL		10.45
2398												
2399	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2400					KM Mean of Logged Data	-1.286				95% KM UTL (Lognormal)95% Coverage		2.398

2401				KM SD of Logged Data	1.042				95% KM UPL (Lognormal)		1.618	
2402			95% KM Percentile Lognormal (z)		1.534				95% KM USL (Lognormal)		5.868	
2403												
2404					Background DL/2 Statistics Assuming Lognormal Distribution							
2405				Mean in Original Scale	0.666				Mean in Log Scale		-1.404	
2406				SD in Original Scale	1.669				SD in Log Scale		1.193	
2407				95% UTL95% Coverage	2.916				95% UPL (t)		1.859	
2408				90% Percentile (z)	1.133				95% Percentile (z)		1.748	
2409				99% Percentile (z)	3.942				95% USL		8.126	
2410				DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.								
2411												
2412					Nonparametric Distribution Free Background Statistics							
2413					Data do not follow a Discernible Distribution (0.05)							
2414												
2415					Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)							
2416				Order of Statistic, r	46				95% UTL with95% Coverage		5.48	
2417				Approx, f used to compute achieved CC	1.211				Approximate Actual Confidence Coefficient achieved by UTL		0.688	
2418			Approximate Sample Size needed to achieve specified CC		93				95% UPL		4.596	
2419				95% USL	10.1				95% KM Chebyshev UPL		7.934	
2420												
2421					Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.							
2422					Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers							
2423					and consists of observations collected from clean unimpacted locations.							
2424					The use of USL tends to provide a balance between false positives and false negatives provided the data							
2425					represents a background data set and when many onsite observations need to be compared with the BTV.							
2426												
2427	BENZENE											
2428												
2429					General Statistics							
2430				Total Number of Observations	47				Number of Missing Observations		0	
2431				Number of Distinct Observations	1							
2432				Number of Detects	0				Number of Non-Detects		47	
2433				Number of Distinct Detects	0				Number of Distinct Non-Detects		1	
2434				Minimum Detect	N/A				Minimum Non-Detect		1	
2435				Maximum Detect	N/A				Maximum Non-Detect		1	
2436				Variance Detected	N/A				Percent Non-Detects		100%	
2437				Mean Detected	N/A				SD Detected		N/A	
2438				Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A	
2439												
2440					Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!							
2441					Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!							
2442					The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).							
2443												
2444					The data set for variable BENZENE was not processed!							
2445												
2446												
2447	1,2-DIBROMOETHANE											
2448												
2449					General Statistics							
2450				Total Number of Observations	47				Number of Missing Observations		0	

2451					Number of Distinct Observations	1						
2452					Number of Detects	0				Number of Non-Detects		47
2453					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2454					Minimum Detect	N/A				Minimum Non-Detect		1
2455					Maximum Detect	N/A				Maximum Non-Detect		1
2456					Variance Detected	N/A				Percent Non-Detects		100%
2457					Mean Detected	N/A				SD Detected		N/A
2458					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2459												
2460	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2461	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2462	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2463												
2464	The data set for variable 1,2-DIBROMOETHANE was not processed!											
2465												
2466												
2467	1,1-DICHLOROETHANE											
2468												
2469	General Statistics											
2470					Total Number of Observations	47				Number of Missing Observations		0
2471					Number of Distinct Observations	1						
2472					Number of Detects	0				Number of Non-Detects		47
2473					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2474					Minimum Detect	N/A				Minimum Non-Detect		1
2475					Maximum Detect	N/A				Maximum Non-Detect		1
2476					Variance Detected	N/A				Percent Non-Detects		100%
2477					Mean Detected	N/A				SD Detected		N/A
2478					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2479												
2480	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2481	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2482	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2483												
2484	The data set for variable 1,1-DICHLOROETHANE was not processed!											
2485												
2486												
2487	1,1-DICHLOROETHENE											
2488												
2489	General Statistics											
2490					Total Number of Observations	47				Number of Missing Observations		0
2491					Number of Distinct Observations	1						
2492					Number of Detects	0				Number of Non-Detects		47
2493					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2494					Minimum Detect	N/A				Minimum Non-Detect		1
2495					Maximum Detect	N/A				Maximum Non-Detect		1
2496					Variance Detected	N/A				Percent Non-Detects		100%
2497					Mean Detected	N/A				SD Detected		N/A
2498					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2499												
2500	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

	A	B	C	D	E	F	G	H	I	J	K	L
2501	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2502	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2503												
2504	The data set for variable 1,1-DICHLOROETHENE was not processed!											
2505												
2506												
2507	1,2-DICHLOROETHANE											
2508												
2509	General Statistics											
2510	Total Number of Observations					47	Number of Missing Observations					0
2511	Number of Distinct Observations					1						
2512	Number of Detects					0	Number of Non-Detects					47
2513	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2514	Minimum Detect					N/A	Minimum Non-Detect					1
2515	Maximum Detect					N/A	Maximum Non-Detect					1
2516	Variance Detected					N/A	Percent Non-Detects					100%
2517	Mean Detected					N/A	SD Detected					N/A
2518	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2519												
2520	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2521	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2522	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2523												
2524	The data set for variable 1,2-DICHLOROETHANE was not processed!											
2525												
2526												
2527	cis 1,2-DICHLOROETHENE											
2528												
2529	General Statistics											
2530	Total Number of Observations					47	Number of Missing Observations					0
2531	Number of Distinct Observations					1						
2532	Number of Detects					0	Number of Non-Detects					47
2533	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2534	Minimum Detect					N/A	Minimum Non-Detect					1
2535	Maximum Detect					N/A	Maximum Non-Detect					1
2536	Variance Detected					N/A	Percent Non-Detects					100%
2537	Mean Detected					N/A	SD Detected					N/A
2538	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2539												
2540	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2541	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2542	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2543												
2544	The data set for variable cis 1,2-DICHLOROETHENE was not processed!											
2545												
2546												
2547	trans 1,2-DICHLOROETHENE											
2548												
2549	General Statistics											
2550	Total Number of Observations					47	Number of Missing Observations					0

2551					Number of Distinct Observations	1						
2552					Number of Detects	0				Number of Non-Detects		47
2553					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2554					Minimum Detect	N/A				Minimum Non-Detect		1
2555					Maximum Detect	N/A				Maximum Non-Detect		1
2556					Variance Detected	N/A				Percent Non-Detects		100%
2557					Mean Detected	N/A				SD Detected		N/A
2558					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2559												
2560	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2561	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2562	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2563												
2564	The data set for variable trans 1,2-DICHLOROETHENE was not processed!											
2565												
2566												
2567	**ETHYLBENZENE**											
2568												
2569	**General Statistics**											
2570					Total Number of Observations	47				Number of Missing Observations		0
2571					Number of Distinct Observations	1						
2572					Number of Detects	0				Number of Non-Detects		47
2573					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2574					Minimum Detect	N/A				Minimum Non-Detect		1
2575					Maximum Detect	N/A				Maximum Non-Detect		1
2576					Variance Detected	N/A				Percent Non-Detects		100%
2577					Mean Detected	N/A				SD Detected		N/A
2578					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2579												
2580	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2581	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2582	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2583												
2584	The data set for variable ETHYLBENZENE was not processed!											
2585												
2586												
2587	**METHYLENE CHLORIDE**											
2588												
2589	**General Statistics**											
2590					Total Number of Observations	47				Number of Missing Observations		0
2591					Number of Distinct Observations	1						
2592					Number of Detects	0				Number of Non-Detects		47
2593					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2594					Minimum Detect	N/A				Minimum Non-Detect		1
2595					Maximum Detect	N/A				Maximum Non-Detect		1
2596					Variance Detected	N/A				Percent Non-Detects		100%
2597					Mean Detected	N/A				SD Detected		N/A
2598					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2599												
2600	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

2601	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2602	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2603												
2604	The data set for variable METHYLENE CHLORIDE was not processed!											
2605												
2606												
2607	**TETRACHLOROETHENE**											
2608												
2609	**General Statistics**											
2610						Total Number of Observations	47			Number of Missing Observations	0	
2611						Number of Distinct Observations	1					
2612						Number of Detects	0			Number of Non-Detects	47	
2613						Number of Distinct Detects	0			Number of Distinct Non-Detects	1	
2614						Minimum Detect	N/A			Minimum Non-Detect	1	
2615						Maximum Detect	N/A			Maximum Non-Detect	1	
2616						Variance Detected	N/A			Percent Non-Detects	100%	
2617						Mean Detected	N/A			SD Detected	N/A	
2618						Mean of Detected Logged Data	N/A			SD of Detected Logged Data	N/A	
2619												
2620	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2621	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2622	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2623												
2624	The data set for variable TETRACHLOROETHENE was not processed!											
2625												
2626												
2627	**TOLUENE**											
2628												
2629	**General Statistics**											
2630						Total Number of Observations	46			Number of Missing Observations	1	
2631						Number of Distinct Observations	1					
2632						Number of Detects	0			Number of Non-Detects	46	
2633						Number of Distinct Detects	0			Number of Distinct Non-Detects	1	
2634						Minimum Detect	N/A			Minimum Non-Detect	1	
2635						Maximum Detect	N/A			Maximum Non-Detect	1	
2636						Variance Detected	N/A			Percent Non-Detects	100%	
2637						Mean Detected	N/A			SD Detected	N/A	
2638						Mean of Detected Logged Data	N/A			SD of Detected Logged Data	N/A	
2639												
2640	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2641	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2642	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2643												
2644	The data set for variable TOLUENE was not processed!											
2645												
2646												
2647	**1,1,1-TRICHLOROETHANE**											
2648												
2649	**General Statistics**											
2650						Total Number of Observations	47			Number of Missing Observations	0	

2651					Number of Distinct Observations	1						
2652					Number of Detects	0				Number of Non-Detects		47
2653					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2654					Minimum Detect	N/A				Minimum Non-Detect		1
2655					Maximum Detect	N/A				Maximum Non-Detect		1
2656					Variance Detected	N/A				Percent Non-Detects		100%
2657					Mean Detected	N/A				SD Detected		N/A
2658					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2659												
2660	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2661	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2662	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2663												
2664	The data set for variable 1,1,1-TRICHLOROETHANE was not processed!											
2665												
2666												
2667	TRICHLOROETHENE											
2668												
2669	General Statistics											
2670					Total Number of Observations	47				Number of Missing Observations		0
2671					Number of Distinct Observations	1						
2672					Number of Detects	0				Number of Non-Detects		47
2673					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2674					Minimum Detect	N/A				Minimum Non-Detect		1
2675					Maximum Detect	N/A				Maximum Non-Detect		1
2676					Variance Detected	N/A				Percent Non-Detects		100%
2677					Mean Detected	N/A				SD Detected		N/A
2678					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2679												
2680	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2681	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2682	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2683												
2684	The data set for variable TRICHLOROETHENE was not processed!											
2685												
2686												
2687	VINYL CHLORIDE											
2688												
2689	General Statistics											
2690					Total Number of Observations	47				Number of Missing Observations		0
2691					Number of Distinct Observations	1						
2692					Number of Detects	0				Number of Non-Detects		47
2693					Number of Distinct Detects	0				Number of Distinct Non-Detects		1
2694					Minimum Detect	N/A				Minimum Non-Detect		1
2695					Maximum Detect	N/A				Maximum Non-Detect		1
2696					Variance Detected	N/A				Percent Non-Detects		100%
2697					Mean Detected	N/A				SD Detected		N/A
2698					Mean of Detected Logged Data	N/A				SD of Detected Logged Data		N/A
2699												
2700	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											

	A	B	C	D	E	F	G	H	I	J	K	L
2701	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2702	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2703												
2704	The data set for variable VINYL CHLORIDE was not processed!											
2705												
2706												
2707	XYLENES (TOTAL)											
2708												
2709	General Statistics											
2710	Total Number of Observations					47	Number of Missing Observations					0
2711	Number of Distinct Observations					1						
2712	Number of Detects					0	Number of Non-Detects					47
2713	Number of Distinct Detects					0	Number of Distinct Non-Detects					1
2714	Minimum Detect					N/A	Minimum Non-Detect					3
2715	Maximum Detect					N/A	Maximum Non-Detect					3
2716	Variance Detected					N/A	Percent Non-Detects					100%
2717	Mean Detected					N/A	SD Detected					N/A
2718	Mean of Detected Logged Data					N/A	SD of Detected Logged Data					N/A
2719												
2720	Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!											
2721	Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!											
2722	The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).											
2723												
2724	The data set for variable XYLENES (TOTAL) was not processed!											
2725												
2726												

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: LCSWMA

Address: 3044 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 30.58" Longitude: 76° 26' 11.25"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 11:00 AM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	6	SM20-2321
CALCIUM, TOTAL	13.4	EPA 200.7
CALCIUM, DISSOLVED	13.7	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.2
CHLORIDE	20.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	10.7	EPA 200.7
MAGNESIUM, DISSOLVED	10.8	EPA 200.7
MANGANESE, TOTAL (ug/l)	30	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	29	EPA 200.7
NITRATE-NITROGEN	18.3	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	4.86	FIELD
pH-LAB (SU)	5.61	SM4500B
POTASSIUM, TOTAL	1.9	EPA 200.7
POTASSIUM, DISSOLVED	1.7	EPA 200.7
SODIUM, TOTAL	8.9	EPA 200.7
SODIUM, DISSOLVED	9.1	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	282	FIELD
SPEC. COND., LAB (umhos/cm)	230	EPA 120.1
SULFATE	2 ND	EPA 300
ALKALINITY	6	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	180	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5	EPA 420.4
TURBIDITY (NTU)	0.1 ND	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: MILLER

Address: 3052 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 29.85" Longitude: 76° 26' 11.45"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 11:18 AM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/10/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS MILLER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	6	SM20-2321
CALCIUM, TOTAL	16.4	EPA 200.7
CALCIUM, DISSOLVED	16.6	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.2
CHLORIDE	21.2	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	40	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	8.8	EPA 200.7
MAGNESIUM, DISSOLVED	9	EPA 200.7
MANGANESE, TOTAL (ug/l)	37	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	37	EPA 200.7
NITRATE-NITROGEN	17.6	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS MILLER

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	4.89	FIELD
pH-LAB (SU)	5.59	SM4500B
POTASSIUM, TOTAL	2	EPA 200.7
POTASSIUM, DISSOLVED	2	EPA 200.7
SODIUM, TOTAL	7.9	EPA 200.7
SODIUM, DISSOLVED	8.2	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	259	FIELD
SPEC. COND., LAB (umhos/cm)	218	EPA 120.1
SULFATE	2.3	EPA 300
ALKALINITY	6	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	170	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5	EPA 420.4
TURBIDITY (NTU)	0.69	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS MILLER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: LCSWMA

Address: 3056 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 28.44" Longitude: 76° 26' 10.43"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 11:29 AM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/10/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	5 ND	SM20-2321
CALCIUM, TOTAL	11.5	EPA 200.7
CALCIUM, DISSOLVED	11.6	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	15 ND	EPA 410.2
CHLORIDE	26.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	13.6	EPA 200.7
MAGNESIUM, DISSOLVED	13.7	EPA 200.7
MANGANESE, TOTAL (ug/l)	100	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	100	EPA 200.7
NITRATE-NITROGEN	22.6	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	3.74	FIELD
pH-LAB (SU)	4.03	SM4500B
POTASSIUM, TOTAL	2.5	EPA 200.7
POTASSIUM, DISSOLVED	2.3	EPA 200.7
SODIUM, TOTAL	8.9	EPA 200.7
SODIUM, DISSOLVED	9.2	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	322	FIELD
SPEC. COND., LAB (umhos/cm)	277	EPA 120.1
SULFATE	2 ND	EPA 300
ALKALINITY	5 ND	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	202	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5 ND	EPA 420.4
TURBIDITY (NTU)	0.14	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: LCSWMA

Address: 3060 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 27.63" Longitude: 76° 26' 10.01"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 11:39 AM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	5 ND	SM20-2321
CALCIUM, TOTAL	10.8	EPA 200.7
CALCIUM, DISSOLVED	11	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	23	EPA 410.2
CHLORIDE	21	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	11.6	EPA 200.7
MAGNESIUM, DISSOLVED	11.9	EPA 200.7
MANGANESE, TOTAL (ug/l)	110	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	110	EPA 200.7
NITRATE-NITROGEN	16.2	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	4.09	FIELD
pH-LAB (SU)	4.54	SM4500B
POTASSIUM, TOTAL	2.7	EPA 200.7
POTASSIUM, DISSOLVED	2.6	EPA 200.7
SODIUM, TOTAL	8.5	EPA 200.7
SODIUM, DISSOLVED	9	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	264	FIELD
SPEC. COND., LAB (umhos/cm)	226	EPA 120.1
SULFATE	9.8	EPA 300
ALKALINITY	5 ND	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	152	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5 ND	EPA 420.4
TURBIDITY (NTU)	0.14	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: SENSENICH

Address: 3076 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 28.2" Longitude: 76° 26' 11.1"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 12:00 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS SENSENICH

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	6	SM20-2321
CALCIUM, TOTAL	14.2	EPA 200.7
CALCIUM, DISSOLVED	14.7	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	22	EPA 410.2
CHLORIDE	48.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	8.5	EPA 200.7
MAGNESIUM, DISSOLVED	8.9	EPA 200.7
MANGANESE, TOTAL (ug/l)	180	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	180	EPA 200.7
NITRATE-NITROGEN	9.8	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS SENSENICH

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	4.9	FIELD
pH-LAB (SU)	5.52	SM4500B
POTASSIUM, TOTAL	3.6	EPA 200.7
POTASSIUM, DISSOLVED	3.5	EPA 200.7
SODIUM, TOTAL	23.8	EPA 200.7
SODIUM, DISSOLVED	25.3	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	328	FIELD
SPEC. COND., LAB (umhos/cm)	284	EPA 120.1
SULFATE	11.1	EPA 300
ALKALINITY	6	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	182	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5 ND	EPA 420.4
TURBIDITY (NTU)	0.23	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS SENSENICH

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised 10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: LCSWMA

Address: 3079 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 21.99" Longitude: 76° 26' 10.58"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 3:22 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	32	SM20-2321
CALCIUM, TOTAL	10.3	EPA 200.7
CALCIUM, DISSOLVED	10.5	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	22	EPA 410.2
CHLORIDE	32.7	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	5.6	EPA 200.7
MAGNESIUM, DISSOLVED	5.7	EPA 200.7
MANGANESE, TOTAL (ug/l)	120	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	120	EPA 200.7
NITRATE-NITROGEN	0.2 ND	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	5.38	FIELD
pH-LAB (SU)	6.13	SM4500B
POTASSIUM, TOTAL	2.2	EPA 200.7
POTASSIUM, DISSOLVED	2.1	EPA 200.7
SODIUM, TOTAL	14.2	EPA 200.7
SODIUM, DISSOLVED	14.6	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	207	FIELD
SPEC. COND., LAB (umhos/cm)	192	EPA 120.1
SULFATE	10.8	EPA 300
ALKALINITY	32	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	150	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5	EPA 420.4
TURBIDITY (NTU)	0.19	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS LCSWMA

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: WEBER

Address: 3088 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 21" Longitude: 76° 26' 7.1"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 12:10 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS WEBER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	168	SM20-2321
CALCIUM, TOTAL	0.16	EPA 200.7
CALCIUM, DISSOLVED	0.14	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	22	EPA 410.2
CHLORIDE	222	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	0.055	EPA 200.7
MAGNESIUM, DISSOLVED	0.1 ND	EPA 200.7
MANGANESE, TOTAL (ug/l)	2.5 ND	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	5 ND	EPA 200.7
NITRATE-NITROGEN	5.7	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS WEBER

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.33	FIELD
pH-LAB (SU)	6.94	SM4500B
POTASSIUM, TOTAL	3.1	EPA 200.7
POTASSIUM, DISSOLVED	2.8	EPA 200.7
SODIUM, TOTAL	209	EPA 200.7
SODIUM, DISSOLVED	226	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	328	FIELD
SPEC. COND., LAB (umhos/cm)	1010	EPA 120.1
SULFATE	8.4	EPA 300
ALKALINITY	168	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	522	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	6	EPA 420.4
TURBIDITY (NTU)	0.23	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS WEBER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

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General Reference: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: KIRCHNER

Address: 3100 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 17.9" Longitude: 76° 26' 6.28"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 12:25 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS KIRCHNER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	11	SM20-2321
CALCIUM, TOTAL	14	EPA 200.7
CALCIUM, DISSOLVED	14.5	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	23	EPA 410.2
CHLORIDE	41.8	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	6.2	EPA 200.7
MAGNESIUM, DISSOLVED	6.4	EPA 200.7
MANGANESE, TOTAL (ug/l)	8.1	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	8.2	EPA 200.7
NITRATE-NITROGEN	4.7	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS KIRCHNER

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	5.09	FIELD
pH-LAB (SU)	5.64	SM4500B
POTASSIUM, TOTAL	1.6	EPA 200.7
POTASSIUM, DISSOLVED	1.6	EPA 200.7
SODIUM, TOTAL	16.2	EPA 200.7
SODIUM, DISSOLVED	16.9	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	259	FIELD
SPEC. COND., LAB (umhos/cm)	216	EPA 120.1
SULFATE	8.7	EPA 300
ALKALINITY	11	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	162	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5	EPA 420.4
TURBIDITY (NTU)	0.15	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS KIRCHNER

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

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General Reference: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: FRY

Address: 3106 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 17.27" Longitude: 76° 26' 5.6"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 12:36 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS FRY

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	12	SM20-2321
CALCIUM, TOTAL	21.4	EPA 200.7
CALCIUM, DISSOLVED	22.2	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	24	EPA 410.2
CHLORIDE	109	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	52	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	14.6	EPA 200.7
MAGNESIUM, DISSOLVED	14.9	EPA 200.7
MANGANESE, TOTAL (ug/l)	44	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	45	EPA 200.7
NITRATE-NITROGEN	10.8	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS FRY

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	5.24	FIELD
pH-LAB (SU)	6.04	SM4500B
POTASSIUM, TOTAL	2.3	EPA 200.7
POTASSIUM, DISSOLVED	2.3	EPA 200.7
SODIUM, TOTAL	43.4	EPA 200.7
SODIUM, DISSOLVED	46.2	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	452	FIELD
SPEC. COND., LAB (umhos/cm)	469	EPA 120.1
SULFATE	5.6	EPA 300
ALKALINITY	12	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	296	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.5 ND	SM20-5310B
TOTAL PHENOLICS (ug/l)	5 ND	EPA 420.4
TURBIDITY (NTU)	0.29	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS FRY

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

2540-FM-BWM0060 Rev. 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
10/08/2020
DEP USE ONLY
Date Received

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

All information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 52, 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: Act 101 Section 1103

SECTION A. SITE IDENTIFIER

Applicant/permittee: Lancaster County Solid Waste Manage

Site Name: Frey Farm Landfill

Facility ID (as issued by DEP): 101389

SECTION B. PRIVATE WATER SUPPLY INFORMATION

INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S")

Facility Name: Frey Farm Landfill

County: Lancaster County

Township or Municipality: MANOR TOWNSHIP

Landowner Name: BECK

Address: 3125 RIVER ROAD

Phone No.:

Sampling Point: Latitude: 39° 57' 11.6" Longitude: 76° 26' 5.4"

Depth to Water Level: ft. Measured from: [X] Land Surface [ ] TOC

Casing Stick Up: ft. Elevation of Water Level: ft./MSL

Total Well Depth: ft.

Sampling Depth: ft. Sampling Method: [ ] Pumped [ ] Bailed

Well Purged: [ ] Yes [X] No Well Volumes Purged:

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

Sample Date:(mm/dd/yy) 08/21/2020 Sample Collection Time: 1:00 PM

Laboratory(ies) Performing Analysis ALS Environmental

(include address and phone number) 34 Dogwood Lane

Middletown, PA 17057 (717) 944-5541

Lab Accreditation Number(s) 22-293

Lab Analysis Date 09/09/2020

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

Comments:

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS BECK

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
AMMONIA-NITROGEN	0.1 ND	SM4500D
BICARBONATE ALKALINITY	124	SM20-2321
CALCIUM, TOTAL	0.3	EPA 200.7
CALCIUM, DISSOLVED	0.28	EPA 200.7
COD (CHEMICAL OXYGEN DEMAND)	21	EPA 410.2
CHLORIDE	85	EPA 300
FLUORIDE	0.2 ND	EPA 300
IRON, TOTAL (ug/l)	30 ND	EPA 200.7
IRON, DISSOLVED (ug/l)	60 ND	EPA 200.7
MAGNESIUM, TOTAL	0.056	EPA 200.7
MAGNESIUM, DISSOLVED	0.1 ND	EPA 200.7
MANGANESE, TOTAL (ug/l)	2.5 ND	EPA 200.7
MANGANESE, DISSOLVED (ug/l)	5 ND	EPA 200.7
NITRATE-NITROGEN	4.7	EPA 300

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS BECK

Sample Date: 08/21/2020

1. Inorganics, continued (Enter all data in mg/l except as noted)

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
NITRITE - NITROGEN	0.2 ND	EPA 300
pH-FIELD (SU)	6.16	FIELD
pH-LAB (SU)	6.89	SM4500B
POTASSIUM, TOTAL	2.3	EPA 200.7
POTASSIUM, DISSOLVED	2	EPA 200.7
SODIUM, TOTAL	120	EPA 200.7
SODIUM, DISSOLVED	125	EPA 200.7
SPEC. COND., FIELD (umhos/cm)	554	FIELD
SPEC. COND., LAB (umhos/cm)	563	EPA 120.1
SULFATE	9.8	EPA 300
ALKALINITY	124	SM20-2320B
TDS (TOT. DISSOLVED SOLIDS)	300	SM20-2540C
TOC (TOTAL ORGANIC CARBON)	0.61	SM20-5310B
TOTAL PHENOLICS (ug/l)	5 ND	EPA 420.4
TURBIDITY (NTU)	0.16	SM 2130B

T Please indicate detection limit if analyte is not detected.

FORM 52
MUNICIPAL WASTE LANDFILL
PRIVATE WATER SUPPLY
QUARTERLY WATER QUALITY ANALYSES

Facility I.D. Number: 101389

Monitoring Point I.D. No.: PS BECK

Sample Date: 08/21/2020

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

PARAMETER	VALUE	ANALYSIS METHOD NUMBER
BENZENE	1 ND	EPA 524.2
1,2-DIBROMOETHANE		EPA 524.2
1,1-DICHLOROETHANE	1 ND	EPA 524.2
1,1-DICHLOROETHENE	1 ND	EPA 524.2
1,2-DICHLOROETHANE	1 ND	EPA 524.2
CIS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
TRANS 1,2-DICHLOROETHENE	1 ND	EPA 524.2
ETHYLBENZENE	1 ND	EPA 524.2
METHYLENE CHLORIDE	1 ND	EPA 524.2
TETRACHLOROETHENE	1 ND	EPA 524.2
TOLUENE	1 ND	EPA 524.2
1,1,1-TRICHLOROETHANE	1 ND	EPA 524.2
TRICHLOROETHENE	1 ND	EPA 524.2
TRICHLOROFLUOROMETHANE	1 ND	EPA 524.2
VINYL CHLORIDE	1 ND	EPA 524.2
XYLENES (TOTAL)	3 ND	EPA 524.2

T Please indicate detection limit if analyte is not detected.

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

September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3044 RIVER RD**	Workorder:	**3123274**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3044 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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.

Ms. Susan J Scherer
Project Coordinator

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SAMPLE SUMMARY

Workorder: 3123274 3RD QTR 2020-3044 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123274001	3044 River Road, Conestoga, PA	Water	8/21/2020 11:00	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123274 3RD QTR 2020-3044 RIVER RD

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: 3123274 3RD QTR 2020-3044 RIVER RD

Lab ID: **3123274001** Date Collected: 8/21/2020 11:00 Matrix: Water

Sample ID: **3044 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 02:33	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 02:33	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.6		%	62 - 133	SW846 8260B			8/27/20 02:33	PDK	K
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			8/27/20 02:33	PDK	K
Dibromofluoromethane (S)	92.6		%	78 - 116	SW846 8260B			8/27/20 02:33	PDK	K
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			8/27/20 02:33	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	6		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	6	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			9/1/20 09:37	JXL	B
Chemical Oxygen Demand (COD)	ND	2	mg/L	15	EPA 410.4			9/9/20 20:00	JAM	B
Chloride	20.8		mg/L	2.0	EPA 300.0			8/22/20 18:00	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 18:00	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/26/20 15:25	PAG	I
Nitrate-N	18.3		mg/L	0.20	EPA 300.0			8/22/20 18:00	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 18:00	MBW	C
pH	5.61	3	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	0.005		mg/L	0.005	EPA 420.4	8/26/20 06:54	C_D	8/26/20 10:35	VXF	H
Specific Conductance	230		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	ND		mg/L	2.0	EPA 300.0			8/22/20 18:00	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123274 3RD QTR 2020-3044 RIVER RD

Lab ID: **3123274001** Date Collected: 8/21/2020 11:00 Matrix: Water

Sample ID: **3044 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	180		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 04:52	PAG	F
Turbidity	ND		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	13.4		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Calcium, Dissolved	13.7		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
Magnesium, Total	10.7		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Magnesium, Dissolved	10.8		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
Manganese, Total	0.030		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Manganese, Dissolved	0.029		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
Potassium, Total	1.9		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Potassium, Dissolved	1.7		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
Sodium, Total	8.9		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:12	SRT	D
Sodium, Dissolved	9.1		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:25	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	4.86		pH_Units		Field			8/21/20 11:00	BGS	N
Specific Conductance, Field	282		umhos/cm	1	Field			8/21/20 11:00	BGS	N
Temperature	19.70		Deg. C		Field			8/21/20 11:00	BGS	N

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3123274 3RD QTR 2020-3044 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123274001	1	3044 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123274001	2	3044 River Road, Conestoga, PA	EPA 410.4	Chemical Oxygen Demand (COD)
The QC sample type MSLO for method EPA 410.4 was outside the control limits for the analyte Chemical Oxygen Demand (COD). The % Recovery was reported as 112 and the control limits were 90 to 110.				
3123274001	3	3044 River Road, Conestoga, PA	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123274 3RD QTR 2020-3044 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123274001	3044 River Road, Conestoga, PA	ASTM D6919-09		
3123274001	3044 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123274001	3044 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123274001	3044 River Road, Conestoga, PA	EPA 300.0		
3123274001	3044 River Road, Conestoga, PA	EPA 410.4		
3123274001	3044 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123274001	3044 River Road, Conestoga, PA	Field		
3123274001	3044 River Road, Conestoga, PA	S2540C-11		
3123274001	3044 River Road, Conestoga, PA	S4500HB-11		
3123274001	3044 River Road, Conestoga, PA	SM2130B-2011		
3123274001	3044 River Road, Conestoga, PA	SM2320B-2011		
3123274001	3044 River Road, Conestoga, PA	SM2510B-2011		
3123274001	3044 River Road, Conestoga, PA	SM5310B-2011		
3123274001	3044 River Road, Conestoga, PA	SW846 8260B		
3123274001	3044 River Road, Conestoga, PA	SW846 9020B		

Thursday, September 10, 2020 12:57:34 PM

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

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

* 3 1 2 3 2 7 4 *

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/#: LCSWMA - Quarterly

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

Container Type	AG	AN	AN	CG	—	PL	PL	PL	PL	
Container Size	40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
					Enter Number of Containers Per Sample or Field Results Below.									
1 3044RIVERRD	08/21/20	1100	G	DW	2	1	2	3	X	1	1	1	1	1
2								DM 8/21/20						
3														
4														
5														
6														
7														
8														
9														
10														

Cooler Temp: 1 Therm ID: 294

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 [signature] ALS	8-21-20	1730	2 [signature]	8/21/20	1730
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

ALS

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

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123274 Initials: DN Date: 8/21

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 Temp >6°		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): 7

Thermometer ID: 794

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

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

September 11, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3052 RIVER RD**	Workorder:	**3123273**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3052 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Landowner , 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: 3123273 3RD QTR 2020-3052 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123273001	3052 River Road, Conestoga, PA	Water	8/21/2020 11:18	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123273 3RD QTR 2020-3052 RIVER RD

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: 3123273 3RD QTR 2020-3052 RIVER RD

Lab ID: **3123273001** Date Collected: 8/21/2020 11:18 Matrix: Water

Sample ID: **3052 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 02:10	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 02:10	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.7		%	62 - 133	SW846 8260B			8/27/20 02:10	PDK	K
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/27/20 02:10	PDK	K
Dibromofluoromethane (S)	93.1		%	78 - 116	SW846 8260B			8/27/20 02:10	PDK	K
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/27/20 02:10	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	6		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	6	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 01:52	JXL	B
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			9/10/20 21:27	JAM	B
Chloride	21.2		mg/L	2.0	EPA 300.0			8/22/20 17:45	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 17:45	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/26/20 15:04	PAG	I
Nitrate-N	17.6		mg/L	0.20	EPA 300.0			8/22/20 17:45	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 17:45	MBW	C
pH	5.59	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	0.005		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	218		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	2.3		mg/L	2.0	EPA 300.0			8/22/20 17:45	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123273 3RD QTR 2020-3052 RIVER RD

Lab ID: **3123273001** Date Collected: 8/21/2020 11:18 Matrix: Water

Sample ID: **3052 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	170		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 04:52	PAG	F
Turbidity	0.69		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	16.4		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Calcium, Dissolved	16.6		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
Iron, Total	0.040		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
Magnesium, Total	8.8		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Magnesium, Dissolved	9.0		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
Manganese, Total	0.037		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Manganese, Dissolved	0.037		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
Potassium, Total	2.0		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Potassium, Dissolved	2.0		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
Sodium, Total	7.9		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:47	SRT	D
Sodium, Dissolved	8.2		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:21	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	4.89		pH_Units		Field			8/21/20 11:18	BGS	N
Specific Conductance, Field	259		umhos/cm	1	Field			8/21/20 11:18	BGS	N
Temperature	21.60		Deg. C		Field			8/21/20 11:18	BGS	N

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123273 3RD QTR 2020-3052 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123273001	1	3052 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123273001	2	3052 River Road, Conestoga, PA	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123273 3RD QTR 2020-3052 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123273001	3052 River Road, Conestoga, PA	ASTM D6919-09		
3123273001	3052 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123273001	3052 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123273001	3052 River Road, Conestoga, PA	EPA 300.0		
3123273001	3052 River Road, Conestoga, PA	EPA 410.4		
3123273001	3052 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123273001	3052 River Road, Conestoga, PA	Field		
3123273001	3052 River Road, Conestoga, PA	S2540C-11		
3123273001	3052 River Road, Conestoga, PA	S4500HB-11		
3123273001	3052 River Road, Conestoga, PA	SM2130B-2011		
3123273001	3052 River Road, Conestoga, PA	SM2320B-2011		
3123273001	3052 River Road, Conestoga, PA	SM2510B-2011		
3123273001	3052 River Road, Conestoga, PA	SM5310B-2011		
3123273001	3052 River Road, Conestoga, PA	SW846 8260B		
3123273001	3052 River Road, Conestoga, PA	SW846 9020B		

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

* 3 1 2 3 2 7 3 *

1 of 1

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

Client Name: LCSWMA - Gerald E. Miller, Sr.

Address: 3052 River Road
Conestoga, PA 17516

Contact: Gerald E. Miller, Sr.

Phone#: (717) 872-5117

Project Name/#: LCSWMA - Quarterly

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

Container Type	AG	AN	AN	CG	—	PL	PL	PL	PL	PL
Container Size	40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
					Enter Number of Containers Per Sample or Field Results Below.									
1 3052RIVERRD	08/21/20	1118	G	DW	2	1	2	23	x	1	1	1	1	1
2								DW 8/21/20						
3														
4														
5														
6														
7														
8														
9														
10														

(Lab use only) Received by Receiving Lab)

Cooler Temp: 8 Therm ID: 294

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 RGN ALS	8-21-20	1200	2	8/21/20	1730
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

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P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123273 Initials: DN Date: 8/21

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 Temp >6°		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):	8							
Thermometer ID:	294							
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

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

September 11, 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:	**3123272**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020 3056 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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.

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3123272 3RD QTR 2020 3056 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123272001	3056RIVERRD	Water	8/21/2020 11:29	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123272 3RD QTR 2020 3056 RIVER RD

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: 3123272 3RD QTR 2020 3056 RIVER RD

Lab ID: **3123272001** Date Collected: 8/21/2020 11:29 Matrix: Water

Sample ID: **3056RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 01:47	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:47	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.6		%	62 - 133	SW846 8260B			8/27/20 01:47	PDK	K
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/27/20 01:47	PDK	K
Dibromofluoromethane (S)	93.4		%	78 - 116	SW846 8260B			8/27/20 01:47	PDK	K
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/27/20 01:47	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	ND	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 09:53	JXL	B
Chemical Oxygen Demand (COD)	ND		mg/L	15	EPA 410.4			9/10/20 21:27	JAM	B
Chloride	26.7		mg/L	2.0	EPA 300.0			8/22/20 17:30	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 17:30	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/26/20 13:22	PAG	I
Nitrate-N	22.6	3	mg/L	0.50	EPA 300.0			8/26/20 07:08	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 17:30	MBW	C
pH	4.03	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	ND		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	277		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	ND		mg/L	2.0	EPA 300.0			8/22/20 17:30	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123272 3RD QTR 2020 3056 RIVER RD

Lab ID: **3123272001** Date Collected: 8/21/2020 11:29 Matrix: Water

Sample ID: **3056RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Total Dissolved Solids	202		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 04:52	PAG	F
Turbidity	0.14		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	11.5		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Calcium, Dissolved	11.6		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
Magnesium, Total	13.6		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Magnesium, Dissolved	13.7		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
Manganese, Total	0.10		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Manganese, Dissolved	0.10		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
Potassium, Total	2.5		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Potassium, Dissolved	2.3		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
Sodium, Total	8.9		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:38	SRT	D
Sodium, Dissolved	9.2		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:18	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	3.74		pH_Units		Field			8/21/20 11:29	BGS	N
Specific Conductance, Field	322		umhos/cm	1	Field			8/21/20 11:29	BGS	N
Temperature	24.20		Deg. C		Field			8/21/20 11:29	BGS	N

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3123272 3RD QTR 2020 3056 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123272001	1	3056RIVERRD	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123272001	2	3056RIVERRD	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.				
3123272001	3	3056RIVERRD	EPA 300.0	Nitrate-N
The sample was originally run within hold time, but required further analysis that exceeded hold time.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123272 3RD QTR 2020 3056 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123272001	3056RIVERRD	ASTM D6919-09		
3123272001	3056RIVERRD	EPA 200.7	EPA ACID	
3123272001	3056RIVERRD	EPA 200.7	EPA TRMD	
3123272001	3056RIVERRD	EPA 300.0		
3123272001	3056RIVERRD	EPA 410.4		
3123272001	3056RIVERRD	EPA 420.4	420.4/9066	
3123272001	3056RIVERRD	Field		
3123272001	3056RIVERRD	S2540C-11		
3123272001	3056RIVERRD	S4500HB-11		
3123272001	3056RIVERRD	SM2130B-2011		
3123272001	3056RIVERRD	SM2320B-2011		
3123272001	3056RIVERRD	SM2510B-2011		
3123272001	3056RIVERRD	SM5310B-2011		
3123272001	3056RIVERRD	SW846 8260B		
3123272001	3056RIVERRD	SW846 9020B		

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

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

* 3 1 2 3 2 7 2 *

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/#: LCSWMA - Quarterly

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? [ ] -Y

Fax? [ ] -Y No.:

ANALYSES/METHOD REQUESTED

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

Enter Number of Containers Per Sample or Field Results Below.

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
1 3056RIVERRD	08/21/20	1129	G	DW	2	1	2	~~2~~ 3	x	1	1	1	1	1
2								DW 8/21/20						
3														
4														
5														
6														
7														
8														
9														
10														

ed by Receiving Lab)

Cooler Temp: 10 Therm ID: 2901

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	[signature] ALS	8-21-20	1230	2	[signature]	8/21/20	1730
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 #: 313272 Initials: DN Date: 8/21

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 Temp >6°		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): 10

Thermometer ID: 794

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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September 10, 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:	**3123271**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020 3060 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 2020.

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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: 3123271 3RD QTR 2020 3060 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123271001	3060RIVERRD	Water	8/21/2020 11:39	8/21/2020 17:30	Mr. Brian G Shade

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3123271 3RD QTR 2020 3060 RIVER RD

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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: 3123271 3RD QTR 2020 3060 RIVER RD

Lab ID: **3123271001** Date Collected: 8/21/2020 11:39 Matrix: Water

Sample ID: **3060RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 01:24	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:24	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	91.6		%	62 - 133	SW846 8260B			8/27/20 01:24	PDK	K
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/27/20 01:24	PDK	K
Dibromofluoromethane (S)	90.8		%	78 - 116	SW846 8260B			8/27/20 01:24	PDK	K
Toluene-d8 (S)	101		%	76 - 127	SW846 8260B			8/27/20 01:24	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	ND		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	ND	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 02:06	JXL	B
Chemical Oxygen Demand (COD)	23		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	21.0		mg/L	2.0	EPA 300.0			8/22/20 17:15	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 17:15	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/26/20 12:18	PAG	I
Nitrate-N	16.2		mg/L	0.20	EPA 300.0			8/22/20 17:15	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 17:15	MBW	C
pH	4.54	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	ND		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	226		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	9.8		mg/L	2.0	EPA 300.0			8/22/20 17:15	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123271 3RD QTR 2020 3060 RIVER RD

Lab ID: **3123271001** Date Collected: 8/21/2020 11:39 Matrix: Water

Sample ID: **3060RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	152		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 04:52	PAG	F
Turbidity	0.14		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	10.8		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Calcium, Dissolved	11.0		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
Magnesium, Total	11.6		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Magnesium, Dissolved	11.9		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
Manganese, Total	0.11		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Manganese, Dissolved	0.11		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
Potassium, Total	2.7		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Potassium, Dissolved	2.6		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
Sodium, Total	8.5		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:28	SRT	D
Sodium, Dissolved	9.0		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:15	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	4.09		pH_Units		Field			8/21/20 11:39	BGS	N
Specific Conductance, Field	264		umhos/cm	1	Field			8/21/20 11:39	BGS	N
Temperature	22.60		Deg. C		Field			8/21/20 11:39	BGS	N

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123271 3RD QTR 2020 3060 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123271001	1	3060RIVERRD	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123271001	2	3060RIVERRD	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123271 3RD QTR 2020 3060 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123271001	3060RIVERRD	ASTM D6919-09		
3123271001	3060RIVERRD	EPA 200.7	EPA ACID	
3123271001	3060RIVERRD	EPA 200.7	EPA TRMD	
3123271001	3060RIVERRD	EPA 300.0		
3123271001	3060RIVERRD	EPA 410.4		
3123271001	3060RIVERRD	EPA 420.4	420.4/9066	
3123271001	3060RIVERRD	Field		
3123271001	3060RIVERRD	S2540C-11		
3123271001	3060RIVERRD	S4500HB-11		
3123271001	3060RIVERRD	SM2130B-2011		
3123271001	3060RIVERRD	SM2320B-2011		
3123271001	3060RIVERRD	SM2510B-2011		
3123271001	3060RIVERRD	SM5310B-2011		
3123271001	3060RIVERRD	SW846 8260B		
3123271001	3060RIVERRD	SW846 9020B		

Thursday, September 10, 2020 12:56:49 PM

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

31232721

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/#: LCSWMA - Quarterly

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

(Lab Use Only) Received by Receiving Lab)

Cooler Temp: 7 Therm ID: 294

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	AN	AN	CG	—	PL	PL	PL	PL	
Container Size	40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3	Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
1 3060RIVERRD	08/21/20	1139	G	DW	2	1	2	3	X	1	1	1	1	1	
2								DW 8/21/20							
3															
4															
5															
6															
7															
8															
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 [signature] ALS	8-21-20	1730	2 [signature]	8/21/20	1730
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

ALS

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

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123271 Initials: DN Date: 8/21

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 Temp >6°		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):	7							
Thermometer ID:	794							
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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September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3076 RIVER RD**	Workorder:	**3123270**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3076 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

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

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

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

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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SAMPLE SUMMARY

Workorder: 3123270 3RD QTR 2020-3076 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123270001	3076 River Road, Conestoga, PA	Water	8/21/2020 12:00	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123270 3RD QTR 2020-3076 RIVER RD

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: 3123270 3RD QTR 2020-3076 RIVER RD

Lab ID: **3123270001** Date Collected: 8/21/2020 12:00 Matrix: Water

Sample ID: **3076 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 01:01	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 01:01	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	91.3		%	62 - 133	SW846 8260B			8/27/20 01:01	PDK	K
4-Bromofluorobenzene (S)	102		%	79 - 114	SW846 8260B			8/27/20 01:01	PDK	K
Dibromofluoromethane (S)	93.3		%	78 - 116	SW846 8260B			8/27/20 01:01	PDK	K
Toluene-d8 (S)	99.5		%	76 - 127	SW846 8260B			8/27/20 01:01	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	6		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	6	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 10:34	JXL	B
Chemical Oxygen Demand (COD)	22		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	48.8		mg/L	2.0	EPA 300.0			8/22/20 17:00	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 17:00	MBW	C
Halogen, Total Organic (TOX)	20.1		ug/L	20.0	SW846 9020B			8/26/20 11:54	PAG	I
Nitrate-N	9.8		mg/L	0.20	EPA 300.0			8/22/20 17:00	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 17:00	MBW	C
pH	5.52	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	ND		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	284		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	11.1		mg/L	2.0	EPA 300.0			8/22/20 17:00	MBW	C

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

ANALYTICAL RESULTS

Workorder: 3123270 3RD QTR 2020-3076 RIVER RD

Lab ID: **3123270001** Date Collected: 8/21/2020 12:00 Matrix: Water

Sample ID: **3076 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	182		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 04:52	PAG	F
Turbidity	0.23		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	14.2		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Calcium, Dissolved	14.7		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
Magnesium, Total	8.5		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Magnesium, Dissolved	8.9		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
Manganese, Total	0.18		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Manganese, Dissolved	0.18		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
Potassium, Total	3.6		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Potassium, Dissolved	3.5		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
Sodium, Total	23.8		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:09	SRT	D
Sodium, Dissolved	25.3		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:11	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	4.90		pH_Units		Field			8/21/20 12:00	BGS	M
Specific Conductance, Field	328		umhos/cm	1	Field			8/21/20 12:00	BGS	M
Temperature	20.30		Deg. C		Field			8/21/20 12:00	BGS	M

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123270 3RD QTR 2020-3076 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123270001	1	3076 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123270001	2	3076 River Road, Conestoga, PA	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123270 3RD QTR 2020-3076 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123270001	3076 River Road, Conestoga, PA	ASTM D6919-09		
3123270001	3076 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123270001	3076 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123270001	3076 River Road, Conestoga, PA	EPA 300.0		
3123270001	3076 River Road, Conestoga, PA	EPA 410.4		
3123270001	3076 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123270001	3076 River Road, Conestoga, PA	Field		
3123270001	3076 River Road, Conestoga, PA	S2540C-11		
3123270001	3076 River Road, Conestoga, PA	S4500HB-11		
3123270001	3076 River Road, Conestoga, PA	SM2130B-2011		
3123270001	3076 River Road, Conestoga, PA	SM2320B-2011		
3123270001	3076 River Road, Conestoga, PA	SM2510B-2011		
3123270001	3076 River Road, Conestoga, PA	SM5310B-2011		
3123270001	3076 River Road, Conestoga, PA	SW846 8260B		
3123270001	3076 River Road, Conestoga, PA	SW846 9020B		

Thursday, September 10, 2020 12:55:36 PM

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

1 of 1

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

Client Name: LCSWMA - Brian Sensenich

Address: 3076 Rover Road
Conestoga, PA 17516

Contact: Brian Sensenich

Phone#: (717) 676-5779

Project Name/#: LCSWMA - Quarterly

Bill To: LCSWMA - Brian Sensenich

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

Date Required: _____ Approved By: _____

Email? [ ] -Y _____

Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
Container Type					AG	AN	AN	CG	—	PL	PL	PL	PL	
Container Size					40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative					HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	HNO3	None	None
					ANALYSES/METHOD REQUESTED									
					Enter Number of Containers Per Sample or Field Results Below.									
1 3076RIVERRD	08/21/20	1200	G	DW	2	1	2	2	X	1	1	1	1	1
2														
3														
4														
5														
6														
7														
8														
9														
10														

(Lab Use Only)

Cooler Temp: 15 Therm ID: 294

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 [signature] ALS	8.21.20	1720	2 [signature]	8/21/20	1735
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

ALS

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Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123270 Initials: DN Date: 8/21

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 Temp >6°		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): 15

Thermometer ID: 294

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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September 10, 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:	**3123269**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020 3079 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

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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: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123269001	3079RIVERRD	Water	8/21/2020 15:22	8/21/2020 17:30	Mr. Brian G Shade
3123269002	FIELD BLANK	Water	8/21/2020 15:29	8/21/2020 17:30	Mr. Brian G Shade
3123269003	TRIP BLANK	Water	8/21/2020 17:30	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

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: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID: **3123269001** Date Collected: 8/21/2020 15:22 Matrix: Water

Sample ID: **3079RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/26/20 05:21	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 05:21	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.3		%	62 - 133	SW846 8260B			8/26/20 05:21	PDK	K
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/26/20 05:21	PDK	K
Dibromofluoromethane (S)	92.7		%	78 - 116	SW846 8260B			8/26/20 05:21	PDK	K
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/26/20 05:21	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	32		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	32	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 02:47	JXL	B
Chemical Oxygen Demand (COD)	22		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	32.7		mg/L	2.0	EPA 300.0			8/22/20 16:45	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 16:45	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/26/20 11:21	PAG	I
Nitrate-N	ND		mg/L	0.20	EPA 300.0			8/22/20 16:45	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 16:45	MBW	C
pH	6.13	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	0.005		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	192		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	10.8		mg/L	2.0	EPA 300.0			8/22/20 16:45	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID: **3123269001** Date Collected: 8/21/2020 15:22 Matrix: Water

Sample ID: **3079RIVERRD** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Total Dissolved Solids	150		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND	3,4,5	mg/L	0.50	SM5310B-2011			8/26/20 00:58	PAG	F
Turbidity	0.19		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	10.3		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Calcium, Dissolved	10.5		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
Magnesium, Total	5.6		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Magnesium, Dissolved	5.7		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
Manganese, Total	0.12		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Manganese, Dissolved	0.12		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
Potassium, Total	2.2		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Potassium, Dissolved	2.1		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
Sodium, Total	14.2		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:06	SRT	D
Sodium, Dissolved	14.6		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:08	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	5.38		pH_Units		Field			8/21/20 15:22	BGS	M
Specific Conductance, Field	207		umhos/cm	1	Field			8/21/20 15:22	BGS	M
Temperature	23.80		Deg. C		Field			8/21/20 15:22	BGS	M

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID: **3123269002** Date Collected: 8/21/2020 15:29 Matrix: Water

Sample ID: **FIELD BLANK** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 00:15	PDK	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 00:15	PDK	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.4		%	62 - 133	SW846 8260B			8/27/20 00:15	PDK	A
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/27/20 00:15	PDK	A
Dibromofluoromethane (S)	91.9		%	78 - 116	SW846 8260B			8/27/20 00:15	PDK	A
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/27/20 00:15	PDK	A

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID: **3123269003** Date Collected: 8/21/2020 17:30 Matrix: Water

Sample ID: **TRIP BLANK** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Toluene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/26/20 23:29	PDK	A
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 23:29	PDK	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.1		%	62 - 133	SW846 8260B			8/26/20 23:29	PDK	A
4-Bromofluorobenzene (S)	103		%	79 - 114	SW846 8260B			8/26/20 23:29	PDK	A
Dibromofluoromethane (S)	92.8		%	78 - 116	SW846 8260B			8/26/20 23:29	PDK	A
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/26/20 23:29	PDK	A

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

ANALYTICAL RESULTS

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123269001	1	3079RIVERRD	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123269001	2	3079RIVERRD	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.				
3123269001	3	3079RIVERRD	SM5310B-2011	Total Organic Carbon (TOC)
The QC sample type MS for method 415.1/9060/5310B was outside the control limits for the analyte Total Organic Carbon (TOC). The % Recovery was reported as 175 and the control limits were 85 to 115.				
3123269001	4	3079RIVERRD	SM5310B-2011	Total Organic Carbon (TOC)
The QC sample type MSD for method 415.1/9060/5310B was outside the control limits for the analyte Total Organic Carbon (TOC). The % Recovery was reported as 224 and the control limits were 85 to 115.				
3123269001	5	3079RIVERRD	SM5310B-2011	Total Organic Carbon (TOC)
The QC sample type MSD for method 415.1/9060/5310B was outside the control limits for the analyte Total Organic Carbon (TOC). The RPD was reported as 24.4 and the upper control limit is 15.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123269 3RD QTR 2020 3079 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123269001	3079RIVERRD	ASTM D6919-09		
3123269001	3079RIVERRD	EPA 200.7	EPA ACID	
3123269001	3079RIVERRD	EPA 200.7	EPA TRMD	
3123269001	3079RIVERRD	EPA 300.0		
3123269001	3079RIVERRD	EPA 410.4		
3123269001	3079RIVERRD	EPA 420.4	420.4/9066	
3123269001	3079RIVERRD	Field		
3123269001	3079RIVERRD	S2540C-11		
3123269001	3079RIVERRD	S4500HB-11		
3123269001	3079RIVERRD	SM2130B-2011		
3123269001	3079RIVERRD	SM2320B-2011		
3123269001	3079RIVERRD	SM2510B-2011		
3123269001	3079RIVERRD	SM5310B-2011		
3123269001	3079RIVERRD	SW846 8260B		
3123269001	3079RIVERRD	SW846 9020B		
3123269002	FIELD BLANK	SW846 8260B		
3123269003	TRIP BLANK	SW846 8260B		

Thursday, September 10, 2020 12:55:06 PM

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

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

* 3 1 2 3 2 6 9 *

(ted 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/#: LCSWMA - Quarterly Fire Co.

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

Cooler Temp: 9 Therm ID: 294

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	AN	AN	CG	—	PL	PL	PL	P.	
Container Size	40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3	Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
1 3079RIVERRD	08/21/20	1522	G	DW	2	1	2	2	x	1	1	1	1	1	
2. Field Blank	08/21/20	1529	G	DW				2							
3. Trip Blank	08/21/20	~~1530~~ 1730	G	DW				2							
4															
5															
6															
7															
8															
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 [illegible] ALS	8/21/20	1730	2 [illegible]	8/21/20	1730
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; Oil=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater

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

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123269 Initials: DN Date: 8/21

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 Temp >6°		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): 9

Thermometer ID: 294

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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September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3088 RIVER RD**	Workorder:	**3123268**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3088 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

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

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Landowner , 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: 3123268 3RD QTR 2020-3088 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123268001	3088 River Road, Conestoga PA	Water	8/21/2020 12:10	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123268 3RD QTR 2020-3088 RIVER RD

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: 3123268 3RD QTR 2020-3088 RIVER RD

Lab ID: **3123268001** Date Collected: 8/21/2020 12:10 Matrix: Water

Sample ID: **3088 River Road, Conestoga PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/26/20 04:58	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:58	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	93.3		%	62 - 133	SW846 8260B			8/26/20 04:58	PDK	K
4-Bromofluorobenzene (S)	105		%	79 - 114	SW846 8260B			8/26/20 04:58	PDK	K
Dibromofluoromethane (S)	93.2		%	78 - 116	SW846 8260B			8/26/20 04:58	PDK	K
Toluene-d8 (S)	102		%	76 - 127	SW846 8260B			8/26/20 04:58	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	168		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	168	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 11:29	JXL	B
Chemical Oxygen Demand (COD)	22		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	222		mg/L	5.0	EPA 300.0			8/26/20 06:52	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 16:30	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/25/20 15:59	PAG	I
Nitrate-N	5.7		mg/L	0.20	EPA 300.0			8/22/20 16:30	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 16:30	MBW	C
pH	6.94	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	0.006		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	1010		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	8.4		mg/L	2.0	EPA 300.0			8/22/20 16:30	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123268 3RD QTR 2020-3088 RIVER RD

Lab ID: **3123268001** Date Collected: 8/21/2020 12:10 Matrix: Water

Sample ID: **3088 River Road, Conestoga PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
Total Dissolved Solids	522	3	mg/L	25	S2540C-11			8/31/20 13:34	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 00:58	PAG	F
Turbidity	0.23		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	0.16		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Calcium, Dissolved	0.14		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
Magnesium, Total	0.055		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Magnesium, Dissolved	ND		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
Manganese, Total	ND		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Manganese, Dissolved	ND		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
Potassium, Total	3.1		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Potassium, Dissolved	2.8		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
Sodium, Total	209		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 11:02	SRT	D
Sodium, Dissolved	226		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:05	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	6.33		pH_Units		Field			8/21/20 12:10	BGS	M
Specific Conductance, Field	328		umhos/cm	1	Field			8/21/20 12:10	BGS	M
Temperature	19.30		Deg. C		Field			8/21/20 12:10	BGS	M

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3123268 3RD QTR 2020-3088 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123268001	1	3088 River Road, Conestoga PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123268001	2	3088 River Road, Conestoga PA	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.				
3123268001	3	3088 River Road, Conestoga PA	S2540C-11	Total Dissolved Solids
The sample was originally run within hold time, but required further analysis that exceeded hold time.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123268 3RD QTR 2020-3088 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123268001	3088 River Road, Conestoga PA	ASTM D6919-09		
3123268001	3088 River Road, Conestoga PA	EPA 200.7	EPA ACID	
3123268001	3088 River Road, Conestoga PA	EPA 200.7	EPA TRMD	
3123268001	3088 River Road, Conestoga PA	EPA 300.0		
3123268001	3088 River Road, Conestoga PA	EPA 410.4		
3123268001	3088 River Road, Conestoga PA	EPA 420.4	420.4/9066	
3123268001	3088 River Road, Conestoga PA	Field		
3123268001	3088 River Road, Conestoga PA	S2540C-11		
3123268001	3088 River Road, Conestoga PA	S4500HB-11		
3123268001	3088 River Road, Conestoga PA	SM2130B-2011		
3123268001	3088 River Road, Conestoga PA	SM2320B-2011		
3123268001	3088 River Road, Conestoga PA	SM2510B-2011		
3123268001	3088 River Road, Conestoga PA	SM5310B-2011		
3123268001	3088 River Road, Conestoga PA	SW846 8260B		
3123268001	3088 River Road, Conestoga PA	SW846 9020B		

Thursday, September 10, 2020 12:53:41 PM

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

1 of 1

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

Client Name: LCSWMA - Hans Weber and Deb Kalbach

Address: 3088 River Road
Conestoga, PA 17516

Contact: Hans Weber and Deb Kalbach

Phone#: (717) 419-7982

Project Name/#: LCSWMA - Quarterly

Bill To: LCSWMA - Hans Weber and Deb Kalbach

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

Date Required: _____ Approved By: _____

Email? [ ] -Y _____

Fax? [ ] -Y No.: _____

(ted by Receiving Lab)

Cooler Temp: 8 Therm ID: 294

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	AN	AN	CG	---	PL	PL	PL	PL	
Container Size	40 ml	125 ml	250 ml	40 ml	---	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	---	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3	Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
1 3088RIVER RD	08/21/20	1210	G	DW	2	1	2	2	X	1	1	1	1	1	
2															
3															
4															
5															
6															
7															
8															
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 [signature] ALS	8-21-20	1230	2 [signature]	8/21/20	1730
3			4		
5			6		
7			8		
9			10		

Data Deliverables: [ ] Standard [ ] CLP-like [ ] USACE [ ]

Reportable to PADEP? Yes [ ]

PWSID # _____

Special Processing: USACE [ ] Navy [ ] [ ]

Sample Disposal: Lab [X] Special [ ]

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

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

ALS

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Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123268 Initials: DN Date: 8/21

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 Temp >6°		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): 8

Thermometer ID: 794

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

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September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3100 RIVER RD**	Workorder:	**3123267**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3100 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Landowner , 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: 3123267 3RD QTR 2020-3100 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123267001	3100 River Road, Conestoga, PA	Water	8/21/2020 12:25	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123267 3RD QTR 2020-3100 RIVER RD

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: 3123267 3RD QTR 2020-3100 RIVER RD

Lab ID: **3123267001** Date Collected: 8/21/2020 12:25 Matrix: Water

Sample ID: **3100 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/26/20 04:35	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/26/20 04:35	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.9		%	62 - 133	SW846 8260B			8/26/20 04:35	PDK	K
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/26/20 04:35	PDK	K
Dibromofluoromethane (S)	91.7		%	78 - 116	SW846 8260B			8/26/20 04:35	PDK	K
Toluene-d8 (S)	100		%	76 - 127	SW846 8260B			8/26/20 04:35	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	11		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	11	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 03:01	JXL	B
Chemical Oxygen Demand (COD)	23		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	41.8		mg/L	2.0	EPA 300.0			8/22/20 16:15	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 16:15	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/25/20 15:29	PAG	I
Nitrate-N	4.7		mg/L	0.20	EPA 300.0			8/22/20 16:15	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 16:15	MBW	C
pH	5.64	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	0.005		mg/L	0.005	EPA 420.4	8/26/20 06:53	C_D	8/26/20 10:35	VXF	H
Specific Conductance	216		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	8.7		mg/L	2.0	EPA 300.0			8/22/20 16:15	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123267 3RD QTR 2020-3100 RIVER RD

Lab ID: **3123267001** Date Collected: 8/21/2020 12:25 Matrix: Water

Sample ID: **3100 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	162		mg/L	25	S2540C-11			8/26/20 11:06	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 00:58	PAG	F
Turbidity	0.15		NTU	0.10	SM2130B-2011			8/22/20 07:43	R2B	C
METALS										
Calcium, Total	14.0		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Calcium, Dissolved	14.5		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
Magnesium, Total	6.2		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Magnesium, Dissolved	6.4		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
Manganese, Total	0.0081		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Manganese, Dissolved	0.0082		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
Potassium, Total	1.6		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Potassium, Dissolved	1.6		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
Sodium, Total	16.2		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 10:59	SRT	D
Sodium, Dissolved	16.9		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:02	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	5.09		pH_Units		Field			8/21/20 12:25	BGS	M
Specific Conductance, Field	259		umhos/cm	1	Field			8/21/20 12:25	BGS	M
Temperature	22.00		Deg. C		Field			8/21/20 12:25	BGS	M

Susan J. Scherer

Ms. Susan J Scherer
Project Coordinator

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: 3123267 3RD QTR 2020-3100 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123267001	1	3100 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123267001	2	3100 River Road, Conestoga, PA	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123267 3RD QTR 2020-3100 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123267001	3100 River Road, Conestoga, PA	ASTM D6919-09		
3123267001	3100 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123267001	3100 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123267001	3100 River Road, Conestoga, PA	EPA 300.0		
3123267001	3100 River Road, Conestoga, PA	EPA 410.4		
3123267001	3100 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123267001	3100 River Road, Conestoga, PA	Field		
3123267001	3100 River Road, Conestoga, PA	S2540C-11		
3123267001	3100 River Road, Conestoga, PA	S4500HB-11		
3123267001	3100 River Road, Conestoga, PA	SM2130B-2011		
3123267001	3100 River Road, Conestoga, PA	SM2320B-2011		
3123267001	3100 River Road, Conestoga, PA	SM2510B-2011		
3123267001	3100 River Road, Conestoga, PA	SM5310B-2011		
3123267001	3100 River Road, Conestoga, PA	SW846 8260B		
3123267001	3100 River Road, Conestoga, PA	SW846 9020B		

Thursday, September 10, 2020 12:52:40 PM

ALS Environmental

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

* 3 1 2 3 2 6 7 *

1 of 1

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

Client Name: LCSWMA - Larry Kirchner

Address: 3100 River Road

Conestoga, PA 17516

Contact: Larry Kirchner

Phone#: (717) 584-0030

Project Name/#: LCSWMA - Quarterly

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

Container Type	AG	AN	AN	CG	---	PL	PL	PL	PL	PL
Container Size	40 ml	125 ml	250 ml	40 ml	---	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative	HCl	H2SO4	H2SO4	HCl	---	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
					Enter Number of Containers Per Sample or Field Results Below.									
1 3100RIVERRD	08/21/20	1225	G	DW	2	1	2	2	X	1	1	1	1	1
2														
3														
4														
5														
6														
7														
8														
9														
10														

* 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

(ed by Receiving Lab)

Cooler Temp: 12 Therm ID: 294

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 [signature] ALS	8-21-20	1720	2 [signature]	8/21/20	1730
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: _____

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 #: 3123267 Initials: DN Date: 8/21

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 Temp >6°		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): 12

Thermometer ID: 294

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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September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3106 RIVER RD**	Workorder:	**3123284**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3106 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Landowner , 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: 3123284 3RD QTR 2020-3106 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123284001	3106 River Road, Conestoga, PA	Water	8/21/2020 12:36	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123284 3RD QTR 2020-3106 RIVER RD

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: 3123284 3RD QTR 2020-3106 RIVER RD

Lab ID: **3123284001** Date Collected: 8/21/2020 12:36 Matrix: Water

Sample ID: **3106 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 06:19	VLM	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 06:19	VLM	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	117		%	62 - 133	SW846 8260B			8/27/20 06:19	VLM	K
4-Bromofluorobenzene (S)	79.7		%	79 - 114	SW846 8260B			8/27/20 06:19	VLM	K
Dibromofluoromethane (S)	103		%	78 - 116	SW846 8260B			8/27/20 06:19	VLM	K
Toluene-d8 (S)	97.7		%	76 - 127	SW846 8260B			8/27/20 06:19	VLM	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	12		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	12	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/28/20 00:00	JXL	B
Chemical Oxygen Demand (COD)	24		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	109		mg/L	2.0	EPA 300.0			8/22/20 15:10	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 15:10	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/27/20 16:48	PAG	I
Nitrate-N	10.8		mg/L	0.20	EPA 300.0			8/22/20 15:10	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 15:10	MBW	C
pH	6.04	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	ND		mg/L	0.005	EPA 420.4	8/26/20 06:54	C_D	8/26/20 10:35	VXF	H
Specific Conductance	469		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	5.6		mg/L	2.0	EPA 300.0			8/22/20 15:10	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123284 3RD QTR 2020-3106 RIVER RD

Lab ID: **3123284001** Date Collected: 8/21/2020 12:36 Matrix: Water

Sample ID: **3106 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	296		mg/L	25	S2540C-11			8/26/20 11:29	KXH	C
Total Organic Carbon (TOC)	ND		mg/L	0.50	SM5310B-2011			8/26/20 08:55	PAG	F
Turbidity	0.29		NTU	0.10	SM2130B-2011			8/22/20 07:50	R2B	C
METALS										
Calcium, Total	21.4		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Calcium, Dissolved	22.2		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
Iron, Total	0.052		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
Magnesium, Total	14.6		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Magnesium, Dissolved	14.9		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
Manganese, Total	0.044		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Manganese, Dissolved	0.045		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
Potassium, Total	2.3		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Potassium, Dissolved	2.3		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
Sodium, Total	43.4		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:29	SRT	D
Sodium, Dissolved	46.2		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 16:16	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	5.24		pH_Units		Field			8/21/20 12:36	BGS	M
Specific Conductance, Field	452		umhos/cm	1	Field			8/21/20 12:36	BGS	M
Temperature	18.30		Deg. C		Field			8/21/20 12:36	BGS	M

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3123284 3RD QTR 2020-3106 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123284001	1	3106 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123284001	2	3106 River Road, Conestoga, PA	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.				

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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: 3123284 3RD QTR 2020-3106 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123284001	3106 River Road, Conestoga, PA	ASTM D6919-09		
3123284001	3106 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123284001	3106 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123284001	3106 River Road, Conestoga, PA	EPA 300.0		
3123284001	3106 River Road, Conestoga, PA	EPA 410.4		
3123284001	3106 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123284001	3106 River Road, Conestoga, PA	Field		
3123284001	3106 River Road, Conestoga, PA	S2540C-11		
3123284001	3106 River Road, Conestoga, PA	S4500HB-11		
3123284001	3106 River Road, Conestoga, PA	SM2130B-2011		
3123284001	3106 River Road, Conestoga, PA	SM2320B-2011		
3123284001	3106 River Road, Conestoga, PA	SM2510B-2011		
3123284001	3106 River Road, Conestoga, PA	SM5310B-2011		
3123284001	3106 River Road, Conestoga, PA	SW846 8260B		
3123284001	3106 River Road, Conestoga, PA	SW846 9020B		

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

* 3 1 2 3 2 8 4 *

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

Client Name: LCSWMA - Aaron Fry

Address: 3106 River Road

Conestoga, PA 17516

Contact: Aaron Fry

Phone#: (717) 669-6831

Project Name/#: LCSWMA - Quarterly

Bill To: LCSWMA - Aaron Fry

TAT [X] Normal-Standard TAT is 10-12 business days.

[ ] Rush-Subject to ALS approval and surcharges.

Date Required: _____ Approved By: _____

Email? [ ] -Y _____

Fax? [ ] -Y No.: _____

Sample Description/Location (as it will appear on the lab report)	Sample Date	Time	*G or C	**Matrix	TOC	O-OH	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3
Container Type					AG	AN	AN	CG	---	PL	PL	PL	PL	
Container Size					40 ml	125 ml	250 ml	40 ml	---	250 ml	125 ml	125 ml	500 ml	500 ml
Preservative					HCl	H2SO4	H2SO4	HCl	---	H2SO4	HNO3	HNO3	None	None
ANALYSES/METHOD REQUESTED														
Enter Number of Containers Per Sample or Field Results Below.														
1 3106RIVERRD	08/21/20	1236	G	DW	2	1	2	2	X	1	1	1	1	1
2														
3														
4														
5														
6														
7														
8														
9														
10														

Cooler Temp: 10 Therm ID: 294

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 [signature] ALS	8-21-20	1730	2 [signature]	8/21/20	1730
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

ALS

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

Condition of Sample Receipt Form

Client: LCSWMA Work Order #: 3123284 Initials: DN Date: 8/21

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 Temp >6°		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): 10

Thermometer ID: 794

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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September 10, 2020

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

Certificate of Analysis

Project Name:	**CONTIGUOUS LANDOWNER-3125 RIVER RD**	Workorder:	**3123283**
Purchase Order:	**PO1000126**	Workorder ID:	**3RD QTR 2020-3125 RIVER RD**

Dear Mr. Brown:

Enclosed are the analytical results for samples received by the laboratory on Friday, August 21, 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.

This laboratory report may not be reproduced, except in full, without the written approval of ALS Environmental.

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

CC: Ms. Ashley Gichuki , Ms. Jordan Gallagher , Landowner , 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: 3123283 3RD QTR 2020-3125 RIVER RD

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
3123283001	3125 River Road, Conestoga, PA	Water	8/21/2020 13:00	8/21/2020 17:30	Mr. Brian G Shade

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SAMPLE SUMMARY

Workorder: 3123283 3RD QTR 2020-3125 RIVER RD

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: 3123283 3RD QTR 2020-3125 RIVER RD

Lab ID: **3123283001** Date Collected: 8/21/2020 13:00 Matrix: Water

Sample ID: **3125 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS										
Benzene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
1,1-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
1,2-Dichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
1,1-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
cis-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
trans-1,2-Dichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Ethylbenzene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Methylene Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Tetrachloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Toluene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Total Xylenes	ND		ug/L	3.0	SW846 8260B			8/27/20 05:59	PDK	K
1,1,1-Trichloroethane	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Trichloroethene	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Trichlorofluoromethane	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Vinyl Chloride	ND		ug/L	1.0	SW846 8260B			8/27/20 05:59	PDK	K
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	92.2		%	62 - 133	SW846 8260B			8/27/20 05:59	PDK	K
4-Bromofluorobenzene (S)	104		%	79 - 114	SW846 8260B			8/27/20 05:59	PDK	K
Dibromofluoromethane (S)	94.9		%	78 - 116	SW846 8260B			8/27/20 05:59	PDK	K
Toluene-d8 (S)	102		%	76 - 127	SW846 8260B			8/27/20 05:59	PDK	K
WET CHEMISTRY										
Alkalinity, Bicarbonate	124		mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	C
Alkalinity, Total	124	1	mg/L	5	SM2320B-2011			8/25/20 20:33	R2B	A
Ammonia-N	ND		mg/L	0.100	ASTM D6919-09			8/29/20 02:20	JXL	B
Chemical Oxygen Demand (COD)	21		mg/L	15	EPA 410.4			9/9/20 22:10	JAM	B
Chloride	85.0		mg/L	2.0	EPA 300.0			8/22/20 13:34	MBW	C
Fluoride	ND		mg/L	0.20	EPA 300.0			8/22/20 13:34	MBW	C
Halogen, Total Organic (TOX)	ND		ug/L	20.0	SW846 9020B			8/27/20 16:18	PAG	I
Nitrate-N	4.7		mg/L	0.20	EPA 300.0			8/22/20 13:34	MBW	C
Nitrite-N	ND		mg/L	0.20	EPA 300.0			8/22/20 13:34	MBW	C
pH	6.89	2	pH_Units		S4500HB-11			8/25/20 20:33	R2B	C
Phenolics	ND		mg/L	0.005	EPA 420.4	8/26/20 06:54	C_D	8/26/20 10:35	VXF	H
Specific Conductance	563		umhos/cm	1	SM2510B-2011			8/25/20 20:33	R2B	C
Sulfate	9.8		mg/L	2.0	EPA 300.0			8/22/20 13:34	MBW	C

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ANALYTICAL RESULTS

Workorder: 3123283 3RD QTR 2020-3125 RIVER RD

Lab ID: **3123283001** Date Collected: 8/21/2020 13:00 Matrix: Water

Sample ID: **3125 River Road, Conestoga, PA** Date Received: 8/21/2020 17:30

Parameters	Results	Flag	Units	RDL	Method	Prepared	By	Analyzed	By	*Cntr*
Total Dissolved Solids	300		mg/L	25	S2540C-11			8/26/20 11:29	KXH	C
Total Organic Carbon (TOC)	0.61		mg/L	0.50	SM5310B-2011			8/26/20 08:55	PAG	F
Turbidity	0.16		NTU	0.10	SM2130B-2011			8/22/20 07:50	R2B	C
METALS										
Calcium, Total	0.30		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Calcium, Dissolved	0.28		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
Iron, Total	ND		mg/L	0.030	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Iron, Dissolved	ND		mg/L	0.060	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
Magnesium, Total	0.056		mg/L	0.050	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Magnesium, Dissolved	ND		mg/L	0.10	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
Manganese, Total	ND		mg/L	0.0025	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Manganese, Dissolved	ND		mg/L	0.0050	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
Potassium, Total	2.3		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Potassium, Dissolved	2.0		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
Sodium, Total	120		mg/L	0.25	EPA 200.7	8/25/20 17:03	SXC	8/26/20 12:26	SRT	D
Sodium, Dissolved	125		mg/L	0.50	EPA 200.7	8/25/20 07:29	SRT	8/27/20 15:57	SRT	E
FIELD PARAMETERS										
pH, Field (SM4500B)	6.16		pH_Units		Field			8/21/20 13:00	BGS	M
Specific Conductance, Field	554		umhos/cm	1	Field			8/21/20 13:00	BGS	M
Temperature	21.00		Deg. C		Field			8/21/20 13:00	BGS	M

Ms. Susan J Scherer
Project Coordinator

ALS Environmental

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ANALYTICAL RESULTS

Workorder: 3123283 3RD QTR 2020-3125 RIVER RD

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
3123283001	1	3125 River Road, Conestoga, PA	SM2320B-2011	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
3123283001	2	3125 River Road, Conestoga, PA	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.				

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ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3123283 3RD QTR 2020-3125 RIVER RD

Lab ID	Sample ID	Analysis Method	Prep Method	Leachate Method
3123283001	3125 River Road, Conestoga, PA	ASTM D6919-09		
3123283001	3125 River Road, Conestoga, PA	EPA 200.7	EPA ACID	
3123283001	3125 River Road, Conestoga, PA	EPA 200.7	EPA TRMD	
3123283001	3125 River Road, Conestoga, PA	EPA 300.0		
3123283001	3125 River Road, Conestoga, PA	EPA 410.4		
3123283001	3125 River Road, Conestoga, PA	EPA 420.4	420.4/9066	
3123283001	3125 River Road, Conestoga, PA	Field		
3123283001	3125 River Road, Conestoga, PA	S2540C-11		
3123283001	3125 River Road, Conestoga, PA	S4500HB-11		
3123283001	3125 River Road, Conestoga, PA	SM2130B-2011		
3123283001	3125 River Road, Conestoga, PA	SM2320B-2011		
3123283001	3125 River Road, Conestoga, PA	SM2510B-2011		
3123283001	3125 River Road, Conestoga, PA	SM5310B-2011		
3123283001	3125 River Road, Conestoga, PA	SW846 8260B		
3123283001	3125 River Road, Conestoga, PA	SW846 9020B		

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

Generated by ALS

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

* 3 1 2 3 2 8 3 *

1 of 1

Client Name: LCSWMA - Christian C. Beck

Address: 3125 River Road
Conestoga, PA 17516

Contact: Christian C. Beck

Phone#: (717) 871-0448

Project Name/#: LCSWMA - Quarterly

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? [ ] -Y _____

Fax? [ ] -Y No.: _____

Container Type					AG	AN	AN	CG	—	PL	PL	PL			
Container Size					40 ml	125 ml	250 ml	40 ml	—	250 ml	125 ml	125 ml	500 ml	500 ml	
Preservative					HCl	H2SO4	H2SO4	HCl	—	H2SO4	HNO3	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	TOX	SW846-8260 VOCs	FM	NH3-N, COD	Dissolved Metals: Ca, Fe, Mg, Mn, K, Na	Metals: Ca, Fe, Mg, Mn, K, Na	pH, TDS, NO2, NO3, Cl, SO4, F, Tb, SpC	Alkalinity, HCO3	Sample/COC Comments
					Enter Number of Containers Per Sample or Field Results Below.										
1 3125RIVERRD	08/21/20	1300	G	DW	2	1	2	2	x	1	1	1	1	1	
2															
3															
4															
5															
6															
7															
8															
9															
10															

(...leted by Receiving Lab)

Cooler Temp: 14 Therm ID: 294

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 #:

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 [signature] ALS	8-21-20	1730	2 [signature]	8/21/20	1730
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

3123283

Client: LCSWMA Work Order #: 3123282 Initials: DN Date: 8/21

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 Temp >6°		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):	14							
Thermometer ID:	294							
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

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