# 2018 WATER QUALITY MONITORING BELTZVILLE RESERVOIR LEHIGHTON, PENNSYLVANIA



U.S. Army Corps of Engineers Philadelphia District Environmental Resources Branch

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## 1.0 INTRODUCTION

#### 1.1 PURPOSE OF THE MONITORING PROGRAM

The U.S. Army Corps of Engineers (USACE) operates Beltzville Reservoir located in east-central Pennsylvania within the Delaware River Basin. Beltzville Reservoir provides flood control and a dependable water supply to downstream communities along the Pohopoco Creek and Lehigh River. Additionally, the reservoir provides important habitat for fish, waterfowl, and other wildlife, and recreational opportunities through fishing, boating, and swimming. Due to the broad range of uses and demands that Beltzville Reservoir serves, the USACE monitors water quality to compare with state water quality standards and to diagnose other problems that commonly effect reservoir health such as nutrient enrichment and toxic loadings. This report summarizes the results of water quality monitoring at Beltzville Reservoir from 06 June to 06 September 2018.

#### 1.2 DESCRIPTION OF BELTZVILLE RESERVOIR

Beltzville Reservoir was designed to provide flood control, water supply, and enhanced water quality to downstream communities along the Lehigh River. The damming of Pohopoco Creek approximately three miles upstream of its confluence with the Lehigh River formed the reservoir. The reservoir is located in Carbon County, 3 miles northeast of Lehighton and about 20 miles northwest of Allentown, Pennsylvania. The reservoir dams a drainage area of 96.3 square miles and can impound up to 13 billion gallons of water. The primary water source feeding into the lake is Pohopoco Creek as it flows southwest to the Lehigh River. Secondary water sources include Pine Run and Wild Creek, both entering the reservoir from the north. The reservoir is approximately 7 miles long and, when full, covers an area of 947 acres. The maximum depth of the lake is 140 feet near the face of the dam.

#### 1.3 ELEMENTS OF THE STUDY

The USACE, Philadelphia District, has been monitoring the water quality of Beltzville Reservoir since 1975. Over this time, the yearly monitoring designs have evolved to address new concerns such as the health of public drinking water and contamination of reservoir bottom sediments. The 2018 monitoring program included the following major elements:

- Monthly water quality and bacteria surface water monitoring of reservoir and upstream sources to evaluate compliance with Pennsylvania state water quality standards and to evaluate the health of the reservoir ecosystem starting on 28 June and ending on 06 September 2018; and
- Monthly profile samples for temperature, dissolved oxygen, chlorophyll a, pH, turbidity, and conductivity at all stations in the reservoir and watershed starting on 28 June and ending on 06 September 2018. An additional profile sampling was conducted at Station BZ-6 on 06 June.

### 2.0 METHODS

#### 2.1 STRATIFICATION MONITORING

Physical stratification monitoring of the water column was conducted five times at Beltzville Reservoir between 28 June and 06 September 2018 (Table 2-1). One additional profile sample was collected at Station BZ-6 on 06 June. Physical stratification parameters included depth, temperature, dissolved oxygen (DO), pH, turbidity, chlorophyll a, and conductivity. Physical stratification was monitored at seven fixed stations throughout the reservoir watershed (Fig. 2-1). Three stations were located within the reservoir body (BZ-3, BZ-6, and BZ-7) for which water quality was measured from the surface to the bottom in 5-foot increments. Surface water quality was measured at four stations, located in upstream source waters (BZ-2S on Pine Run, BZ-4S on Wild Creek, and BZ-5S on Pohopoco Creek) and BZ-1S downstream of the reservoir on Pohopoco Creek. The physical water quality parameters were measured with a calibrated YSI 6600 V2-4 water quality probe. For this report, all of the stratification monitoring results were summarized and compared to water quality standards enacted by the Pennsylvania Department of Environmental Protection (PADEP), where applicable.

#### 2.2 WATER COLUMN CHEMISTRY MONITORING

Water column chemistry monitoring was conducted five times (once a month) at Beltzville Reservoir between 28 June and 06 September 2018 (Table 2-1). Water samples were collected at the seven fixed stations in the reservoir watershed (Fig. 2-1). Surface water samples were collected in release waters downstream of the reservoir (BZ-1S) and on upstream tributary sources Pine Run (BZ-2S), Wild Creek (BZ-4S), and Pohopoco Creek (BZ-5S). Surface, middle, and bottom water samples were collected at three reservoir stations (BZ-3, BZ-6, and BZ-7). Surface water samples were collected by opening sample containers approximately 1 foot below the water's surface. Middle and bottom water samples were collected with a Van Dorn design horizontal water bottle. SGS North America Inc. laboratory in Dayton, New Jersey conducted the laboratory water sample analysis for 2018.

Water samples from all depths were analyzed for ammonia, nitrite, nitrate, total Kjeldahl nitrogen, total phosphorus, soluble phosphorus, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, and total organic carbon. Table 2-2 summarizes the laboratory method detection limits, laboratory/Corps required reporting limits, state regulatory criteria, and allowable maximum hold times for each water quality parameter monitored.

<b>Table 2-1.</b> Be	eltzville Reservoir	water quality mon	itoring schedule	for 2018		
Date of Sample Collection	Physical Stratification Monitoring (All Stations)	Water Column Chemistry Monitoring (All Stations)	BTEX Monitoring <sup>(2)</sup> (BZ-3 and -6)	Trophic State Assessment (BZ-6)	Coliform Bacteria Monitoring (All Surface Stations)	Drinking Water Monitoring <sup>(1)</sup>
06 June	X (Station BZ-6 Only)	-	-	-	-	-
28 June	х	x	-	х	Х	-
12 July	х	x	-	х	Х	-
31 July	х	x	-	х	Х	-
15 August	Х	X	-	х	Х	-
06 September	Х	Х	-	Х	х	-

(1) Drinking water samples are sampled quarterly by personnel at each reservoir. This data has not been included within the reservoir water quality sampling report.

(2) BTEX sampling was not conducted in 2018 based on historically low and non-detectable levels of these parameters.



Figure 2-1. Beltzville Reservoir and the location of water quality monitoring stations in 2018.

Table 2-2.Water qual holding tim 2018	ity test methods es for water qua	, detection limits, ality parameters r	, state regulatory c nonitored at Beltzv	riteria, and sample ille Reservoir in	
Parameter	(2) Limit of PAD Quantification Wat LOQ 0		PADEP Surface Water Quality Criteria	Allowable Hold Times (Days)	
Total Alkalinity	SM20 2320 B-11	5.0 mg/L	Min. 20 mg/L CaCO₃	14	
Biochemical Oxygen Demand (BOD)	SM5210 B-11	2.0 mg/L	None	2	
Total Phosphorus	EPA 365.3	0.05 mg/L	None	28	
Diss./Ortho-Phosphate	NA	NA	None	28	
Soluble Phosphorus	EPA 365.3	0.05 mg/L	None	28	
Total Organic Carbon (TOC)	SM5310 B-11	1.0 mg/L	None	28	
Total Inorganic Carbon (TIC) *	NA	NA	None	28	
Total Carbon (TOC + TIC) *	NA	NA	None	28	
(1) Chlorophyll a	YSI Probe		None	In Situ	
Total Kjeldahl Nitrogen	EPA 351.2/ LACHAT	0.20 mg/L	None	28	
Ammonia	SM4500 H-11LACHAT	0.20 mg/L	Temp. and pH dependent	28	
Nitrate	EPA 353.2/ SM4500NO2B	0.11 mg/L	Maximum	28	
Nitrite	SM4500NO2 B-11	0.01 mg/L	(nitrate + nitrite)	28	
Total Dissolved Solids	SM2540 C-11	10.0 mg/L	Maximum 750 mg/L	7	
Total Suspended Solids	SM2540 D-11	4.0 mg/L	None	7	

(1) Chlorophyll a samples were recorded using a YSI 6600 with a chlorophyll sensor.

(2) Laboratory Methods Reference:

**EPA**- "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

**SM-** "Standard Methods for the Examination of Water and Wastewater", 22<sup>nd</sup> Edition, 2012.

**SW846**- "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", 3<sup>rd</sup>. Edition, November 1986 and updates.

\* Total Inorganic Carbon and Total Carbon were not sampled for in 2018

#### 2.3 TROPHIC STATE DETERMINATION

The trophic state of Beltzville Reservoir was determined by methods outlined by Carlson (1977). In general, this method calculated trophic state indices (TSIs) independently for measures of total phosphorus, chlorophyll *a*, and secchi disk depth. Surface water measures of total phosphorus and chlorophyll *a* from chemistry monitoring were used independently in the determination of monthly trophic state (Table 2-1). Secchi disk depth was measured monthly at reservoir-body station BZ-6. Trophic state determinations were made using criteria defined by Carlson and EPA (1983) and calculated only for Station BZ-6 within the deepest portion of the reservoir.

#### 2.4 RESERVOIR BACTERIA MONITORING

Monitoring for coliform bacteria contaminants was conducted five times at Beltzville Reservoir between 28 June and 06 September 2018 (Table 2-1). Surface water samples were collected at all seven stations and analyzed for total coliform and fecal coliform each month. The samples were collected in the same manner as the chemistry samples or approximately 1-foot below the surface of the water. Table 2-3 presents the test methods, detection limits, PADEP standards, and sample holding times for the bacteria parameters monitored at Beltzville Reservoir in 2018. The bacteria analytical method was based on a membrane filtration technique. All of the samples were analyzed within their maximum allowable hold times.

Table 2-3. Wat hold	ter quality to ding times f	est methods, detection li or bacteria parameters r	mits, PADEP standards, and sample nonitored at Beltzville Reservoir in 2018.
Paramete	er	Total Coliform	Fecal Coliform
Test metho	od	SM 9223 B-06	SM 9222 D-06
Limit of Quantif	fication	10 clns/100-mls	10 clns/100-mls
PADEP stan	dard	None	Geometric mean < 200 clns/100-mls or a single sample reading of < 1000 clns/100-mls
Maximum allowab time	le holding	30 hours	30 hours
Achieved holdir	ng time	< 30 hours	< 30 hours

The PADEP monthly coliform bacteria standard is defined as a maximum geometric mean of 200 colonies/100-ml based on 5 consecutive samples collected on different days. In addition, a single sample standard of 1000 colonies/100-ml can also be used. These standards are most applicable at bathing beaches. Beltzville State Park maintains a bathing beach at Beltzville Reservoir and conducts bacteria sampling of that area. Given our logistical limitations (all monthly sampling conducted on one day) and the fact that water contact recreation is permitted within the reservoir, the coliform data collected by the Corps is compared to the single sample standard as a method of collecting and evaluating background coliform data on the main body of the reservoir. Although our sampling design does not fully meet PADEP guidelines for bathing beach monitoring, we feel that this interpretation of the coliform data meets the intent of the PADEP water quality standard for evaluating Beltzville Reservoir bacteria levels within the main reservoir body.

### 3.0 RESULTS AND DISCUSSION

#### 3.1 STRATIFICATION MONITORING

The following sections summarize the water quality monitoring results of the physical and chemical parameters: temperature, dissolved oxygen, and pH. Seasonal and spatial patterns of surface water quality measured throughout the reservoir watershed, and seasonal and depth related patterns of the stratified lake water column based on measures from the deepest portion of the reservoir (station BZ-6 or the "Tower") are described. The discussion of stratification is focused on this station as water quality problems related to depth are generally most severe in deeper water habitats. Corps personnel collected the physical and chemical water quality data discussed herein over the monitoring period from June to September 2018. All of the parameters were measured with a calibrated YSI 6600 V2-4 water quality probe and are presented in Appendix A.

#### 3.1.1 Temperature

Temperature is the primary influencing factor on water density, affects the solubility of many chemicals compounds, and can therefore influence the effect of pollutants on aquatic life. Increased temperatures elevate the metabolic oxygen demand, in conjunction with reduced oxygen solubility, and can impact many species. Vertical stratification patterns naturally occurring in lakes affect the distribution of dissolved and suspended compounds.

Temperatures of the tributary and downstream release surface waters generally followed a similar seasonal pattern throughout the watershed of Beltzville Reservoir during 2018 with maximum surface water temperatures seen in September at upstream stations (Fig. 3-1). The maximum upstream tributary temperature of 25.49 °C was seen at station BZ-4S on 06 September. The maximum downstream release (BZ-1S) surface water temperature was 19.06 °C on 06 September. Upstream and downstream waters have a variety of environmental and anthropogenic factors potentially influencing surface water temperature. Station BZ-1S is directly influenced by Beltzville Reservoir releases that come from various locations in the water column and is dictated by reservoir release operations. Downstream release temperatures are managed to meet Pennsylvania State High Quality Cold Water Fishery standards. Station BZ-2S is a small well vegetated cold water tributary. Station BZ-4S is influenced by Wild Creek Reservoir releases upstream of Beltzville Reservoir and maintained the highest average tributary surface water temperatures throughout the sampling season. Station BZ-5S is located in an open water area were Pohopoco Creek enters Beltzville Reservoir. These factors, amongst others, result in the temperature variations in surface water temperatures at each tributary station shown in Figure 3.1.

Beltzville Reservoir was stratified with respect to temperature in 2018 (Fig. 3-2). The reservoir surface waters are warmed by the sun and account for warmer surface water temperatures recorded at lake stations (BZ-3, BZ-7, and BZ-6). In June, the onset of stratification was apparent with lake surface temperatures (20.57°C) approximately 13.88°C warmer than the lower water column (6.69°C). A strong stratification pattern was evident from June into August. In September, cooling surface temperatures and erosion of the epilimnion marked the onset of fall turnover and destratification within the reservoir.



**Figure 3-1.** Tributary and downstream surface water temperature (°C) measured at Beltzville Reservoir in 2018. See Appendix A for Summary of plotted values. Station BZ-1 reflects releases surface water temperatures downstream of Beltzville Reservoir. The coldwater species preference temperature of 20°C is shown as a red line reference.



**Figure 3-2.** Lake temperature profile at station BZ-6 of Beltzville Reservoir in 2018. See Appendix A for summary of plotted values. The yellow bars represent the locations of water control gates in the Beltzville Reservoir control tower. Corresponding downstream release water temperatures at Station BZ-1S on each sampling date is also presented.

#### 3.1.2 Dissolved Oxygen

Dissolved oxygen (DO) is the measure of the amount of DO in water. Typically, DO concentrations in surface waters are less than 10 mg/L. Dissolved Oxygen concentrations are subject to diurnal and seasonal fluctuations that can be influenced, in part, by air and water temperature, river discharge, and photosynthetic activity. Dissolved Oxygen is essential to the respiratory metabolism of most aquatic organisms. It affects the availability and solubility of nutrients and subsequently the productivity of aquatic ecosystems. Low levels of dissolved oxygen can facilitate the release of nutrients from bottom sediments.

Dissolved oxygen (DO) in the tributary and release surface waters remained primarily within an 8-11 mg/L range of values and followed a similar seasonal pattern throughout the watershed of Beltzville Reservoir during 2018 (Fig. 3-3). Dissolved oxygen concentrations downstream of the reservoir (BZ-1S) averaged 9.73 mg/L for the sampling season. The upstream tributary stations (BZ-2S, -4S, -5S) averaged 8.94 mg/L for the sampling season. The maximum DO reading of 10.34 mg/L occurred at BZ-1S on 15 August and a minimum reading of 7.93 mg/L occurred at BZ-4S on 06 September.

Dissolved Oxygen in the water column at station BZ-6 of Beltzville Reservoir from June through September, exhibited a metalimnetic oxygen minimum (negative heterograde curve) with concentrations decreasing, increasing and decreasing rapidly as measurements were taken from the surface to the lake bottom (Fig. 3-4). This general pattern has been observed at station BZ-6 in previous years and may be due to a lens of low oxygenated water passing through the reservoir from upstream sources, a result of portal operations at the reservoir tower, respiratory oxygen consumption, lake topography or some other factor or combination of factors.

DO concentrations in the water column of Beltzville Reservoir were in compliance with PADEP water quality standards during 2018. The state water quality standard for DO is a minimum concentration of 5-mg/L in the epilimnion of stratified lakes. As shown in Figure 3-4, concentrations falling below the standard were encountered in August and September, but were located below the epilimnion. DO concentrations measured in all surface waters of the reservoir were in compliance with the standard.

The health of aquatic ecosystems is impaired by low DO concentrations in the water column. Hypoxia, or conditions of DO less than 2 mg/L, is generally accepted as the threshold at which the most severe effects on biota occur. Bottom waters that are not mixed during stratification are depleted of oxygen primarily through biological respiration. In 2018, these conditions were seen in the water column at station BZ-6 in September (Appendix A).



Figure 3-3. Dissolved oxygen concentrations measured in tributary and downstream surface waters at Beltzville Reservoir in 2018. (The PADEP water quality standard for dissolved oxygen is a minimum concentration of 5 mg/L.) See Appendix A for summary of plotted values. Station BZ-1S reflects reservoir release surface waters downstream of Beltzville Reservoir.



**Figure 3-4.** Dissolved oxygen profile at station BZ-6 of Beltzville Reservoir in 2018. The PADEP water quality standard for DO is a minimum concentration of 5 mg/L in epilimnion. Start of hypoxia is shown as 2 mg/L. See Appendix A for summary of plotted values.

#### 3.1.3 pH

PH is the measure of the hydrogen –ion concentration in the water. The pH scale is 0-14. A pH below 7 is considered acidic and a pH above 7 is basic. High pH values tend to facilitate solubilization of ammonia, salts, and heavy metals. Low pH levels tend to increase carbonic acid and carbon dioxide concentrations. Lethal effects of pH on aquatic life typically occur below pH 4.5 and above pH 9.5.

Measures of pH at upstream tributary (BZ-2S, BZ-4S and BZ-5S) and release (BZ-1S) surface water stations primarily stayed within a tight range of values (6.53-7.71) and followed a similar seasonal pattern at Beltzville Reservoir during 2018 (Fig. 3-5).

In all months sampled in 2018, pH values in the lake water column were slightly higher near the water surface, declined rapidly, and remained relatively constant throughout most of the remaining water column (Fig. 3-6). The higher pH readings near the surface can be attributed to algal productivity in the trophic zone of the lake. A slight variation in pH in bottom waters occurred in the portions of the water column experiencing anoxic or low oxygen conditions. This localized change in pH may be attributed to anaerobic oxidation processes in the bottom waters of the lake. The pH measures at all lake and tributary stations at Beltzville Reservoir during 2018 were not in compliance with PADEP pH criteria. The standard for pH is a range of acceptable measures between 6 and 9. Lake surface waters exceeded standards in September (9.03) and were below minimum standards in bottom waters in August (5.88-5.97).



Figure 3-5. pH concentrations measured in tributary and downstream surface waters at Beltzville Reservoir in 2018. (The PADEP water quality standard for pH is between 6 and 9). See Appendix A for summary of plotted values.



Figure 3-6. pH profile at station BZ-6 of Beltzville Reservoir in 2018. (The PADEP water quality standard for pH is between 6 and 9) See Appendix A for summary of plotted value

#### 3.2 WATER COLUMN CHEMISTRY MONITORING

The following sections describe temporal, spatial, and patterns relating to depth for the water quality parameters measured in surface, middle, and bottom waters of Beltzville Reservoir during 2018 (Table 3-2).

#### 3.2.1 Ammonia

Total Ammonia (NH3) is a measure of the most reduced inorganic form of nitrogen in water and includes dissolved ammonia and the ammonium ion. Ammonia is a small component of the nitrogen cycle but as an essential plant nutrient, it contributes to the trophic status of a water body. Elevated ammonia in the lower water column of deep, stratified lakes and reservoirs usually results in those that are affected by eutrophication. Excess ammonia contributes to eutrophication of water bodies. This can result in excessive algal growths and impacts on recreation and drinking water supplies. In high concentrations, ammonia is toxic to aquatic life.

EPA guidance for ambient water quality criteria for Ammonia in freshwater are dependent on temperature and pH (EPA, 2013). Table 3.1 shows the acute and chronic criteria that are expected to protect freshwater aquatic life. The EPA (2013) also provides tables with the temperature and pH-dependent values of the acute criterion magnitude and the temperature and pH-dependent values of the chronic criterion magnitude. These tables provide an expected ammonia criteria over a wide range of pH and temperature values and can be utilized to evaluate field collected samples.

Table 3.1 Environmental Protection Agency Ammonia Freshwater Criteria 2013									
2013 Final Aquatic Life Criteria for Ammonia (Magnitude, Frequency, and Duration)									
(mg TAN/L) pH 7.0, T=20°C									
Acute (1-hour average)	17								
Chronic (30-day rolling average)	1.9*								
*Not to exceed 2.5 times the CCC as a 4-day average	e within the 30-days, i.e. 4.8 mg TAN/L at pH 7 and								
20°C, more than once in three years on average.									
Criteria frequency: Not to be exceeded more than one	e in three years on average.								

Ammonia concentrations were low in Beltzville Reservoir during 2018. With the exception of three samples, concentrations measured at all other stations and depths were less than the laboratory reporting limit of 0.20 mg/L during the entire sampling season. The maximum single recorded sample of 0.14 mg/L was collected from station BZ-7M on 06 September. Concentrations of ammonia measured at Beltzville Reservoir were in compliance with the PADEP water quality standards during 2018. The state water quality standard for ammonia is dependent on temperature and pH (Table 3-1).

<b>Table 3.2.</b>	Fable 3.2. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018												
Station	Date	ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	10.9	<3.40	<0.05	<0.20	<0.01	0.87	NS	44	0.27	1.70	<0.05	<4.0
	7/12/2018	10.9	<3.40	<0.05	<0.20	0.02	0.76	NS	228	0.28	1.20	<0.05	<1.0
	7/31/2018	4.7	<3.40	<0.05	<0.20	0.02	0.84	NS	65.7	0.34	2.00	<0.05	<3.3
B7-1S	8/15/2018	11.9	<3.40	<0.05	<0.20	<0.01	0.92	NS	82.9	0.15	1.90	<0.05	3.1
	9/6/2018	14.8	<3.40	<0.05	<0.20	<0.01	0.81	NS	95	0.23	4.00	<0.05	1.6
	Mean	10.64	3.4	.05	.20	.014	.84		103	.25	2.16	.05	2.6
	Stdev	3.29	0	0	0	.005	.05		64.75	.06	.96	0	1.13
	Max	14.8	3.4	.05	.20	.02	.92		228	.34	4	.05	4
	Min	4.7	3.4	.05	.20	.01	.76		44	.15	1.2	.05	1
	No. of Det.	5	0	0	0	2	5		5	5	5	0	2
	6/28/2018	8.8	<3.40	<0.05	<0.20	<0.01	0.26	NS	65	0.22	1.7	<0.05	<4
	7/12/2018	4.7	<3.40	<0.05	<0.20	<0.01	0.24	NS	4	0.19	1.1	<0.05	1.9
	7/31/2018	<4.0	<3.40	<0.05	<0.20	<0.01	0.31	NS	35	<0.15	<1.0	<0.05	2.3
	8/15/2018	6.2	<3.40	<0.05	<0.20	<0.01	0.23	NS	31.3	0.15	1.1	<0.05	2.5
D7 20	9/6/2018	8.4	<3.40	<0.05	<0.20	<0.01	0.20	NS	48.8	0.15	1.8	<0.05	2.0
BZ-25	Mean	6.42	3.4	.05	.20	.01	.25		36.82	.17	1.34	.05	2.54
	Stdev	1.92	0	0	0	0	.04		20.24	.03	.34	0	.76
	Max	8.8	3.4	.05	.20	.01	.31		65	.22	1.8	.05	4
	Min	4	3.4	.05	.20	.01	.20		4	.15	1	.05	1.9
	No. of Det.	4	0	0	0	0	5		5	4	4	0	4

Table 3.2	Fable 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018												
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	10.9	<3.40	<0.05	<0.20	<0.01	0.52	NS	57	0.28	1.5	<0.05	<4
	7/12/2018	9.4	<3.40	<0.05	<0.20	<0.01	0.39	NS	58.8	0.21	2.0	<0.05	<2.2
	7/31/2018	<4.0	<3.40	<0.05	<0.20	<0.01	0.32	NS	43	0.18	1.1	<0.05	<2.0
	8/15/2018	10.9	<3.40	<0.05	<0.20	<0.01	0.26	NS	35	0.15	1.8	<0.05	1.7
D7 20	9/6/2018	10.6	<3.40	<0.05	<0.20	<0.01	0.21	NS	46.7	0.24	2.9	<0.05	1.8
BZ-32	Mean	9.16	3.4	.05	.20	.01	.34		48.1	.21	1.8	.05	2.34
	Stdev	2.64	0	0	0	0	.11		8.87	.05	.60	0	.85
	Max	10.9	3.4	.05	.20	.01	.52		58.8	.28	2.9	.05	4
	Min	4.0	3.4	.05	.20	.01	.21		35	.15	1.1	.05	1.7
	No. of Det.	4	0	0	0	0	5		5	5	5	0	2
	6/28/2018	14.6	<3.40	<0.05	<0.20	<0.01	0.94	NS	71.4	0.24	1.8	<0.05	<4
	7/12/2018	10.4	<3.40	<0.05	<0.20	<0.01	0.82	NS	64	0.22	1.4	<0.05	1.3
	7/31/2018	<4.0	<3.40	<0.05	<0.20	<0.01	0.93	NS	47	0.17	<1.0	<0.05	<2.0
	8/15/2018	14	<3.40	<0.05	<0.20	<0.01	0.86	NS	66.3	0.16	2.2	<0.05	<2.0
	9/6/2018	12.7	<3.40	<0.05	<0.20	<0.01	0.74	NS	60	0.18	3.5	<0.05	1.6
BZ-3M	Mean	11.14	3.4	.05	.20	.01	.86		61.74	.19	1.98	.05	2.18
	Stdev	3.85	0	0	0	0	.07		8.24	.03	.86	0	.95
	Max	14.6	3.4	.05	.20	.01	.94		71.4	.24	3.5	.05	4
	Min	4	3.4	.05	.20	.01	.74		47	.16	1	.05	1.3
	No. of Det.	4	0	0	0	0	5		5	5	4	0	2

Table 3.2	Fable 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018												
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	6.8	<3.40	<0.05	<0.20	<0.01	0.90	NS	68	<0.20	<1.0	<0.05	<4
	7/12/2018	10.9	<3.40	<0.05	<0.20	<0.01	0.82	NS	73.3	0.21	1.4	<0.05	1.0
	7/31/2018	8.8	<3.40	<0.05	<0.20	<0.01	0.78	NS	55.7	0.15	1.3	<0.05	6.8
	8/15/2018	12.9	<3.40	<0.05	<0.20	<0.01	0.84	NS	54	0.15	1.4	<0.05	1.5
	9/6/2018	12.7	<3.40	<0.05	0.11	<0.01	0.66	NS	77.1	0.30	4.7	<0.05	4.1
RT-2R	Mean	10.42	3.4	.05	1.62	.01	.80		65.62	.20	1.96	.05	3.48
	Stdev	2.34	0	0	.76	0	.08		9.27	.06	1.38	0	2.09
	Max	12.9	3.4	.05	2	.01	.90		77.1	.30	4.7	.05	6.8
	Min	6.8	3.4	.05	.11	.01	.66		54	.15	1	.05	1
	No. of Det.	5	0	0	1	0	5		5	4	4	0	4
	6/28/2018	8.3	<3.40	<0.05	<0.20	<0.01	<0.11	NS	40	<0.20	1.3	<0.05	6.5
	7/12/2018	4.7	<3.40	<0.05	<0.20	<0.01	<0.11	NS	27.5	0.26	1.3	<0.05	<1.0
	7/31/2018	<4.0	<3.40	<0.05	<0.20	<0.01	0.14	NS	20	0.15	1.6	<0.05	<2.0
	8/15/2018	3.6	<3.40	<0.05	<0.20	<0.01	<0.11	NS	22.2	<0.15	1.7	<0.05	3.3
D7 40	9/6/2018	4.2	<3.40	<0.05	<0.20	<0.01	1.0	NS	57.1	0.26	3.3	<0.05	<2.0
BZ-45	Mean	4.96	3.4	.05	.20	.01	.29		33.36	.20	1.84	.05	2.96
	Stdev	1.71	0	0	0	0	.35		13.75	.05	.75	0	1.92
	Max	8.3	3.4	.05	.20	.01	1		57.1	.26	3.3	.05	6.5
	Min	3.6	3.4	.05	.20	.01	.11		20	.15	1.3	.05	1
	No. of Det.	4	0	0	0	0	2		5	3	5	0	2

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018													
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	14	<3.40	<0.05	<0.20	<0.01	1.1	NS	62	0.34	2.9	<0.05	22.3
	7/12/2018	7.8	<5.0	<0.05	<0.20	<0.01	1.3	NS	82.5	0.28	<1.0	<0.05	4.3
	7/31/2018	9.8	<3.40	<0.05	<0.20	<0.01	1.3	NS	78.6	0.19	1.0	<0.05	29.3
	8/15/2018	24.3	<3.40	<0.05	<0.20	<0.01	1.2	NS	71.3	0.23	2.2	<0.05	3.4
D7 50	9/6/2018	13.2	<3.40	<0.08	<0.20	<0.01	1.4	NS	83.8	0.19	2.4	<0.05	2.5
RT-22	Mean	13.82	3.72	.06	.20	.01	1.26		75.64	.25	1.9	.05	12.36
	Stdev	5.70	.64	.01	0	0	.10		8.09	.06	.77	0	11.21
	Max	24.3	5.0	.08	.20	.01	1.4		83.8	.34	2.9	.05	29.3
	Min	7.8	3.4	.05	.20	.01	1.1		62	.19	1	.05	2.5
	No. of Det.	5	0	1	0	0	5		5	5	4	0	5
	6/28/2018	6.8	<3.40	<0.05	<0.20	<0.01	0.50	NS	83	0.25	1.3	<0.05	<4
	7/12/2018	11.4	<5.0	<0.05	<0.20	<0.01	0.42	NS	52	0.20	1.3	<0.05	1.3
	7/31/2018	8.8	<3.40	<0.05	<0.20	<0.01	0.44	NS	59	0.20	1.1	<0.05	<2.0
	8/15/2018	11.4	<3.40	<0.05	<0.20	<0.01	0.33	NS	35	0.15	1.7	<0.05	2.0
D7 (0	9/6/2018	11.6	<3.40	<0.05	<0.20	<0.01	0.19	NS	53	0.22	2.8	<0.05	1.8
BZ-02	Mean	10	3.72	.05	.20	.01	.38		56.4	.20	1.64	.05	2.22
	Stdev	1.91	.64	0	0	0	.11		15.51	.03	.61	0	.93
	Max	11.6	5.0	.05	.20	.01	.50		83	.25	2.8	.05	4
	Min	6.8	3.4	.05	.20	.01	.19		35	.15	1.1	.05	1.3
	No. of Det.	5	0	0	0	0	5		5	5	5	0	3

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018													
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	12	<3.40	<0.05	<0.20	<0.01	0.91	NS	78	0.26	1.8	<0.05	<4.0
	7/12/2018	10.4	<5.0	<0.05	<0.20	<0.01	0.87	NS	58	0.19	<1.0	<0.05	<1.0
	7/31/2018	7.8	<3.40	<0.05	<0.20	<0.01	0.94	NS	55	0.15	<1.0	<0.05	<1.0
	8/15/2018	11.9	<3.40	<0.05	<0.20	0.03	0.75	NS	50	0.13	2.3	<0.05	1.5
$\mathbf{D}\mathbf{T}$ (M	9/6/2018	11.6	<3.40	<0.05	<0.20	<0.01	0.78	NS	63.3	0.17	3.5	<0.05	2.0
BZ-0M	Mean	10.74	3.72	.05	.20	.01	.85		60.86	.18	1.92	.05	2.1
	Stdev	1.58	.64	0	0	.01	.07		9.59	.04	.93	0	1.02
	Max	12	5.0	.05	.20	.03	.94		78	.26	3.5	.05	4
	Min	7.8	3.4	.05	.20	.01	.75		50	.13	1	.05	1
	No. of Det.	5	0	0	0	1	5		5	5	3	0	2
	6/28/2018	11.4	<3.40	<0.05	<0.20	<0.01	0.83	NS	86	0.42	1.2	<0.05	21
	7/12/2018	13.5	<5.0	<0.05	<0.20	<0.01	0.85	NS	90	0.53	1.0	<0.05	22.5
	7/31/2018	9.3	<3.40	0.22	<0.20	<0.01	0.85	NS	22.9	0.19	<1.0	<0.05	<2.0
	8/15/2018	14.5	<3.40	<0.05	<0.20	<0.01	0.72	NS	60	0.14	1.3	<0.05	3.2
	9/6/2018	17.4	<3.40	<0.05	<0.20	<0.01	0.73	NS	86.7	0.19	4.0	<0.05	2.2
BZ-6B	Mean	13.22	3.72	.04	.20	.01	.80		69.12	.29	1.7	.05	10.18
	Stdev	2.75	.64	.01	0	0	.06		25.49	.15	1.56	0	9.47
	Max	17.4	5.0	.05	.20	.01	.85		90	.53	4	.05	22.5
	Min	9.3	3.4	.02	.20	.01	.72		22.9	.14	1	.05	2
	No. of Det.	5	0	1	0	0	5		5	5	4	0	4

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018													
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	10.9	<3.40	<0.05	<0.20	<0.01	0.51	NS	64	0.23	1.4	<0.05	<4
	7/12/2018	<4.0	<5.0	<0.05	<0.20	<0.01	0.40	NS	50	0.27	1.3	<0.05	1.6
	7/31/2018	<4.0	<3.40	<0.08	<0.20	<0.01	0.21	NS	33	0.18	1.0	<0.05	<2.0
	8/15/2018	9.3	<3.40	<0.05	<0.20	<0.01	0.26	NS	26.7	0.18	2.6	<0.05	2.0
D7 70	9/6/2018	11.6	<3.40	<0.05	<0.20	<0.01	0.48	NS	64	0.18	2.6	<0.05	2.0
BT-\2	Mean	7.96	3.72	.06	.20	.01	.37		47.54	.21	1.78	.05	2.32
	Stdev	3.32	.64	.01	0	0	.12		15.45	.04	.68	0	.85
	Max	11.6	5.0	.08	.20	.01	.51		64	.27	2.6	.05	4
	Min	4	3.4	.05	.20	.01	.21		26.7	.18	1	.05	1.6
	No. of Det.	3	0	0	0	0	5		5	5	5	0	3
	6/28/2018	7.8	<3.40	<0.05	<0.20	<0.01	0.76	NS	56	0.28	1.2	<0.05	<4
	7/12/2018	12.0	<5.0	<0.05	<0.20	<0.01	0.87	NS	50	0.34	<1.0	<0.05	2.5
	7/31/2018	7.8	<3.40	0.06	<0.20	<0.01	0.89	NS	58.8	0.24	1.0	<0.05	2.1
	8/15/2018	8.8	<3.40	<0.05	<0.20	<0.01	0.16	NS	37.8	0.12	1.8	<0.05	1.8
D7 7M	9/6/2018	14.8	<3.40	<0.05	0.14	<0.01	0.82	NS	70	0.28	2.9	<0.05	49.3
BZ-/M	Mean	10.24	3.72	.05	.19	.01	.7		54.52	.25	1.58	.05	11.94
	Stdev	2.75	.64	0.0	.02	0	.27		10.58	.07	.72	0	18.69
	Max	14.8	5.0	.06	.2	.01	.89		70	.34	2.9	.05	49.3
	Min	7.8	3.4	.05	.14	.01	.16		37.8	.12	1	.05	1.8
	No. of Det.	5	0	2	1	0	5		5	5	4	0	4

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2018													
		ALK	BOD5	DISS-P	NH3	NO2	NO3	PO4	TDS	TKN	TOC	TP	TSS
Station	Date	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	6/28/2018	12.5	<3.40	<0.05	<0.20	<0.01	0.87	NS	88	0.24	1.0	<0.05	13.3
	7/12/2018	12.0	<5.0	<0.05	<0.20	0.01	0.79	NS	25	0.26	<1.0	<0.05	4.9
	7/31/2018	8.3	<3.40	1.8	<0.20	<0.01	0.95	NS	50	0.19	1.1	<0.05	<2.0
	8/15/2018	14.0	<3.40	<0.05	<0.20	<0.01	0.94	NS	50	0.21	2.5	<0.05	4.4
	9/6/2018	13.2	<3.40	<0.05	0.11	<0.01	0.86	NS	66.3	0.23	2.9	<0.05	45.8
BT-\R	Mean	12	3.72	.4	.18	.01	.88		55.86	.23	1.7	.05	14.08
	Stdev	1.97	.64	.7	.04	0	.06		20.80	.02	.83	0	16.31
	Max	14	5.0	1.8	.2	.01	.95		88	.26	2.9	.05	45.8
	Min	8.3	3.4	.05	.11	.01	.79		25	.19	1	.05	2
	No. of Det.	5	0	1	1	0	5		5	5	4	0	4

< Laboratory analysis result was less than the limit of quantification or limit of detection. NS- Not Sampled

#### 3.2.2 Nitrite and Nitrate

Nitrite (NO2) is a measure of a form of nitrogen that occurs as an intermediate in the nitrogen cycle. It is unstable and can rapidly be oxidized to nitrate or reduced to nitrogen gas. Nitrite is a source of nutrients for plants and can be toxic to aquatic life in relatively low concentrations. With the exception of three samples, concentrations measured at all other stations and depths were less than the laboratory reporting limit of 0.01 mg/L during the entire 2018 sampling season. The maximum single recorded sample of 0.03 mg/L was collected from station BZ-6M on 15 August.

Nitrate (NO3) is the measure of the most oxidized and stable form of nitrogen. It is the principal form of combined nitrogen in natural waters. Nitrate is the primary form of nitrogen used by plants as a nutrient to stimulate plant growth. Nitrate was distributed uniformly in the water column of Beltzville Reservoir during 2018 with sample results ranging from the laboratory reporting limit of <0.11 mg/L to 1.40 mg/L (Table 3-2). The highest recorded single nitrate measure of 1.40 mg/L was measured on 06 September at station BZ-5S. Station BZ-5S maintained the highest seasonal mean concentration (1.26 mg/L) of all stations.

Beltzville Reservoir was in compliance with the PADEP water quality standard for nitrite and nitrate during 2018. The standard is a summed concentration of nitrite and nitrate of less than 10 mg/L. Throughout the monitoring period, a maximum summed concentration across all stations and depths of 1.41 mg/L was measured at station BZ-5S on 06 September.

#### 3.2.3 Total Kjeldahl Nitrogen

Total Kjeldahl nitrogen (TKN) is a measure of organic nitrogen that includes ammonia. Organic nitrogen is not immediately available for biological activity and is therefore not available for plant growth until decomposition to inorganic form occurs. Total kjeldahl nitrogen (TKN) was low in the water column of Beltzville Reservoir during 2018 with single sample concentrations ranging from less than the 0.15 mg/L laboratory reporting limit to 0.53 mg/L (Table 3-2). The highest concentration of 0.53 mg/L was recorded at station BZ-6B on 12 July.

#### 3.2.4 Total Phosphorus

Total phosphorus (TP) is a measure of both organic and inorganic forms of phosphorus. It is an essential plant nutrient and is often the most limiting nutrient to plant growth in freshwater systems. Inputs of phosphorus are the prime contributing factors to eutrophication in most freshwater systems. Phosphorus bound to bottom sediments in lakes can be released when oxygen levels are depleted in bottom waters. This phosphorus then becomes available for plant growth.

EPA guidance for nutrient criteria in lakes and reservoirs suggests a maximum concentration for total phosphorus of 0.01-mg/L (EPA 2000). Lakes and reservoirs exceeding this concentration are more likely to experience algal bloom problems during the growing

season. In 2018, the laboratory sample analysis method used to measure total phosphorus only allowed a minimum reporting limit of 0.05 mg/L. As a result of the detection limit being greater than sample results typically seen at Beltzville Reservoir, sample results for all stations and dates were recorded as <0.05 mg/L (Table 3-2). All sample results exceeded the EPA 0.01 mg/L suggested concentration, however, these results do not accurately reflect total phosphorus concentrations in Beltzville Reservoir and its tributaries.

#### 3.2.5 Dissolved Phosphorus

During the 2018 sampling season, with the exception of five samples, concentrations measured at all other stations and depths were less than the laboratory reporting limit of 0.05 mg/L (Table 3-2). The maximum single recorded sample of 1.80 mg/L was collected from station BZ-7B on 31 July.

#### 3.2.6 Dissolved Phosphate

Orthophosphate (PO4) is a measure of the inorganic oxidized form of soluble phosphorus. This form of phosphorus is the most readily available for uptake during photosynthesis. In freshwater environments, dissolved phosphate is usually a limiting nutrient and is readily taken up by freshwater plants and algae. In 2018, dissolved phosphate concentrations were not measured in samples collected at Beltzville Reservoir.

#### 3.2.7 Total Dissolved Solids

Total dissolved solids (TDS) is a measure of the amount of non-filterable dissolved material in the water. Dissolved salts such as sulfate, magnesium, chloride, and sodium contribute to elevated levels. Concentrations of TDS in the water column of Beltzville Reservoir were consistently low during 2018 (Table 3-2). Concentrations among all stations and depths ranged from 4.0 to 95 mg/L. Total dissolved solids measured at Beltzville Reservoir in 2018 were in compliance with PADEP water quality standards. The state water quality standard for TDS is a maximum concentration of 500 mg/L.

#### 3.2.8 Total Suspended Solids

Total suspended solids (TSS) are a measure of the amount of filterable particulate matter that is suspended within the water column. High concentrations increase the turbidity of the water and can hinder photosynthetic activity, result in damage to fish gills, and cause impairment to spawning habitat (smothering). Total suspended solids concentrations in the waters of Beltzville Reservoir were low during 2018 (Table 3-2). Many concentrations measured at all stations and depths were less than or near the laboratory reporting limit. The maximum concentration of 49.3 mg/L was measured in mid-depth lake waters at station BZ-7M on 06 September. High measures of TSS can be the result of sample collection error associated with capturing disturbed fine sediments in the lake bottom sample during field sampling. This sampling error particularly may apply to any elevated or unexplained high TSS

water samples collected at lake bottom water sampling stations such as BZ-6B, BZ-3B, and BZ-7B.

#### 3.2.9 Biochemical Oxygen Demand

Five-day biochemical oxygen demand (BOD5) is a measure of the oxygen-depleting burden imposed by organic material present in water. It measures the rate of oxygen uptake by organisms in the water sample over a period of time. It is an indicator of the quality of a water body and the degree of pollution by biodegradable organic matter can therefore be inferred. The five-day biochemical oxygen demand and commonly accepted water quality inferences are as follows:

- 1-2 mg/L is associated with very clean water and little biodegradable wastes;
- 3-5 mg/L is associated with moderately clean water with some biodegradable wastes;
- 6-9 mg/L is associated with fairly polluted water, many bacteria, and much biodegradable wastes;
- 10+ mg/L is associated with very polluted water and large amounts of biodegradable wastes.

Biochemical oxygen demand concentrations in the water column of Beltzville Reservoir were consistently low in all months and stations sampled (Table 3-2). All samples were below the laboratory reporting limit of 3.4 and 5.0 mg/L for the entire sampling season. Based on the seasonal sampling results, it is inferred that in 2018, Beltzville Reservoir and its associated tributaries contain very clean water with little biodegradable organic wastes.

#### 3.2.10 Alkalinity

Alkalinity (ALK) is a measure of the acid-neutralizing capacity of water. Waters that have high alkalinity values are considered undesirable because of excessive hardness and high concentrations of sodium salts. Water with low alkalinity has little capacity to buffer acidic inputs and is susceptible to acidification (low pH). The PADEP standard is a minimum concentration of 20-mg/L CaCO<sub>3</sub> except where natural conditions are less.

For all sampling stations and depths, alkalinity measures during 2018 ranged from 24.3 mg/L to 3.6 mg/L (Table 3-2). A maximum concentration of 24.3 mg/L was measured in surface waters at station BZ-5S on 15 August. All other reservoir and tributary samples remained below the state minimum criteria (20 mg/L) for the sampling season. The natural alkalinity of water is largely dependent on the underlying geology and soils within the surrounding watershed. The typically low alkalinity measured at Beltzville Reservoir results from the regional geology, which is primarily sandstone and shale. Based on this, the reservoir waters and surrounding tributaries are in compliance with the PADEP alkalinity criteria, due to the regional natural conditions.

#### 3.2.11 Total Organic Carbon

Total organic carbon (TOC) is a measurement of the amount of dissolved and particulate carbon that is bound in organic compounds. TOC can be derived from decaying vegetation, bacterial growth, and metabolic activities of living organisms. The bulk of organic carbon in water is composed of humic substances and partly degraded animal and plant materials. Other sources of TOC can include agricultural chemicals such as herbicides and insecticides and also wastewater treatment plant discharges. The amount of carbon in a freshwater stream is an indicator of the organic character of the stream or water body. High organic content can increase the growth of microorganisms which contribute to the depletion of oxygen. Total organic carbon concentrations in the water column and tributaries of Beltzville Reservoir were low during 2018 (Table 3-2). Concentrations of TOC at all stations and depths ranged from <1.0 mg/L to 4.7 mg/L.

#### 3.2.12 Chlorophyll a

Chlorophyll a is the measure of the plant chlorophyll a primary pigment which helps plants get energy from light. It is found in most plants, algae, and cyanobacteria. Chlorophyll a measures increase in relation to algal densities in a water body. Chlorophyll *a* concentrations in the surface waters (0-15 feet) of Beltzville Reservoir were low during 2018 (Appendix A). Concentrations measured in surface waters at all lake body stations ranged between 0.0 and 5.0 ug/L with an average concentration of 1.28 ug/L.

#### 3.3 TROPHIC STATE DETERMINATION

Carlson's (1977) trophic state index (TSI) is a method of quantitatively expressing the magnitude of eutrophication for a lake. The trophic state analysis calculates separate indices for eutrophication based on measures of total phosphorus, chlorophyll *a*, and secchi disk. Index values for each parameter range on the same scale from 0 (least enriched) to 100 (most enriched). The resulting indices can also be compared to qualitative threshold values that correspond to levels of eutrophication. Classification of Beltzville Reservoir was based on a single sample each month during the sampling season taken at station BZ-6 (Figure 3-7).

TSIs calculated for measures of total phosphorus (Figure 3-7) classified Beltzville Reservoir as eutrophic in June (60.56), early July (60.56), late July (60.56), August (60.56) and September (60.56). TSIs calculated for measures of secchi disk depth (Figure 3-7) classified Beltzville Reservoir as mesotrophic in early July (42.58), late July (42.80), August (43.70), and September (42.80) and oligotrophic in June (38.33). TSIs calculated for measures of chlorophyll *a* (Figure 3-7) classified Beltzville Reservoir as oligotrophic in June (25.59), early July (8.01), late July (28.41), August (29.23), and September (34.12).

Carlson (1977) warned against averaging TSI values estimated for different parameters, and instead suggested giving priority to chlorophyll *a* in the summer and to phosphorus in the spring, fall, and winter. The laboratory minimum detection limit for total phosphorus did not accurately reflect levels of total phosphorus in samples collected from Beltzville Reservoir in

2018. With this in mind and considering historic sampling results, the trophic state of the reservoir, based on TSI's, was oligotrophic/mesotrophic throughout the 2018 sampling season.

The EPA (1983) also provides criteria for defining the trophic conditions of lakes of the north-temperate zone based on concentrations of total phosphorus, chlorophyll *a*, and secchi depth (Table 3-3). Taking into account the general agreement between the EPA classifications with that of the Carlson TSI's, the trophic condition of Beltzville Reservoir was predominantly oligotrophic/mesotrophic in 2018.

<b>Fable 3-3.</b> EPA trophic classification criteria and average monthly measures for Beltzville Reservoir in 2018.													
Water Quality Variable	Oligo- trophic	Meso- trophic	Eutrophic	06 June	12 July	31 July	15 August	06 September					
Total phos. (ppb)	<10	10-20	>20	<50	<50	<50	<50	<50					
Chlorophyll a (ppb)	<4	4-10	>10	0.6	0.1	0.8	0.87	1.43					
Secchi depth (meters)	>4	2-4	<2	4.5	3.35	3.3	3.1	3.3					

#### 3.4 RESERVOIR BACTERIA MONITORING

Two forms of coliform bacteria contamination were monitored in the tributary and lake surface waters at Beltzville Reservoir during 2018 including total and fecal coliform (Table 3-4). Total coliform includes *escherica coliform* (*E. coli*) and related bacteria that are associated with fecal discharges. Fecal coliform bacteria are a subgroup of the total coliform and are normally associated with waste derived from human and other warm-blooded animals and indicate the presence of fecal contamination but not the associated risk.

Total coliform values for all stations ranged from <2 colonies/100-ml to greater than the detection limit of 964 colonies/100-ml. Bacteria in natural waters are common and their presence in the sample is not necessarily a human health concern. With respect to PADEP water quality standards, fecal coliform bacteria has been replaced with an e-coli criteria. For purposes of the 2018 reservoir bacteria sampling, previous fecal coliform criteria are being used. Fecal contamination was low in Beltzville Reservoir and its tributaries during 2018. The previous standard for fecal coliform bacteria during the swimming season (from 1 May to 30 September) is a geometric mean not greater than 200 colonies/100-ml. Given that our regular monitoring was completed on one day grab samples, single sample results were then compared to the Pennsylvania Department of Health single sample standard of <1000 colonies/100-ml. The fecal coliform samples collected at Beltzville Reservoir did exceed this standard one time in 2018 at station BZ-5S on 28 June. The cause of this single elevated sample result is unknown but may be a result of upstream watershed activities or land use. Water contact recreation is permitted at Beltzville Reservoir. However, the recreational swimming beach is monitored and managed by the Commonwealth of Pennsylvania. No long term elevated bacteria counts were recorded in the main reservoir body where public water recreation is also permitted.



**Figure 3-7.** Trophic state indices calculated from secchi disk depth and concentrations of total phosphorus and chlorophyll *a* at reservoir Station BZ-6 for Beltzville Reservoir in 2018.

<b>Table 3-4</b> Bacteria counts (colonies/100ml) at Beltzville Reservoir and tributaries during2018. NS = Not Sampled in 2018												
STATION	DATE	Total Coliform (TC)			Fecal Coliform (FC)	Escherichia coli						
	6/28/2018		104		84	NS						
	7/12/2018		82		64	NS						
BZ-1S	7/31/2018		84		43	NS						
	8/15/2018		580		160	NS						
	9/6/2018		104		96	NS						
	6/28/2018		118		62	NS						
	7/12/2018		90		12	NS						
BZ-2S	7/31/2018		214		160	NS						
	8/15/2018		231		183	NS						
	9/6/2018		144		29	NS						
	6/28/2018	<	2	<	4	NS						
	7/12/2018	<	4		2	NS						
BZ-3S	7/31/2018	<	4	<	4	NS						
	8/15/2018	<	4		4	NS						
	9/6/2018		8	<	4	NS						
	6/28/2018		11		360	NS						
	7/12/2018		22		20	NS						
BZ-4S	7/31/2018		151		132	NS						
	8/15/2018		140		92	NS						
	9/6/2018		43		112	NS						
	6/28/2018		673		3500	NS						
	7/12/2018		530		210	NS						
BZ-5S	7/31/2018		530		320	NS						
	8/15/2018		964		350	NS						
	9/6/2018		96		168	NS						
	6/28/2018		7		4	NS						
	7/12/2018	<	4		5	NS						
BZ-6S	7/31/2018	<	4	<	4	NS						
	8/15/2018	<	4	<	4	NS						
	9/6/2018		4	<	4	NS						
	6/28/2018	<	2	<	4	NS						
	7/12/2018		4	<	4	NS						
BZ-7S	7/31/2018	<	4	<	4	NS						
	8/15/2018	<	4	<	4	NS						
	9/6/2018		4		4	NS						

• Highlighted counts exceed single sample State (1000 fecal colonies/100ml) bathing beach criteria.

### 4.0 REFERENCES

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# **APPENDIX** A

# **STRATIFICATION DATA TABLES**

Station	Date	Time	Depth	Temp	DO	DO	pН	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
	6/5/2018	13:41:56	0.5	12.6	92.3	9.81	7.41	-39.1	126.1	0.8	2.4	0.079
BZ-1S	6/28/2018	6:53:16	0.5	14.28	95.1	9.74	6.8	-4	143.8	3.4	0.0	0.082
Outfall	7/12/2018	11:20:52	0.5	17.58	106	10.15	7.01	-16.2	188.6	1.3	0.0	0.089
Pohopoco	7/31/2018	16:00:23	0.5	17.28	97	9.32	6.53	12.3	160	4.1	0.0	0.087
	8/15/2018	15:49:58	0.5	15.11	103	10.34	6.74	-0.2	168.5	1.7	0.0	0.087
	9/6/2018	7:29:13	0.5	19.06	98.5	9.12	6.56	10.5	187.2	3.3	0.0	0.094
	6/28/2018	11:39:30	0.5	15.19	94.9	9.53	6.96	-13.3	135.8	27.9	1.0	0.068
BZ-2S	7/12/2018	11:06:52	0.5	16.61	96.7	9.42	6.93	-11.5	194.1	1.5	0.0	0.07
Pine Run	7/31/2018	15:42:00	0.5	15.22	92.3	9.26	7.46	-42.4	155.5	3.5	0.0	0.073
Trib.	8/15/2018	15:38:32	0.5	15.69	98.9	9.83	6.58	9.3	179.9	3.1	0.0	0.072
	9/6/2018	11:22:10	0.5	16.29	97.9	9.61	6.18	32.6	205.5	0.4	0.0	0.061
		9:20:11	0.5	23.31	103	8.82	7.84	-65.5	155.5	1.6	3.4	0.088
		9:18:28	5	23.12	102	8.77	7.75	-60.4	157.3	2.6	3.0	0.088
		9:17:34	10	23.04	101	8.67	7.61	-52.1	160.7	1.5	3.6	0.087
		9:16:43	15	22.92	99.3	8.53	7.37	-37.7	164.8	2.5	3.4	0.087
		9:15:44	20	20.16	90.9	8.24	6.86	-7	178.3	1.8	3.2	0.089
BZ-3		9:14:47	25	18.32	77.2	7.26	6.68	3.5	182.6	2.1	3.4	0.087
Bouy/Beach		9:13:30	30	17.08	68.9	6.64	6.59	8.7	183.9	1.5	1.9	0.086
-		9:12:07	35	15.83	61.6	6.1	6.52	12.4	184.7	1	2.3	0.085
		9:11:06	40	14.62	59.7	6.07	6.5	13.6	184.7	0.2	2.2	0.082
	6/28/2018	9:10:04	45	12.88	59	6.23	6.51	13.1	184	0.9	2.5	0.080
		9:07:56	50	11	60.8	6.7	6.52	11.9	182.3	0	2.2	0.079
		9:01:13	55	10.09	66.9	7.53	6.57	9.2	171.4	1	2.8	0.078
		9:00:18	60	9.29	70.9	8.14	6.61	6.9	169.1	1.7	3.1	0.077
		8:59:40	65	8.77	72.1	8.37	6.64	5.1	167.1	0.1	2.5	0.076
		8:58:41	70	8.15	72.2	8.52	6.65	4.3	164.6	1.8	2.6	0.075
		8:57:12	75	7.96	72.6	8.6	6.67	3.5	160.2	0.4	3.1	0.075
		8:54:42	80	7.64	74.1	8.86	6.69	2.1	152.4	0.3	3.1	0.074
		8:52:29	85	7.38	72.6	8.73	6.68	2.8	143.9	0.5	2.9	0.074
		8:51:06	90	7.41	72.1	8.66	6.68	2.4	136.4	-0.4	2.0	0.074
		8:49:51	95	7.2	70	8.46	6.68	2.4	127.1	0.3	2.9	0.074
		8:48:38	100	7.04	66.5	8.06	6.68	2.6	113.7	3.9	3.4	0.074
		8:47:26	105	7.47	65.9	7.9	6.7	1.4	118.7	102.2	1.7	0.088
L												

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		8:49:29	0.5	26.34	107	8.65	8.3	-94	120.9	1.5	0.9	0.095
		8:48:11	5.0	26.35	107	8.6	8.28	-92.8	122.7	2.3	0.8	0.095
		8:47:32	10.0	26.34	106	8.57	8.24	-90.6	124.4	2.4	1.0	0.095
		8:46:36	15.0	26.3	106	8.54	8.04	-78.1	127.8	2.2	0.7	0.095
		8:45:16	20.0	23.1	94.2	8.06	6.89	-8.7	154.4	2.7	3.8	0.095
BZ-3		8:44:44	25.0	20.4	73.5	6.63	6.68	3.6	161.3	1.8	3.8	0.092
Bouy/Beach		8:44:01	30.0	18.66	62.9	5.87	6.59	8.5	163.6	1.4	3.3	0.088
		8:43:02	35.0	17.35	53.6	5.14	6.52	12.4	164.7	1.6	3.3	0.088
	7/12/2018	8:42:23	40.0	15.74	50.6	5.02	6.51	13.2	165	1.2	2.9	0.086
		8:41:22	45.0	13.35	51.9	5.42	6.51	13	164.8	0.7	3.6	0.082
		8:40:36	50.0	11.49	55.5	6.05	6.55	10.5	163.5	0.7	3.4	0.080
1		8:39:44	55.0	10.08	57.8	6.52	6.58	8.4	161.6	0.7	3.0	0.078
		8:38:44	60.0	9.44	61.1	6.98	6.63	5.4	157.9	0.5	2.6	0.077
		8:36:03	65.0	9.02	66.6	7.69	6.68	2.5	151.2	0.4	2.6	0.076
		8:35:22	70.0	8.69	67.5	7.86	6.69	2.1	149.6	0.4	2.9	0.076
		8:34:38	75.0	8.17	68	8.01	6.71	0.8	147.3	1.7	2.7	0.075
		8:32:55	80.0	7.83	68.9	8.19	6.7	1.3	143.3	-0.1	2.9	0.075
1		8:31:44	85.0	7.48	67.5	8.09	6.69	1.8	139.6	0.6	2.9	0.074
		8:30:45	90.0	7.39	66.8	8.03	6.7	1.4	134.7	-0.2	2.8	0.074
		8:29:48	95.0	7.19	62.7	7.57	6.7	1.3	129.3	0.2	3.3	0.074
		8:28:56	100.0	7.07	59.2	7.17	6.72	0.5	122	0.4	2.9	0.074
		8:27:23	105.0	7.01	53.8	6.52	6.78	-2.9	99.6	6.1	5.8	0.076
			!			<b></b> _		└───┤			لــــــــــــــــــــــــــــــــــــ	<b></b>
		10, 10, 00	2.5	05.07	105	<u> </u>	~	110.0	105.0			0.000
		13:42:28	0.5	25.87	105	8.55	8.57	-110.3	135.9	2.0	0.0	0.093
		13:41:49	5	25.46	104	8.48	8.48	-104.5	138.4	2.1	1.0	0.092
		13:41:15	10	25.4	102	8.34	8.35	-96.9	140.1	3.2	1.4	0.092
		13:40:27	15	25.35	93	7.63	7.79	-63.3	145.8	2.4	1.3	0.091
		13:39:55	20	23.42	72	6.12	6.81	-4.1	168	2.6	2.0	0.092
		13:38:52	25	22.29	65.1	5.66	6.73	0.9	169.7	2.0	0.2	0.091
BZ-3		13:38:06	30	21.06	65.8	5.86	6.73	0.6	170	2.7	0.0	0.091
Bouy/Beach	7/31/2018	13:37:23	35	20.42	71.8	6.47	6.//	-2.1	168.4	3.2	0.0	0.089
		13:36:41	40	20.04	69.3	6.29	6.73	0.2	169.4	3.8	0.0	0.093
		13:35:30	45	19.61	60.8	5.57	6.66	4.8	170.1	4.3	0.0	0.090
		13:34:32	50	18.99	45.2	4.19	6.55	11	170.9	4.3	0.0	0.090
		13:33:28	55	16.39	31.7	3.1	6.46	15.8	172.2	2.4	0.0	0.088
		13:31:20	60	14.01	35.4	3.65	6.5	13.5	168.4	2.0	0.0	0.083
		13:30:10	65	12.4	38.5	4.11	6.53	11./	165.7	1.9	0.0	0.081
		13:29:02	70	11.17	41.4	4.55	6.54	10.7	163.7	3.0	0.0	0.080
		13:28:03	75	10.47	41.1	4.59	6.5	13.1	164.2	2.2	0.0	0.080
		13:26:58	80	9.98	44.4	5.01	6.45	16.1	165.1	0.9	0.0	0.078
		13:26:01	85	9.55	44.9	5.12	6.39	19.4	166.3	1.5	0.0	0.078
		13:25:10	90	9.31	44.5	5.1	6.38	20.1	164.6	1.7	0.0	0.077
		13:23:32	95	9.05	38.5	4.45	6.34	22.2	160.6	0.6	0.0	0.077
		13:22:06	100	8.73	37	4.3	6.39	19.4	152.9	1.3	0.0	0.077
		13:20:00	105	8.17	33.3	3.93	6.56	9.3	133.1	1.8	0.0	0.076

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		13:35:56	0.5	26.73	113	9.02	8.64	-114.8	115.2	1.4	0.0	0.087
		13:35:19	5	26.52	113	9.06	8.66	-115.9	114.9	2.3	0.3	0.087
		13:34:31	10	26.23	113	9.15	8.49	-105.6	117.4	2.2	1.7	0.086
		13:33:49	15	25.08	116	9.53	7.58	-50.4	131.7	2.4	2.9	0.086
BZ-3		13:32:19	20	23.38	72.2	6.15	6.71	1.7	153.8	1.8	2.0	0.087
Bouy/Beach		13:31:16	25	22.48	54.3	4.7	6.63	6.7	154.8	2.0	3.3	0.09
		13:30:24	30	21.66	71.3	6.28	6.72	1.1	150.8	1.2	0.0	0.085
		13:29:37	35	21.16	72.9	6.47	6.73	0.7	149.4	1.5	0.0	0.085
		13:28:14	40	20.79	86	7.69	6.84	-6.2	140.4	2.3	0.0	0.078
	8/15/2018	13:26:47	45	20.63	64.6	5.8	6.72	1.4	141.2	1.3	0.0	0.09
		13:25:11	50	20.48	73.8	6.65	6.78	-2.6	135.3	1.8	0.0	0.098
		13:24:18	55	20.29	70.7	6.39	6.74	-0.2	134.4	2.5	0.0	0.095
		13:23:39	60	20.15	69.9	6.34	6.75	-0.8	130.9	2.4	0.0	0.094
		13:22:23	65	19.86	65.9	6	6.72	1.1	127.5	2.0	0.0	0.095
		13:21:15	70	19.52	60.8	5.58	6.67	4	124.9	2.4	0.0	0.097
		13:19:50	75	18.78	51.5	4.79	6.6	8.1	118	3.0	0.0	0.096
		13:18:41	80	17.57	39.9	3.81	6.55	11.2	111.2	2.3	0.0	0.094
		13:16:33	85	14.75	17.3	1.76	6.12	35.8	113	1.7	0.0	0.088
		13:16:00	90	13.14	16.6	1.74	6.02	41.4	115.4	1.0	0.0	0.085
		13:15:00	95	11.62	15.8	1.71	6.04	39.8	106.6	1.6	0.0	0.083
		13:13:45	100	10.94	15.3	1.69	6.23	28.7	88.3	1.8	0.0	0.081
		13:11:36	105	9.97	7.6	0.86	6.59	7.9	31.8	3.0	0.0	0.082
		9:26:57	0.5	26.65	112	8.97	8.83	-126.4	97	3.0	0.3	0.084
		9:26:11	5	26.54	112	9.01	8.85	-127.3	97	1.5	1.4	0.084
		9:25:20	10	25.77	115	9.38	9.03	-138	95.1	2.1	2.5	0.083
		9:24:16	15	24.91	110	9.09	8.57	-109.8	102.1	3.0	3.3	0.08
		9:22:56	20	23.55	67.8	5.75	6.73	0.7	142.3	3.5	2.3	0.079
		9:22:07	25	22.57	46.7	4.04	6.63	6.6	144.8	1.2	2.9	0.087
BZ-3		9:20:53	30	21.91	69	6.04	6.75	-0.7	138.5	1.7	1.5	0.08
Bouy/Beach		9:19:43	35	21.39	58.8	5.2	6.67	4	139.4	0.7	0.0	0.085
	9/6/2018	9:18:47	40	21.11	59.9	5.32	6.67	4.4	137.7	0.5	0.0	0.085
		9:17:56	45	20.85	61.3	5.48	6.65	5	136.5	0.5	0.0	0.089
		9:17:00	50	20.68	60.6	5.44	6.6	8	136.6	0.5	0.0	0.093
		9:16:08	55	20.53	60.1	5.41	6.57	9.8	135.7	0.4	0.0	0.093
		9:15:35	60	20.44	59.4	5.35	6.55	11.4	135.1	0.5	0.0	0.094
		9:14:00	65	20.35	56.2	5.08	6.43	18.3	135.6	0.8	0.0	0.096
		9:13:13	70	20.28	54.8	4.96	6.37	22	135.2	1.5	0.0	0.094
		9:12:22	75	20.15	52	4.71	6.28	27	135.6	1.6	0.0	0.093
		9:11:40	80	20.06	52.2	4.74	6.19	32.7	137	1.2	0.0	0.092
		9:10:50	85	19.91	49.8	4.53	6.02	42.8	141.2	2.5	0.0	0.09
		9:10:04	90	19.82	48.1	4.39	5.98	44.7	136.5	1.9	0.0	0.097
		9:09:04	95	19.67	43.5	3.98	5.99	44.5	126.6	2.9	0.0	0.096
		9:08:10	100	19.48	38.6	3.55	6.04	41.5	113.1	3.2	0.0	0.096
		9:06:56	105	18.97	32	2.97	6.2	31.6	78.2	5.7	0.0	0.096

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-4S	6/28/2018	11:21:36	0.5	22.74	96.7	8.33	7.12	-22.4	150.3	3.8	0.0	0.042
Wild Creek	7/12/2018	10:48:37	0.5	23.06	95.1	8.15	6.47	16	170.7	0.4	0.0	0.053
Upstream	7/31/2018	15:26:39	0.5	23.82	95.2	8.04	7.47	-43.9	141.1	0.5	0.0	0.043
	8/15/2018	15:23:02	0.5	24.73	99.4	8.26	7.31	-34.4	121.3	6.2	0.8	0.044
	9/6/2018	11:07:33	0.5	25.49	96.8	7.93	7.03	-17.3	148.6	-0.3	0.0	0.044
BZ-5S	6/28/2018	11:08:22	0.5	16.99	92.6	8.95	7.16	-24.6	140.4	50.7	0.0	0.095
Pohopoco	7/12/2018	10:35:22	0.5	18.88	95.9	8.92	7.37	-37.1	131.3	7.2	0.0	0.116
Upstream	7/31/2018	15:12:54	0.5	16.56	94.7	9.24	7.71	-57.2	145.3	17.4	0.1	0.107
	8/15/2018	15:11:57	0.5	18.74	102	9.49	7.34	-35.5	116.5	8.0	0.0	0.11
	9/6/2018	10:54:13	0.5	20.3	101	9.09	7.53	-46.9	125.8	9.4	0.0	0.121
		12:24:02	0.5	20.57	102	9.2	7.27	-31.4	146.5	3.2	0.2	0.043
		12:23:32	5	20.58	101	9.07	7.14	-23.9	150.3	2.4	1.9	0.082
		12:22:51	10	18.19	93.7	8.84	6.88	-8.2	159.6	2.2	3.0	0.081
		12:21:54	15	17.29	89.6	8.61	6.79	-3.1	161.7	1.7	2.9	0.082
		12:20:44	20	15.99	82.7	8.16	6.7	2.3	163.5	1.1	2.4	0.08
		12:19:52	25	15.35	78.1	7.81	6.64	5.7	164.2	1	1.4	0.08
		12:19:03	30	14.82	77.2	7.81	6.63	6.2	162.7	2.2	1.8	0.08
BZ-6		12:18:09	35	14.23	77.7	7.96	6.63	5.9	162	0.6	1.7	0.08
In-Lake		12:17:24	40	12.88	79	8.34	6.66	4	161.3	1.4	2.1	0.079
Tower		12:16:46	45	11.2	78.6	8.63	6.68	2.7	161.3	1.9	2.1	0.079
	6/5/2018	12:15:33	50	9.61	79.9	9.11	6.71	1.2	160.7	1.7	2.5	0.077
		12:14:51	55	8.67	79.3	9.24	6.72	0.5	160.1	0.8	2.1	0.076
		12:13:58	60	8.23	79.4	9.35	6.73	-0.1	158.9	1.2	2.8	0.075
		12:13:03	65	8	80	9.47	6.74	-0.7	157.9	0.5	2.3	0.074
		12:11:35	70	7.59	80	9.57	6.75	-1.3	156.1	0.6	3.0	0.074
		12:10:33	75	7.36	79.6	9.58	6.74	-0.8	155.5	0.4	2.5	0.073
		12:09:28	80	7.25	79.1	9.53	6.73	-0.2	154.6	0.5	3.1	0.073
		12:08:14	85	7.14	78.5	9.49	6.71	0.8	153.5	0.3	2.3	0.073
		12:06:48	90	7.05	76.9	9.32	6.67	3.3	153.4	-0.1	2.6	0.073
		12:05:16	95	6.99	75	9.1	6.6	7.3	154.2	0	2.8	0.073
		12:04:33	100	6.85	73.4	8.94	6.57	9	154.3	0	3.1	0.073
		12:03:25	105	6.81	71.6	8.73	6.51	12.3	154.6	0	2.9	0.073
		12:02:06	110	6.73	70.3	8.59	6.48	14	153	0.5	3.0	0.073
		11:50:36	115	6.79	68	8.3	6.92	-11	90.3	13.8	7.0	0.073
		12:01:02	120	6.72	70	8.55	6.47	14.2	150.3	0	6.0	0.073
L	L	11:59:57	125	6.69	69.5	8.5	6.48	13.8	145.8	2.4	220.6	0.073

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		8:28:21	0.5	22.98	103	8.86	7.82	-64.7	158.1	1.3	0.5	0.087
		8:27:06	5	22.96	103	8.82	7.78	-61.8	159.1	2.6	1.1	0.087
		8:25:52	10	22.91	102	8.73	7.68	-55.9	162	2	0.2	0.087
		8:23:01	15	22.82	99.9	8.6	7.43	-41.2	166.5	2.5	0.6	0.087
		8:21:21	20	20.1	95.4	8.66	6.94	-11.8	178.3	1.6	1.0	0.088
		8:20:17	25	18.59	80.2	7.5	6.72	1	182.7	1.8	3.0	0.086
		8:18:28	30	16.92	68.1	6.6	6.58	9.1	185.2	1.2	2.3	0.085
		8:16:58	35	15.7	59.7	5.93	6.51	13	186	1	2.0	0.083
BZ-6		8:15:11	40	14.76	57.6	5.84	6.5	13.8	184.8	0.7	2.1	0.082
In-Lake		8:13:21	45	13.12	62.5	6.57	6.52	12.2	183.7	0.5	2.3	0.08
Tower	6/28/2018	8:12:07	50	10.82	66.6	7.38	6.57	9.3	183.2	0.2	2.7	0.078
		8:10:47	55	9.74	68.1	7.73	6.59	7.9	182.3	0.5	2.5	0.077
		8:09:19	60	9.27	69.9	8.03	6.6	7.2	180.9	0.2	2.2	0.077
Secchi		8:07:58	65	8.83	71.8	8.34	6.63	5.6	178.5	-0.2	2.1	0.076
4.50 M		8:06:55	70	8.32	72.8	8.56	6.64	5.2	177.6	1.3	3.4	0.075
		8:05:44	75	7.93	73.1	8.68	6.64	4.8	176.1	2	2.5	0.075
		8:04:25	80	7.72	73.3	8.73	6.65	4.2	173.6	0.5	2.7	0.074
		8:02:17	85	7.55	73	8.73	6.63	5.4	171.2	0	3.0	0.074
		8:01:11	90	7.46	72.3	8.67	6.64	4.8	168.5	0.4	2.7	0.074
		7:59:41	95	7.31	71.1	8.56	6.64	4.9	165.3	0.2	2.6	0.074
		7:58:00	100	7.21	68.6	8.28	6.61	6.8	162.1	0.6	2.7	0.074
		7:56:51	105	7.1	66	7.99	6.55	10.1	161.2	0.7	2.6	0.074
		7:55:40	110	6.97	62.9	7.64	6.49	13.3	159.1	0	2.1	0.074
		7:54:44	115	6.9	60.6	7.37	6.46	15.2	156.3	-0.3	2.7	0.074
		7:53:43	120	6.86	59.4	7.24	6.44	16.5	151.4	0.5	2.7	0.074
	<u> </u>	7:51:24	125	7.32	60.8	7.32	6.49	13.1	1/3.4	5.5	2.5	0.081
		8:11:48	0.5	26.34	106	8.56	8.2	-88.4	119.5	1.9	0.0	0.095
		8:10:58	5.0	26.37	106	8.55	8.2	-87.8	120.5	2.0	0.0	0.095
		8:09:58	10	26.37	106	8.53	8.16	-85.8	121.4	1.8	0.0	0.095
		8:08:53	15	26.34	106	8.55	8.08	-80.5	124.5	1.7	0.0	0.095
		8:07:28	20	22.55	111	9.63	7.6	-51.2	134.6	1.8	0.0	0.091
		8:05:58	25	20.56	90	8.09	6.88	-8.1	152.5	1./	0.2	0.090
D7.0		8:03:39	30	19.07	64.6	5.98	6.63	6.5	156.7	1.4	0.0	0.089
BZ-6		8:02:02	35	17.49	54.3	5.19	6.55	10.8	157.4	0.8	1.1	0.088
In-Lаке	7/40/0040	8:00:41	40	15.28	49.6	4.97	6.51	13.1	156.8	1.6	0.5	0.084
Tower	7/12/2018	8:00:04	45	13.35	50.4	5.27	0.03	11.5	155.4	0.0	1.7	0.081
		7.36.40	50	11.77	59.2	0.07 6 F	0.00	0.4	132.2	0.0	1.5	0.079
Saaahi		7.57.29	- 00 - 60	10.43	00.Z	0.0	6.72	4	147	0.9	2.0	0.070
2 25 M		7.55.57	65	9.0	62.3	7.1	6.76	-0.2	141	1.1	2.0	0.077
3.35 IVI		7:53:17	70	9.19	64.4	7.20	6.75	-1.7	130.4	0.9	2.0	0.070
		7:52:01	70	0.79	65.0	7.40	6.61	-1.Z	137.3	0.7	2.0	0.076
		7:52:13	80	0.33	65.6	7.74	6.56	0.9	142.1	0.0	2.1	0.073
		7:51:24	85	7./9	63.0	7.01	6.50	12.4	142.0	-0.5	2.0	0.074
		7:50:44	90	7.40	62.1	7.00	6.49	12.5	143.2	-0.3	2.4	0.074
		7:49:55	95	7 18	59.7	7.73	6 4 4	16.1	140.8	0.2	2.3	0.074
		7:49:09	100	7.09	57 1	6.91	6.39	19.3	140.2	1 4	2.0	0.074
		7:48:16	105	7.02	53.9	6.54	6.32	23.1	139.3	0.6	3.0	0.074
	1			0.00	E4 7	6.20	0.04	22.1	106.1	1.0	0.0	0.075
		7:47:40	110	6.89	DI./	0.29	0.31	Z3.4	130.1	.Z	2.8	0.075
		7:47:40 7:46:09	110 115	6.89 6.86	50.1	6.1	6.31	23.4	125.1	22.7	4.3	0.075
		7:47:40 7:46:09 7:44:25	110 115 120	6.89 6.86 6.85	51.7 50.1 48.4	6.29 6.1 5.89	6.31 6.33 6.42	23.4 22.6 17.1	125.1 125.1	22.7 12.0	2.8 4.3 14.9	0.075

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		13:06:00	0.5	25.93	105	8.53	8.46	-103.9	140.9	1.2	0.0	0.093
		13:05:02	5	25.68	105	8.58	8.52	-107.1	140.9	2.3	0.9	0.093
		13:04:15	10	25.5	104	8.54	8.46	-103.7	142.5	2.1	1.5	0.093
		13:03:29	15	25.37	103	8.44	8.2	-88	146.5	1.9	1.8	0.092
		13:01:33	20	23.68	76	6.44	6.85	-6.5	171.9	1.3	2.8	0.092
		12:59:37	25	22.16	58.8	5.12	6.65	5.1	177	2.2	0.0	0.094
		12:58:39	30	21.1	58.5	5.2	6.63	6.5	177.8	3.3	0.0	0.091
BZ-6		12:57:49	35	20.42	53.9	4.86	6.61	7.9	178.6	4.3	0.1	0.09
In-Lake		12:56:47	40	19.94	53.6	4.87	6.6	8.2	178.3	4.6	0.0	0.089
Tower		12:55:29	45	19.59	56.8	5.21	6.62	7.2	177.3	4.9	0.4	0.089
	7/31/2018	12:52:58	50	18.57	35.9	3.36	6.46	16.3	180	3.7	0.0	0.09
		12:51:59	55	16.94	35.9	3.47	6.46	16.3	180.4	1.9	0.0	0.088
Secchi		12:50:46	60	14.09	35.8	3.68	6.46	15.6	180.4	3.1	0.0	0.082
3.3		12:48:38	65	12.4	40.6	4.34	6.48	14.4	179.4	2.5	0.0	0.08
		12:47:19	70	11.3	44.3	4.85	6.52	12.2	177.3	2.2	0.0	0.079
		12:45:20	75	10.43	46.6	5.2	6.53	11.5	175.5	2.2	0.0	0.079
		12:44:32	80	10.03	48	5.42	6.52	11.9	175.5	1.2	0.0	0.078
		12:43:44	85	9.51	50	5.71	6.52	11.7	174.9	1.2	0.0	0.077
		12:42:48	90	9.29	50.3	5.77	6.46	15.1	177.1	1.3	0.0	0.077
		12:41:44	95	8.97	50.3	5.81	6.39	19	179.5	0.2	0.0	0.076
		12:40:33	100	8.74	47.9	5.57	6.26	26.9	185	0.6	0.0	0.076
		12:39:51	105	8.37	46.2	5 42	6.22	28.8	185.6	0.8	0.0	0.076
		12:38:59	110	8	45	5.33	6.2	29.7	185	0.6	0.0	0.075
		12:37:34	115	7 71	44.2	5 27	6 18	.31	183.9	2.0	0.0	0.075
		2.07.49	120	7 58	42.2	5.04	62	29.7	176.5	2.0	0.0	0.075
		2:06:19	125	7.4	42.6	5.12	6.3	24.1	166.7	2.1	0.0	0.075
		12:56:36	0.5	26.62	112	9	8 41	-101 1	153.4	12	0.0	0.087
		12:55:41	5	25.99	113	9.18	84	-100	155.1	1.2	0.0	0.001
		12:54:39	10	25.5	111	9.10	76	-51.9	170.1	21	22	0.000
		12.04.00	15	20.0	92.6	7 77	6.88	-8.5	187.5	2.1	53	0.000
		12:52:08	20	23 38	59	5.03	6 65	5.2	104.3	15	4.8	0.004
		12:52:00	25	20.00	34.6	3.00	6.5	14.5	104.0	1.0	1.0	0.00
B7-6		12:00:02	30	21.27	40.1	3.53	6.5	14.0	103.3	0.2	0.4	0.001
In-I ako		12:43:01	35	21.0	56.1	4 98	6.6	85	190.2	0.2	0.4	0.00
		12:47:22	40	20.84	50.1	53	6.64	5.9	107.4	3.8	0.0	0.000
TOWER		12:40:07	40	20.04	58.6	5.26	6.65	53	102.4	0.0	0.0	0.03
Sacchi		12.44.34	-40 -50	20.0	64.6	5.20	6.68	3.5	180.5	1.0	0.0	0.03
3 1	8/15/2018	12.42.37	55	20.40	63.0	5.02	6.68	3.5	180.1	1.0	0.0	0.031
5.1	0/10/2010	12:30:47	60	20.02	62.3	5.65	6.65	53	100.1	1.5	0.0	0.001
		12:39:47	65	10.10	59.6	5.03	6.63	63	100.2	1.0	0.0	0.035
		12:30:33	70	10.42	59.0	1.43	6.50	0.5	100.2	1.0	0.0	0.095
		12:37:40	70	19.43	40.0	4.97	6.52	12.0	190.3	1.0	0.2	0.094
		12:33:32	73 90	17.04	29.1	2.60	6.42	12.9	102 /	1.2	0.0	0.093
		12.34.14	00 95	1/.3/	20.1	2.09	6.43	17.0	193.4	1.2	0.0	0.091
		12.33.15	00	14.31	20.9	2.75	6.45	17.0	193.3	0.7	0.0	0.000
		12.31.33	90	12.73	29.9	3.17	6.40	10.0	190.7	0.7	0.0	0.003
		12.30.35	90	11.07	32.3	2.51	6.41	10.2	109.9	0.0	0.0	0.001
		12.29.47	100	11.20	3Z	3.5	0.41	10.0	191.2	0.0	0.0	0.061
		12.20.20	105	10.07	29.5	3.27	0.27	20.1	195.0	0.0	0.0	0.08
		12:27:08	110	10.3	27.5	3.08	6.17	31.9	198.2	0.8	0.0	0.08
		12:25:44	115	9.98	26.4	2.99	5.97	43.5	205.5	1.3	0.0	0.079
		12:24:58	120	9.51	25.1	2.86	5.96	44	202.5	1.1	0.0	0.079
L		12:22:16	125	9.11	19.7	2.28	5.88	48.6	207.4	1.5	0.0	0.079

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		8:49:33	0.5	26.3	111	8.96	8.81	-124.9	102	1.5	0.0	0.083
		8:48:34	5	26.21	113	9.11	8.87	-128.8	101.4	2.1	1.5	0.083
		8:47:53	10	25.73	115	9.41	9.03	-138.2	98.9	3.2	2.8	0.083
		8:46:43	15	25.02	110	9.05	8.42	-101.1	105.6	3.2	3.7	0.081
		8:44:59	20	23.61	61.2	5.19	6.72	1.6	146.1	2.5	3.0	0.084
		8:43:35	25	22.67	38.9	3.36	6.6	8.5	148.4	0.9	2.6	0.087
BZ-6		8:42:17	30	21.91	30	2.62	6.56	10.7	148	1.0	1.0	0.088
In-Lake		8:40:57	35	21.47	34.4	3.04	6.58	9.8	146.5	0.8	0.5	0.088
Tower		8:40:09	40	21.07	40.7	3.62	6.6	8.1	144.7	1.0	0.4	0.087
		8:39:00	45	20.8	51.2	4.58	6.65	5.2	141.5	1.3	0.0	0.087
Secchi	9/6/2018	8:37:16	50	20.66	42.9	3.85	6.62	6.9	139.5	1.4	0.0	0.088
		8:36:26	55	20.57	38.1	3.43	6.62	7.1	138.1	1.9	0.0	0.089
3.30 M		8:34:58	60	20.41	47	4.23	6.64	5.6	135.5	0.6	0.0	0.09
		8:33:57	65	20.31	49.3	4.45	6.65	5	133.1	1.0	0.0	0.092
		8:33:10	70	20.24	49	4.44	6.66	5	130.9	1.2	0.0	0.092
		8:32:13	75	20.17	46.4	4.2	6.64	5.8	129.1	1.4	0.0	0.092
		8:31:30	80	20.11	45.3	4.1	6.64	6.1	127.1	1.3	0.0	0.092
		8:30:39	85	19.94	43.8	3.99	6.64	6.1	124.3	1.1	0.0	0.092
		8:29:33	90	19.7	41.5	3.8	6.62	7	121.6	3.0	0.0	0.092
		8:28:49	95	19.64	40.6	3.72	6.62	6.8	118.6	2.2	0.0	0.093
		8:27:35	100	19.39	39.8	3.66	6.59	8.7	116.4	6.4	0.0	0.093
		8:26:34	105	19.2	37.4	3.45	6.58	9.2	112.2	2.0	0.0	0.093
		8:24:15	110	19.05	33.3	3.09	6.44	17.8	110.4	3.4	0.0	0.094
		8:22:31	115	18.67	27.9	2.6	6.25	28.8	110.8	3.9	0.0	0.094
		8:20:56	120	17.99	17.8	1.68	6.08	38.8	106.4	11.2	0.0	0.096
		8:19:56	125	17.7	14	1.33	6.16	33.7	89.3	29.6	4.1	0.097
		9:49:49	0.5	23.57	104	8.81	7.58	-50.1	145.5	3.4	3.9	0.087
		9:49:07	5	23.41	104	8.81	7.57	-49.7	145.5	3.4	4.1	0.087
		9:47:39	10	23.34	101	8.57	7.31	-34	150.1	3.7	5.0	0.087
BZ-7		9:46:43	15	22.23	94.4	8.22	6.98	-14	156.9	3.2	4.0	0.089
Upper Lake		9:45:52	20	20.4	87.9	7.92	6.87	-8	160.5	4.4	2.7	0.106
No-Wake	6/28/2018	9:45:01	25	19.16	79.2	7.32	6.78	-2.6	161.5	5.4	3.0	0.106
		9:44:20	30	18.38	72	6.76	6.69	3	161.9	4.8	2.7	0.101
		9:42:38	35	17.41	60.9	5.83	6.55	11	159.2	3.9	2.2	0.095
		9:41:47	40	16.27	55.5	5.45	6.5	13.5	156.3	1	2.7	0.092
		9:40:42	45	14.77	51.6	5.23	6.48	14.8	150.8	1.7	2.9	0.089
		9:39:56	50	11.72	49.3	5.35	6.47	15.3	147.3	1.6	2.6	0.083
		9:38:49	55	10.49	50.7	5.66	6.5	12.9	140.3	2.3	2.6	0.08
		9:26:07	0.5	26.77	110	8.79	8.44	-102.8	130.3	1.7	0.0	0.095
		9:25:32	5	26.77	110	8.79	8.39	-99.6	132.1	2.6	1.2	0.095
		9:24:26	10	26.45	110	8.89	7.89	-69.2	140.8	3.5	2.0	0.095
BZ-7		9:23:36	15	24.56	106	8.86	7.21	-27.9	156.1	2.7	2.0	0.096
Upper Lake		9:22:40	20	22.93	86.4	7.42	6.9	-9.4	164.9	3.2	1.9	0.103
No-Wake	7/12/2018	9:21:29	25	21.75	74.6	6.55	6.76	-1.5	167.8	6.1	1.9	0.113
		9:20:14	30	18.4	43.2	4.06	6.51	13.4	173.8	2.6	1.7	0.096
		9:19:26	35	16.25	39.1	3.84	6.5	13.7	172.9	3.1	3.3	0.092
		9:17:57	40	12.99	40.5	4.27	6.48	14.7	172.8	3.9	3.3	0.085
		9:16:50	45	11.05	42.7	4.7	6.47	14.9	171.3	1.5	2.7	0.081
		9:15:51	50	10.03	44.2	4.98	6.52	12.2	166.4	0.4	2.2	0.08
		9:14:28	55	9.86	46.1	5.22	6.62	6	153.6	2.9	2.3	0.079
L	L	9:13:37	57	9.91	48.6	5.49	6.75	-1.4	154.8	3	1.6	0.079

Station	Date	Time	Depth	Temp	DO	DO	рΗ	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	С	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		14:15:59	0.5	26.15	110	8.93	8.75	-121.3	124.6	1.8	1.9	0.082
		14:14:29	5	25.63	108	8.85	8.49	-105.5	129.5	2.0	2.6	0.083
		14:13:38	10	24.52	103	8.58	7.33	-35.1	147.1	2.5	2.7	0.075
BZ-7		14:12:44	15	24.06	91.3	7.68	7.11	-22	150.9	1.7	1.2	0.065
Upper Lake	7/31/2018	14:11:57	20	22.73	88.1	7.6	7.05	-18.5	154.5	2.4	0.1	0.096
No-Wake		14:10:28	25	21.24	89.7	7.96	7.06	-18.8	153.7	4.4	0.5	0.103
		14:09:28	30	20.32	90	8.13	7.05	-18.3	152.7	5.0	0.7	0.103
		14:08:36	35	19.91	90.8	8.27	7.05	-18.3	151.3	5.2	0.1	0.100
		14:07:57	40	19.56	89.4	8.2	7.02	-16.8	150.7	4.6	0.0	0.100
		14:06:36	45	19.11	83.3	7.71	6.94	-12	150.6	6.6	0.1	0.100
		14:05:16	50	18.82	71.6	6.66	6.85	-6.7	149.6	6.2	0.0	0.100
		14:03:14	55	14.88	20.9	2.11	6.41	18.8	163.3	250.6	1.5	0.089
		14:07:58	0.5	26.89	116	9.28	8.69	-118	122.8	1.7	0.0	0.082
		14:07:22	5	26.19	115	9.28	8.51	-106.8	127	2.0	0.2	0.08
		14:06:51	10	25.91	112	9.13	8.19	-87.1	132	1.6	1.7	0.078
		14:06:24	15	25.77	109	8.91	7.66	-55.4	138.9	1.2	2.5	0.074
		14:05:49	20	25.29	104	8.57	7.13	-23.6	151.9	2.0	1.7	0.064
BZ-7	8/15/2018	14:05:04	25	23.96	94.5	7.96	6.96	-13.3	156.3	2.3	0.0	0.052
Upper Lake		14:04:25	30	22.7	87.9	7.58	6.82	-5	164.8	4.6	0.0	0.077
No-Wake		14:02:42	35	20.93	91	8.13	6.59	9.1	181.1	11.1	0.2	0.089
		14:01:47	40	20.52	89.7	8.07	6.58	9.5	180.8	9.4	0.7	0.091
		14:01:08	45	20.45	88.6	7.98	6.6	8.2	178.7	9.0	0.0	0.091
		14:00:30	50	20.1	86.3	7.83	6.62	6.8	177.2	8.0	0.0	0.094
		13:59:41	55	20.12	86.9	7.88	6.71	1.9	174.4	9.9	0.3	0.094
		9:59:03	0.5	27.49	111	8.8	8.54	-109.3	117.4	1.9	0.2	0.085
		9:58:15	5	27.39	111	8.8	8.4	-100.5	120.1	1.5	0.2	0.084
		9:57:12	10	25.87	110	8.94	7.88	-68.3	128.9	1.9	1.6	0.079
		9:56:03	15	24.49	93.3	7.78	7.06	-18.9	148.8	2.1	1.7	0.071
		9:55:04	20	23.05	80.4	6.89	6.8	-3.8	161.1	1.8	0.8	0.085
BZ-7		9:54:12	25	22.02	82.5	7.21	6.7	2.7	168.6	4.4	0.0	0.100
Upper Lake	9/6/2018	9:53:07	30	21.4	81.5	7.21	6.57	10.1	175.7	2.9	0.0	0.104
No-Wake		9:52:13	35	21.16	78.8	7	6.44	17.7	182.3	3.5	0.0	0.103
		9:51:18	40	20.79	74.7	6.69	6.3	26	189.6	2.6	0.0	0.101
		9:50:01	45	20.66	72.7	6.53	6.32	24.9	188.1	2.7	0.0	0.101
		9:49:14	50	20.57	70.8	6.36	6.36	22.8	186	4.7	0.0	0.101
		9:48:24	55	20.53	70.1	6.31	6.43	18.6	182.4	3.8	0.0	0.101
		9:47:10	57	20.53	70.7	6.36	6.62	7	172.7	4.3	0.0	0.101

# **APPENDIX B**

# LABORATORY REPORTS



#### Dayton, NJ

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0 Automated Report

07/24/18

### **Technical Report for**

USACE-Philadelphia District

Philadelphia District, Reservoir Sampling

W25PHS81145379

SGS Job Number: JC68915



Sampling Date: 06/28/18

Report to:

Army Corps of Engineers

joseph.m.loeper@usace.army.mil

**ATTN: Joseph Loeper** 

#### Total number of pages in report: 46



A. Paul Ioannidis General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Tammy McCloskey 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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Please share your ideas about how we can serve you better at: EHS.US.CustomerCare@sgs.com

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## Sample Summary

USACE-Philadelphia District

Job No: JC68915

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matrix Code Type		Client Sample ID
JC68915-1	06/28/18	06:45 GW	06/28/18	AQ	Surface Water	BZ-1S
JC68915-1F	06/28/18	06:45 GW	06/28/18	AQ	Surface H2O Filtered	BZ-1S
JC68915-2	06/28/18	11:45 GW	06/28/18	AQ	Surface Water	BZ-2S
JC68915-2F	06/28/18	11:45 GW	06/28/18	AQ	Surface H2O Filtered	BZ-2S
JC68915-3	06/28/18	08:35 GW	06/28/18	AQ	Surface Water	BZ-3S
JC68915-3F	06/28/18	08:35 GW	06/28/18	AQ	Surface H2O Filtered	BZ-3S
JC68915-4	06/28/18	08:35 GW	06/28/18	AQ	Surface Water	BZ-3M
JC68915-4F	06/28/18	08:35 GW	06/28/18	AQ	Surface H2O Filtered	BZ-3M
JC68915-5	06/28/18	08:35 GW	06/28/18	AQ	Surface Water	BZ-3D
JC68915-5F	06/28/18	08:35 GW	06/28/18	AQ	Surface H2O Filtered	BZ-3D
JC68915-6	06/28/18	11:30 GW	06/28/18	AQ	Surface Water	BZ-4S
JC68915-6F	06/28/18	11:30 GW	06/28/18	AQ	Surface H2O Filtered	BZ-4S
JC68915-7	06/28/18	11:10 GW	06/28/18	AQ	Surface Water	BZ-5S



# Sample Summary (continued)

USACE-Philadelphia District

Job No:

JC68915

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC68915-7F	06/28/18	11:10 GW	06/28/18	AQ	Surface H2O Filtered	BZ-5S
JC68915-8	06/28/18	08:00 GW	06/28/18	AQ	Surface Water	BZ-6S
JC68915-8F	06/28/18	08:00 GW	06/28/18	AQ	Surface H2O Filtered	BZ-6S
JC68915-9	06/28/18	08:00 GW	06/28/18	AQ	Surface Water	BZ-6M
JC68915-9F	06/28/18	08:00 GW	06/28/18	AQ	Surface H2O Filtered	BZ-6M
JC68915-10	06/28/18	08:00 GW	06/28/18	AQ	Surface Water	BZ-6D
JC68915-10F	06/28/18	08:00 GW	06/28/18	AQ	Surface H2O Filtered	BZ-6D
JC68915-11	06/28/18	09:40 GW	06/28/18	AQ	Surface Water	BZ-7S
JC68915-11F	06/28/18	09:40 GW	06/28/18	AQ	Surface H2O Filtered	BZ-7S
JC68915-12	06/28/18	09:40 GW	06/28/18	AQ	Surface Water	BZ-7M
JC68915-12F	06/28/18	09:40 GW	06/28/18	AQ	Surface H2O Filtered	BZ-7M
JC68915-13	06/28/18	09:40 GW	06/28/18	AQ	Surface Water	BZ-7D
JC68915-13F	06/28/18	09:40 GW	06/28/18	AQ	Surface H2O Filtered	BZ-7D



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#### CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	USACE-Philadelphia District	Job No	JC68915
Site:	Philadelphia District, Reservoir Sampling	Report Date	7/12/2018 5:29:35 PM

On 06/28/2018, 26 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 4.8 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC68915 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

#### General Chemistry By Method EPA 351.2/LACHAT

	Matrix: AQ	Batch ID:	GP14300
_	4.11 1 1	a: a — 1 1 a	

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC68841-12MS, JC68841-12DUP were used as the QC samples for Nitrogen, Total Kjeldahl.

RPD(s) for Duplicate for Nitrogen, Total Kjeldahl are outside control limits for sample GP14300-D1. RPD acceptable due to low duplicate and sample concentrations.

#### General Chemistry By Method EPA 353.2/LACHAT

	Matrix: AQ	Batch ID:	GP14357
-	All samples were prepared within the recommended method holding time.		
	All method blanks for this batch meet method specific criteria.		

Sample(s) JC68915-3DUP, JC68915-3MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

Γ		Matrix: AQ		Batch ID:	GP14407
	4.11		1 111 1	1 1 4	

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC68915-5DUP, JC68915-5MS, JC68915-9MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

#### **General Chemistry By Method EPA 365.3**

Matrix: AQ	Batch ID:	GP14360	
All samples were prepared within the recommended method holding time.			

All method blanks for this batch meet method specific criteria.

Sample(s) JC68915-1DUP, JC68915-1MS were used as the QC samples for Phosphorus, Total.

1 ()		~ I	1	
Matrix: AQ	Batch ID:	GP14385		

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC68915-1FDUP, JC68915-1FMS were used as the QC samples for Phosphorus, Total.

#### General Chemistry By Method EPA353.2/SM4500NO2B

Matrix:	AQ Batch II	<b>D:</b> R171216
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-1 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171217
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-2 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171218
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-3 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171219
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-4 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171236
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-9 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171237
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-5 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171238
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-6 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171239
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-7 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	D: R171240
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-8 for N	itrogen, Nitrate: Calculated as: (Nitrog	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171241
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-10 for	Nitrogen, Nitrate: Calculated as: (Nitro	ogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171242
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-11 for	Nitrogen, Nitrate: Calculated as: (Nitro	ogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171243
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-12 for	Nitrogen, Nitrate: Calculated as: (Nitro	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix:	AQ Batch II	<b>D:</b> R171244
The data for EP.	A353.2/SM4500NO2B meets quality c	ontrol requirements.
JC68915-13 for	Nitrogen, Nitrate: Calculated as: (Nitro	gen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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N

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#### General Chemistry By Method SM2320 B-11

	Matrix: AQ Batch ID: GN82406		
	All samples were analyzed within the recommended method holding time.		
	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC68915-1DUP were used as the QC samples for Alkalinity, Total as CaCO3.		
	JC68915-4 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-9 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
-	JC68915-8 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-7 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-6 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-5 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-3 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-2 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-13 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-12 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-11 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-1 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC68915-10 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
G	neral Chemistry By Method SM2540 C-11		
	Matrix: AQ Batch ID: GN82294		
	All samples were analyzed within the recommended method holding time.		
	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC68915-1DUP were used as the QC samples for Solids, Total Dissolved.		
	Matrix: AQBatch ID:GN82324		
	All samples were analyzed within the recommended method holding time.		
	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC69096-1DUP were used as the QC samples for Solids, Total Dissolved.		

#### General Chemistry By Method SM2540 D-11

	Matrix: AQ	Batch ID:	GN82302
-	All samples were analyzed within	n the recommended metho	d holding time.
-	All method blanks for this batch	meet method specific crite	eria.
-	Sample(s) JC68824-12DUP wer	e used as the QC samples	for Solids, Total Suspended.

- JC68915-3 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 500 mL of sample. Volume was reduced from 1 liter due to limited volume.
- JC68915-1 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 900 mL of sample. Volume was reduced from 1 liter due to limited volume.

#### Batch ID: GN82344

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68925-1DUP were used as the QC samples for Solids, Total Suspended.
- JC68915-12 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 900 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.

#### Thursday, July 12, 2018

Matrix: AQ

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#### General Chemistry By Method SM4500NH3 H-11LACHAT

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69096-1DUP, JC69096-1MS, JC69096-1MSD were used as the QC samples for Nitrogen, Ammonia.

#### General Chemistry By Method SM4500NO2 B-11

Matrix: AQ Batch ID	GN82128
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- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68915-2DUP, JC68915-2MS were used as the QC samples for Nitrogen, Nitrite.

#### General Chemistry By Method SM5210 B-11

Matrix: AQ	Batch ID:	GP14133
A11 1 1 1 1 1 1 1 1 1	4 11 4	11 112 2

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68840-8DUP were used as the QC samples for BOD, 5 Day.

#### General Chemistry By Method SM5310 B-11

	Matrix: AQ	Batch ID:	GP14287
-	All samples were prepared within	the recommended metho	d holding time.
-	All method blanks for this batch	meet method specific crite	eria.
	Sample(s) JC68915-1MS, JC689	915-1MSD were used as t	he OC samples for Total Organic Carbon.

 ······································		
Matrix: AQ	Batch ID:	GP14288

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68915-8MS, JC68915-8MSD were used as the QC samples for Total Organic Carbon.

#### General Chemistry By Method SM9222 B-06

Matrix: AQ	Batch ID: MB5290	

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68915-1DUP were used as the QC samples for Coliform, Total.
- RPD(s) for Duplicate for Coliform, Total are outside control limits for sample MB5290-D1. High RPD due to possible sample nonhomogeneity.
- JC68915-11 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-8 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-1 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- = JC68915-7 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-6 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-3 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- = JC68915-2 for Coliform, Total: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

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#### General Chemistry By Method SM9222 D-06

- Matrix: AQ Batch ID: MB5291
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC68915-1DUP were used as the QC samples for Coliform, Fecal.
- RPD(s) for Duplicate for Coliform, Fecal are outside control limits for sample MB5291-D1. High RPD due to possible sample nonhomogeneity.
- JC68915-2 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-3 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-6 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-8 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-7 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.
- JC68915-1 for Coliform, Fecal: Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Job Number:	JC68915
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	06/28/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC68915-1	BZ-1S					
Alkalinity, Total a Coliform, Fecal <sup>b</sup> Coliform, Total <sup>c</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Car <b>JC68915-1F</b> No hits reported in	as CaCO3 <sup>a</sup> d + Nitrite jeldahl olved bon <b>BZ-1S</b> n this sample.	10.9 84 104 0.87 0.27 44.0 1.7	5.0 4 4 0.11 0.10 0.20 10 1.0		mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC68915-2	BZ-2S					
Alkalinity, Total a Coliform, Fecal <sup>b</sup> Coliform, Total <sup>c</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Car	as CaCO3 <sup>a</sup> d + Nitrite jeldahl olved :bon	8.8 62 118 0.26 0.26 0.22 65.0 2.4	5.0 2 2 0.11 0.10 0.20 10 1.0		mg/l col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC68915-2F	BZ-2S					
No hits reported in <b>JC68915-3</b>	n this sample. <b>BZ-3S</b>					
Alkalinity, Total a Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Car	as CaCO3 <sup>a</sup> d + Nitrite jeldahl olved ·bon	10.9 0.52 0.52 0.28 57.0 1.5	5.0 0.11 0.10 0.20 10 1.0		mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11

No hits reported in this sample.

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JC68915

Job Number:	JC68915
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	06/28/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
JC68915-4	BZ-3M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl solved rbon	14.6 0.94 0.94 0.24 71.4 1.8	5.0 0.11 0.10 0.20 10 1.0		mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC68915-4F	BZ-3M					
No hits reported i	n this sample.					
JC68915-5	BZ-3D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Solids, Total Diss	as CaCO3 <sup>a</sup> d + Nitrite solved	6.8 0.90 0.90 68.0	5.0 0.11 0.10 10		mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM2540 C-11
JC68915-5F	BZ-3D					
No hits reported i	n this sample.					
JC68915-6	BZ-4S					
Alkalinity, Total Coliform, Fecal <sup>b</sup> Coliform, Total <sup>c</sup> Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> solved pended rbon	8.3 360 118 40.0 6.5 1.3	5.0 10 2 10 4.0 1.0		mg/l col/100ml col/100ml mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 SM2540 C-11 SM2540 D-11 SM5310 B-11
JC68915-6F	BZ-4S					
No hits reported in this sample.						
JC68915-7	BZ-5S					
Alkalinity, Total Coliform, Fecal <sup>b</sup> Coliform, Total <sup>c</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl	14.0 3500 673 1.1 1.1 0.34	5.0 100 10 0.11 0.10 0.20		mg/l col/100ml col/100ml mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT

Job Number:	JC68915
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	06/28/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Solids, Total Di	ssolved	62.0	10		mg/l	SM2540 C-11
Solids. Total Su	spended	22.3	4.0		mg/l	SM2540 D-11
Total Organic C	arbon	2.9	1.0		mg/l	SM5310 B-11
JC68915-7F	BZ-5S					
No hits reported	l in this sample.					
JC68915-8	BZ-6S					
Alkalinity, Tota	l as CaCO3 <sup>a</sup>	6.8	5.0		mg/l	SM2320 B-11
Coliform. Fecal	b	4	2		col/100ml	SM9222 D-06
Coliform. Total	c	7	2		col/100ml	SM9222 B-06
Nitrogen, Nitrat	e <sup>d</sup>	0.50	0.11		mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrat	e + Nitrite	0.50	0.10		mg/1	EPA 353.2/LACHAT
Nitrogen, Total	Kieldahl	0.25	0.20		mg/1	EPA 351.2/LACHAT
Solids Total Di	ssolved	83.0	10		mg/l	SM2540 C-11
Total Organic C	larbon	1.3	1.0		mg/l	SM5310 B-11
JC68915-8F	BZ-6S					
No hits reported	l in this sample.					
JC68915-9	BZ-6M					
Alkalinity, Tota	l as CaCO3 <sup>a</sup>	12.0	5.0		mg/l	SM2320 B-11
Nitrogen, Nitrat	e <sup>d</sup>	0.91	0.11		mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrat	e + Nitrite	0.91	0.10		mg/l	EPA 353.2/LACHAT
Nitrogen, Total	Kieldahl	0.26	0.20		mg/l	EPA 351.2/LACHAT
Solids Total Di	ssolved	78.0	10		mg/l	SM2540 C-11
Total Organic C	larbon	1.8	1.0		mg/l	SM5310 B-11
JC68915-9F	BZ-6M					
No hits reported	l in this sample.					
JC68915-10	BZ-6D					
Alkalinity. Tota	l as CaCO3 <sup>a</sup>	11.4	5.0		mg/l	SM2320 B-11
Nitrogen, Nitrat	e d	0.83	0.11		mg/l	EPA353.2/SM4500NO2B
Nitrogen. Nitrat	e + Nitrite	0.83	0.10		mg/l	EPA 353.2/LACHAT
Nitrogen, Total	Kieldahl	0.42	0.20		mg/l	EPA 351.2/LACHAT
Solids. Total Di	ssolved	86.0	10		mg/l	SM2540 C-11
Solids, Total Su	spended	21.0	4.0		mg/l	SM2540 D-11
Total Organic C	arbon	1.2	1.0		mg/l	SM5310 B-11
	-				0	



Job Number:	JC68915
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	06/28/18

Lab Sample ID Cli Analyte	ent Sample ID	Result/ Qual	RL	MDL	Units	Method
JC68915-10F BZ	-6D					
No hits reported in th	is sample.					
JC68915-11 BZ	-7S					
Alkalinity, Total as C Nitrogen, Nitrate <sup>d</sup> Nitrogen, Nitrate + <sup>1</sup> Nitrogen, Total Kjeld Solids, Total Dissolve Total Organic Carbor	CaCO3 <sup>a</sup> Nitrite lahl ed n	10.9 0.51 0.51 0.23 64.0 1.4	5.0 0.11 0.10 0.20 10 1.0		mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC68915-11F BZ	-7S					
No hits reported in th	is sample.					
JC68915-12 BZ	-7M					
Alkalinity, Total as C Nitrogen, Nitrate <sup>d</sup> Nitrogen, Nitrate + 1 Nitrogen, Total Kjeld Solids, Total Dissolve Total Organic Carbor	'aCO3 <sup>a</sup> Nitrite lahl ed	7.8 0.76 0.76 0.28 56.0 1.2	5.0 0.11 0.10 0.20 10 1.0		mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC68915-12F BZ	-7M					
No hits reported in th	is sample.					
JC68915-13 BZ	-7D					
Alkalinity, Total as C Nitrogen, Nitrate <sup>d</sup> Nitrogen, Nitrate + 1 Nitrogen, Total Kjeld Solids, Total Dissolve Solids, Total Suspend Total Organic Carbor	CaCO3 <sup>a</sup> Nitrite lahl ed led	12.5 0.87 0.24 88.0 13.3 1.0	5.0 0.11 0.10 0.20 10 4.0 1.0		mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11

#### JC68915-13F BZ-7D

No hits reported in this sample.



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Job Number:JC68915Account:USACE-Philadelphia DistrictProject:Philadelphia District, Reservoir SamplingCollected:06/28/18

Lab Sample ID	Client Sample ID	Result/				
Analyte		Qual	RL	MDL	Units	Method

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Dayton, NJ

Section 4

Sample Results

Report of Analysis



4



Client Sample ID:	BZ-1S		
Lab Sample ID:	JC68915-1	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

#### **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:49	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	84	4	col/100ml	4	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	104	4	col/100ml	4	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:04	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.87	0.11	mg/l	1	07/10/18 14:27	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.87	0.10	mg/l	1	07/10/18 14:27	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.27	0.20	mg/l	1	07/11/18 11:17	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	44.0	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended e	< 4.0	4.0	mg/l	1	07/03/18 13:40	RC	SM2540 D-11
Total Organic Carbon	1.7	1.0	mg/l	1	07/06/18 17:34	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(e) Reported sample aliquot obtained from filtration of 900 mL of sample. Volume was reduced from 1 liter due to limited volume.



4.1 **4** 

RL = Reporting Limit

#### SGS LabLink@1007736 10:36 24-Jul-2018

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-1S JC68915-1F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a		
General Chemistry								
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3

# **Report of Analysis**

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4.2



Client Sample ID:	BZ-2S		
Lab Sample ID:	JC68915-2	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

#### **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.8	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:51	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	62	2	col/100ml	2	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	118	2	col/100ml	2	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:05	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.26	0.11	mg/l	1	07/10/18 14:29	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.26	0.10	mg/l	1	07/10/18 14:29	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.22	0.20	mg/l	1	07/11/18 11:17	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	65.0	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/03/18 13:40	RC	SM2540 D-11
Total Organic Carbon	2.4	1.0	mg/l	1	07/06/18 18:31	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





#### SGS LabLink@1007736 10:36 24-Jul-2018

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-2S JC68915-2F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a			
General Chemistry									
Analyte		Result	RL	Units	DF	Analyzed	By	Method	
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3	

# **Report of Analysis**

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4.4

4



Client Sample ID:	BZ-3S		
Lab Sample ID:	JC68915-3	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	<b>Date Received:</b>	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

#### **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:52	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	0	0	col/100ml	1	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	< 2	2	col/100ml	1	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:07	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.52	0.11	mg/l	1	07/10/18 14:30	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.52	0.10	mg/l	1	07/10/18 14:30	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.28	0.20	mg/l	1	07/11/18 11:18	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	57.0	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended <sup>e</sup>	< 4.0	4.0	mg/l	1	07/03/18 13:40	RC	SM2540 D-11
Total Organic Carbon	1.5	1.0	mg/l	1	07/06/18 18:42	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(e) Reported sample aliquot obtained from filtration of 500 mL of sample. Volume was reduced from 1 liter due to limited volume.



4.5 **4** 

#### SGS LabLink@1007736 10:36 24-Jul-2018

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3S JC68915-3F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a		
General Chemistry								
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3

# **Report of Analysis**

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4.6

4



BZ-3M		
JC68915-4	Date Sampled:	06/28/18
AQ - Surface Water	Date Received:	06/28/18
	Percent Solids:	n/a
Philadelphia District, Reservoir Sampling		
	BZ-3M JC68915-4 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-3M JC68915-4 Date Sampled: AQ - Surface Water Date Received: Philadelphia District, Reservoir Sampling

## **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.6	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:54	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:08	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.94	0.11	mg/l	1	07/10/18 14:31	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.94	0.10	mg/l	1	07/10/18 14:31	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.24	0.20	mg/l	1	07/11/18 11:19	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	71.4	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.8	1.0	mg/l	1	07/06/18 18:53	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





#### SGS LabLink@1007736 10:36 24-Jul-2018

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3M JC68915- AQ - Surt Philadelph	4F face H2O Fil <sup>i</sup> hia District, 1	tered Reservoir Sa	mpling		Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a			
General Chemistry									
Analyte		Result	RL	Units	DF	Analyzed	By	Method	
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3	

# **Report of Analysis**

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4.8



Client Sample ID:	BZ-3D		
Lab Sample ID:	JC68915-5	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

## **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	6.8	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:56	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:12	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.90	0.11	mg/l	1	07/12/18 14:16	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.90	0.10	mg/l	1	07/12/18 14:16	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	< 0.20	0.20	mg/l	1	07/11/18 11:22	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	68.0	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	< 1.0	1.0	mg/l	1	07/06/18 19:06	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





#### SGS LabLink@1007736 10:36 24-Jul-2018

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3D JC68915-5F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a			
General Chemistry	7								
Analyte		Result	RL	Units	DF	Analyzed	By	Method	
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3	

# **Report of Analysis**

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4.10

4



Client Sample ID:	BZ-4S		
Lab Sample ID:	JC68915-6	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

#### **Report of Analysis**

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.3	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 21:58	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	360	10	col/100ml	10	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	118	2	col/100ml	2	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:14	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	< 0.11	0.11	mg/l	1	07/12/18 14:17	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	< 0.10	0.10	mg/l	1	07/12/18 14:17	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:18	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	< 0.20	0.20	mg/l	1	07/11/18 11:22	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:29	MP	EPA 365.3
Solids, Total Dissolved	40.0	10	mg/l	1	07/03/18 11:00	RC	SM2540 C-11
Solids, Total Suspended	6.5	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	mg/l	1	07/06/18 19:15	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



4.11 4

JC68915
Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-4S JC68915-6F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a			
General Chemistry	General Chemistry								
Analyte		Result	RL	Units	DF	Analyzed	By	Method	
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:03	MP	EPA 365.3	

# **Report of Analysis**

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4.12



Client Sample ID:	BZ-5S		
Lab Sample ID:	JC68915-7	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	Bv	Method
					<b>J</b>		
Alkalinity, Total as CaCO3 <sup>a</sup>	14.0	5.0	mg/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:00	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	3500	100	col/100ml	100	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	673	10	col/100ml	10	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:15	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	1.1	0.11	mg/l	1	07/12/18 14:19	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.1	0.10	mg/l	1	07/12/18 14:19	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.34	0.20	mg/l	1	07/11/18 11:23	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	62.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	22.3	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	2.9	1.0	mg/l	1	07/06/18 19:34	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



4.13 4

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-5S JC68915-7F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a			
General Chemistry	General Chemistry								
Analyte		Result	RL	Units	DF	Analyzed	By	Method	
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3	

# **Report of Analysis**

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Client Sample ID:	BZ-6S		
Lab Sample ID:	JC68915-8	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity Total as CaCO3 <sup>a</sup>	6.8	5.0	mø/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:02	SA	SM5210 B-11
Coliform, Fecal <sup>b</sup>	4	2	col/100ml	2	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	7	2	col/100ml	2	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:17	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.50	0.11	mg/l	1	07/12/18 14:20	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.50	0.10	mg/l	1	07/12/18 14:20	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.25	0.20	mg/l	1	07/11/18 11:24	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	83.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	mg/l	1	07/06/18 20:42	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-6S JC68915-8F AQ - Surface H2O Fil Philadelphia District, I	tered Reservoir Sa	ampling		Date Sampled:06/28/18Date Received:06/28/18Percent Solids:n/a		
General Chemistry	,						
Analyte	Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4.16

4



BZ-6M		
JC68915-9	Date Sampled:	06/28/18
AQ - Surface Water	Date Received:	06/28/18
	<b>Percent Solids:</b>	n/a
Philadelphia District, Reservoir Sampling		
	BZ-6M JC68915-9 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-6M JC68915-9 Date Sampled: AQ - Surface Water Date Received: Philadelphia District, Reservoir Sampling

**General Chemistry** 

Analyta	Docult	DI	Unite	DF	Applyzod	Bv	Mothod
Analyte	Kesuit	KL	Units	Dr	Analyzeu	Бу	Methou
Alkalinity, Total as CaCO3 <sup>a</sup>	12.0	5.0	mg/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:04	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:18	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.91	0.11	mg/l	1	07/12/18 14:21	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.91	0.10	mg/l	1	07/12/18 14:21	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.26	0.20	mg/l	1	07/11/18 11:25	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	78.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.8	1.0	mg/l	1	07/06/18 21:15	CD	SM5310 B-11

(a) Sample was titrated to a final pH  $\,$  of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-6M JC68915-9F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling					Date Sampled Date Received Percent Solids	: 06, : 06, : n/a	/28/18 /28/18 a
General Chemistry								
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4.18

4



BZ-6D		
JC68915-10	Date Sampled:	06/28/18
AQ - Surface Water	Date Received:	06/28/18
	<b>Percent Solids:</b>	n/a
Philadelphia District, Reservoir Sampling		
	BZ-6D JC68915-10 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-6DDate Sampled:JC68915-10Date Sampled:AQ - Surface WaterDate Received: Percent Solids:Philadelphia District, Reservoir SamplingPhiladelphia District, Reservoir Sampling

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity. Total as CaCO3 <sup>a</sup>	11.4	5.0	mg/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:06	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:20	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.83	0.11	mg/l	1	07/12/18 14:24	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.83	0.10	mg/l	1	07/12/18 14:24	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.42	0.20	mg/l	1	07/11/18 11:26	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	86.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	21.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.2	1.0	mg/l	1	07/06/18 21:26	CD	SM5310 B-11

(a) Sample was titrated to a final pH  $\,$  of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-6D JC68915- AQ - Surt Philadelph	10F face H2O Fil hia District, I	tered Reservoir Sa	mpling		Date Sampled Date Received Percent Solids	: 06 : 06 : n/a	/28/18 /28/18 a
General Chemistry	7							
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4.20

4



Client Sample ID:	BZ-7S		
Lab Sample ID:	JC68915-11	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

						_	
Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	mg/l	1	07/05/18 22:20	СВ	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:08	SA	SM5210 B-11
Coliform, Fecal	0	0	col/100ml	1	06/28/18 17:25	SA	SM9222 D-06
Coliform, Total <sup>b</sup>	< 2	2	col/100ml	1	06/28/18 17:24	SA	SM9222 B-06
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:21	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.51	0.11	mg/l	1	07/12/18 14:25	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.51	0.10	mg/l	1	07/12/18 14:25	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.23	0.20	mg/l	1	07/11/18 11:27	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	64.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.4	1.0	mg/l	1	07/06/18 21:38	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Outside of 8 hour holding time, but within 24 hour window accepted by client for this project.

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



4.21 **4** 



Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-7S JC68915- AQ - Sur Philadelp	11F face H2O Fil hia District, 1	tered Reservoir Sa	mpling		Date Sampled Date Received Percent Solids	: 06 : 06 : n/a	/28/18 /28/18 a
General Chemistry	7							
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4.22



Client Sample ID:	BZ-7M		
Lab Sample ID:	JC68915-12	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	Bv	Method
1 Kinary te	Kesuit	<b>KL</b>	Onits	DI	maryzeu	Dy	Methou
Alkalinity, Total as CaCO3 <sup>a</sup>	7.8	5.0	mg/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:10	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:23	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.76	0.11	mg/l	1	07/12/18 14:26	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.76	0.10	mg/l	1	07/12/18 14:26	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.28	0.20	mg/l	1	07/11/18 11:27	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	56.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended <sup>c</sup>	< 4.0	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.2	1.0	mg/l	1	07/06/18 21:49	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(c) Reported sample aliquot obtained from filtration of 900 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-7M JC68915- AQ - Sur Philadelp	12F face H2O Fil hia District,	ltered Reservoir Sa	ampling		Date Sampled Date Received Percent Solids	: 06 l: 06 s: n/s	5/28/18 5/28/18 a
General Chemistry	,							
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4.24 4

Client Sample ID:	BZ-7D		
Lab Sample ID:	JC68915-13	Date Sampled:	06/28/18
Matrix:	AQ - Surface Water	Date Received:	06/28/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	12.5	5.0	mg/l	1	07/05/18 22:20	CB	SM2320 B-11
BOD, 5 Day	< 3.4	3.4	mg/l	1	06/28/18 22:12	SA	SM5210 B-11
Nitrogen, Ammonia	< 0.20	0.20	mg/l	1	07/09/18 13:24	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>b</sup>	0.87	0.11	mg/l	1	07/12/18 14:27	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.87	0.10	mg/l	1	07/12/18 14:27	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	< 0.010	0.010	mg/l	1	06/28/18 21:25	JO	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.24	0.20	mg/l	1	07/11/18 11:28	BM	EPA 351.2/LACHAT
Phosphorus, Total	< 0.050	0.050	mg/l	1	07/11/18 09:58	MP	EPA 365.3
Solids, Total Dissolved	88.0	10	mg/l	1	07/03/18 15:40	RI	SM2540 C-11
Solids, Total Suspended	13.3	4.0	mg/l	1	07/04/18 10:35	RC	SM2540 D-11
Total Organic Carbon	1.0	1.0	mg/l	1	07/06/18 22:00	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-7D JC68915- AQ - Sur Philadelp	13F face H2O Fil hia District,	tered Reservoir Sa	ampling		Date Sampled Date Received Percent Solids	: 06 l: 06 s: n/s	5/28/18 5/28/18 a
General Chemistry	7							
Analyte		Result	RL	Units	DF	Analyzed	By	Method
Phosphorus, Total		< 0.050	0.050	mg/l	1	07/12/18 11:19	MP	EPA 365.3

# **Report of Analysis**

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4







Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

• Chain of Custody



606	$\varsigma \omega$	CHAIN OF CUSTODY			
303		2235 Route 130, Dayton, NJ 08810 TEL. 732-329-0200 FAX 732-329-3499 www.sgs.com/ehsusa	SGS Quote #	Botte Ore	D-061418.199 PN
Client / Reporting Information		Project Information	Req	uested Analysis see TEST CO	DE sheet) Matrix Codes
USACE - Phila, Distici	USACE - Belt	zuille Reservoir	St St		DW - Drinking Water GW - Ground Water
100 Penn Sg. East	2145 Pohopoco	Billing Information ( if different from Report 1 State Company Name		A POS	SW - Surface Water SC - Soit SL - Studge
DHila PA 19107 roject Contact E-mail	Lehighton, PA	Street Address	0304 1020	2	SED-Sediment OF - Oli LIQ - Other Liquid
Soe Loeper -USACE	#PD-061418 Client Purchase Order #	199 City State		L L	A/R - Air SOL - Other Solid WP - Wipe
Sampler(s) Name(s)	Project Manager	Attention:	P Bo	N Sol	EB-Field Blank EB-Equipment Blank RB-Rinse Blank ZB Trin Purch
Fregory Wacik - 9786	Colle	ztion Number c	preserved bottles C	alp	TE-Trip Elank
ample # Field ID / Point of Collection	MEOH/DI Vial # Date	Time Sampled by Matrix bottles $\overrightarrow{P}$ $\overrightarrow{P}$	NONE MECH MCCOF ENCOF	Tol	LAB USE ONLY
IF BZ-IS	6/28/18	145 M SW 10 X Y	XXX	X X	67
F 132-25	+ /	835 VI Cut OX			
1F BZ-3M		835 16 SW 8 X )		× ×	19M1
F BZ.3D		835 70 3W 8 X X	××	x	637
1 BZ-45	+	1130 PG SWIOX Y		X X X	
F BZ-65		800 48 SW 10 x x	X X X	XX	
F BZ-6M	$++f_{}$	800 45 SW 8 x x	X X	X	
0/- BZ-60	V	800 / (10) SW 8 X X	× X	×	· · · · · · · · · · · · · · · · · · ·
Turnaround Time ( Business days)		Data Deliverable In	formation	Comments / S	pecial Instructions
Std. 10 Business Days	Approved by (SGS Project Manage	rr)/Date: Commercial "A" (Level 1) Commercial "B" (Level 2) FULLT1 (Level 3+4)	NYASP Category A NYASP Category B State Forms	INITIAL ASE	SSMENT_2BD
3 Day RUSH 2 Day RUSH		NJ Reduced	EDD Format     Other	LABEL VEF	RIFICATION
the provide the provided of the provided		Commercial "A" = Results Only; Commercial "E NJ Reduced = Results + QC Summarv + Partial J	" = Results + QC Summary aw data	Sample inventory is verified u	pon receipt in the Laboratory
Relinquished by Sampler Detertime: Relinquished by Sampler Difference Differe	Sample Custody	The bedocumented below each time samples chapter and Development of the samples of the same samples of the same same same same same same same sam	ossession, including ourier de	bilvery. / YZS Date Time:/ Received E 6/78//2 2 Date Time: Received E	
Relinquished by: Date Time:	Received By: 5	4 Custody Seal #	☐ Intact F ☐ Not intact	i j4 Preserved where applicable	On Ice Cooler Temp.
Form:SM088-03C (revised 2/12/18)				4.8, 3. http://www.sgs	0, 3, 9, 4, 1, 4, 7 .com/en/terms-and-conditions.

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JC68915: Chain of Custody Page 1 of 4



Client / Reporting Information JSACE - PHila District Accross 00 Pen Sg. East State PA 19107 E-mail 50e Loeper - USACE	Project Name: USF Street Z/45 City Lehic Project #	ice - E Pohopou	Project Bel+Z Co DR	ville	on Re	732-329 susa Sen	) 0		22	10. je			SGS Que	Req	Jestec	Analysi	s Fsee	SGS JO	ODE shee	J	668	Atrix Codes
Client / Reporting Information JSACE - PHila District Accross OD Pen Sg. East State A 19107 E-mail Toe Loeper - USACE	Project Name: USA Street Z.145 City City Lehic Project #	ice - E Pohopou ghton,	Project Sel+z co DR	Informati	on Re	sen	20	<u>.</u>	1920				~	Req	Jester	Analysi	s Free	TEST C	ODE shee			Matrix Code
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hila. PA 19107 ecicontact <u>Toe Loeper-USACE</u>	Lehia Project #	gihton ,		Company	ormation ( Name	( if differer	nt froi	m Repo	ort to)	18 - 1 <sub>8</sub> 17 -	3127		d'	7		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2						SW - Surface W SO - Soil SL- Sludge
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ne# · · · · · · · · · · · · · · · · · · ·	Client Purchase	- <b>3 6141</b> Order #	8-199	City	<u></u>			State			Zip		DC X	1 N	Ľ	phon						Alk - Air SOL - Other Sol WP - Wipe FB-Field Blant
regory Wacik 597-9780	Project Manager			Attention:								03	μβα	00	Ц	Phis					f	.B-Equipment Bl RB- Rinse Blar TB-Trip Blank
hb hple # Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled b	y Matrix	# of bottles	Ŗ	Numt HOWN HOWN	H2SO4	NONE DI Water	HOBM	1035	PIK, M	, F	F	Γσταλ					f	LAB USE ON
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Form:SM088-03C (revised 2/12/18)

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http://www.sgs.com/en/terms-and-conditions.

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## SGS Sample Receipt Summary

Job Number:	JC68915 Client:	USACE-PHILADELPHIA	DISTRICT	Project: PHILADELPHIA D	USTRICT, RESERVOIR SAMPL
Date / Time Received:	6/28/2018 2:25:00 PM	Delivery Method:	Other Courier	Airbill #'s:	
<ul> <li>Cooler Temps (Raw Measured) °C: Cooler 1: (4.8); Cooler 2: (3.0); Cooler 3: (3.9); Cooler 4: (4.1); Cooler 5: (4.7);</li> <li>Cooler Temps (Corrected) °C: Cooler 1: (4.8); Cooler 2: (3.0); Cooler 3: (3.9); Cooler 4: (4.1); Cooler 5: (4.7);</li> </ul>					
Cooler Security 1. Custody Seals Present: 2. Custody Seals Intact: Cooler Temperature	<u>Y or N</u> ✓ 3. COC P ✓ 4. Smpl Date <u>Y or N</u>	Y     or     N       resent:     ✓     □       es/Time OK     ✓     □	Sample Integ 1. Sample labe 2. Container lai 3. Sample cont	rity - Documentation Is present on bottles: beling complete: ainer label / COC agree:	Y or N V V V
<ol> <li>Temp criteria achieved:</li> <li>Cooler temp verification</li> <li>Cooler media:</li> <li>No. Coolers:</li> <li>Quality Control Preserv.</li> <li>Trip Blank present / cool</li> <li>Trip Blank listed on COO</li> <li>Samples preserved prop</li> <li>VOCs headspace free:</li> </ol>	IR Gun       Ice (Bag)       5       ration     Y or N       N/A       ler:     Image: Comparison of the second sec		Sample Integ 1. Sample recv 2. All container 3. Condition of Sample Integ 1. Analysis rec 2. Bottles rece 3. Sufficient vo 4. Compositing 5. Filtering ins	rity - Condition d within HT: s accounted for: sample: rity - Instructions quested is clear: ived for unspecified tests olume recvd for analysis: g instructions clear: tructions clear:	Y     or     N       ✓     □       ✓     □       Intact     N/A       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □       ✓     □
Test Strip Lot #s:	pH 1-12:216017	pH 12+:	208717	Other: (Specify)	
20mments       1) For all samples Total Diss LF Phosphorous was rec'd but not noted on COC. Per bottleorder, Filtration is needed and will be sent.         2) -1 TCF/FCF rec' in hold but processed out of hold.         3) For all other samples requesting TCF/FCF, lab to notify PM whether samples were set up within hold or not.					

SM089-02 Rev. Date 12/1/16

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5.<u>1</u>



Responded to by: Tammy McCloskey

Proceed as noted

JC68915: Chain of Custody Page 4 of 4





## Dayton, NJ

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0 Automated Report

08/03/18

Technical Report for

USACE-Philadelphia District

Philadelphia District, Reservoir Sampling

W25PHS81145379

SGS Job Number: JC69748



Sampling Date: 07/12/18

Report to:

Army Corps of Engineers

joseph.m.loeper@usace.army.mil

ATTN: Joseph Loeper

Total number of pages in report: 45



-A. Paul Ioannidis General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Tammy McCloskey 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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SGS North America Inc. • 2235 Route 130 • Dayton, NJ 08810 • tel: 732-329-0200 • fax: 732-329-3499

Please share your ideas about how we can serve you better at: EHS.US.CustomerCare@sgs.com



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**4.20:** JC69748-10F: BZ-6D

**4.21:** JC69748-11: BZ-7S .....

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## Sample Summary

USACE-Philadelphia District

JC69748 Job No:

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC69748-1	07/12/18	11:20 GW	07/12/18	AQ	Surface Water	BZ-1S
JC69748-1F	07/12/18	11:20 GW	07/12/18	AQ	Surface H2O Filtered	BZ-1S
JC69748-2	07/12/18	11:10 GW	07/12/18	AQ	Surface Water	BZ-2S
JC69748-2F	07/12/18	11:10 GW	07/12/18	AQ	Surface H2O Filtered	BZ-2S
JC69748-3	07/12/18	08:25 GW	07/12/18	AQ	Surface Water	BZ-3S
JC69748-3F	07/12/18	08:25 GW	07/12/18	AQ	Surface H2O Filtered	BZ-3S
JC69748-4	07/12/18	08:25 GW	07/12/18	AQ	Surface Water	BZ-3M
JC69748-4F	07/12/18	08:25 GW	07/12/18	AQ	Surface H2O Filtered	BZ-3M
JC69748-5	07/12/18	08:25 GW	07/12/18	AQ	Surface Water	BZ-3D
JC69748-5F	07/12/18	08:25 GW	07/12/18	AQ	Surface H2O Filtered	BZ-3D
JC69748-6	07/12/18	10:50 GW	07/12/18	AQ	Surface Water	BZ-4S
JC69748-6F	07/12/18	10:50 GW	07/12/18	AQ	Surface H2O Filtered	BZ-4S
JC69748-7	07/12/18	10:20 GW	07/12/18	AQ	Surface Water	BZ-5S





# Sample Summary (continued)

USACE-Philadelphia District

Job No:

JC69748

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC69748-7F	07/12/18	10:20 GW	07/12/18	AQ	Surface H2O Filtered	BZ-5S
JC69748-8	07/12/18	07:45 GW	07/12/18	AQ	Surface Water	BZ-6S
JC69748-8F	07/12/18	07:45 GW	07/12/18	AQ	Surface H2O Filtered	BZ-6S
JC69748-9	07/12/18	07:45 GW	07/12/18	AQ	Surface Water	BZ-6M
JC69748-9F	07/12/18	07:45 GW	07/12/18	AQ	Surface H2O Filtered	BZ-6M
JC69748-10	07/12/18	07:45 GW	07/12/18	AQ	Surface Water	BZ-6D
JC69748-10F	07/12/18	07:45 GW	07/12/18	AQ	Surface H2O Filtered	BZ-6D
JC69748-11	07/12/18	09:30 GW	07/12/18	AQ	Surface Water	BZ-7S
JC69748-11F	07/12/18	09:30 GW	07/12/18	AQ	Surface H2O Filtered	BZ-7S
JC69748-12	07/12/18	09:30 GW	07/12/18	AQ	Surface Water	BZ-7M
JC69748-12F	07/12/18	09:30 GW	07/12/18	AQ	Surface H2O Filtered	BZ-7M
JC69748-13	07/12/18	09:30 GW	07/12/18	AQ	Surface Water	BZ-7D
JC69748-13F	07/12/18	09:30 GW	07/12/18	AQ	Surface H2O Filtered	BZ-7D



## **CASE NARRATIVE / CONFORMANCE SUMMARY**

Client:	USACE-Philadelphia District	Job No	JC69748
Site:	Philadelphia District, Reservoir Sampling	Report Date	7/25/2018 9:50:08 AM

On 07/12/2018, 26 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.6 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC69748 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

### General Chemistry By Method EPA 351.2/LACHAT

	Matrix: AQ	Batch ID:	GP14672
_	A11 1 1 1 1 1	4 11 4	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-2DUP, JC69748-2MS were used as the QC samples for Nitrogen, Total Kjeldahl.

### General Chemistry By Method EPA 353.2/LACHAT

_			
	Matrix: AQ	Batch ID:	GP14644
-	All samples were prepared within the recommended method holding time.		
	All method blanks for this batch i	neet method specific crite	eria.

- Sample(s) JC69748-2DUP, JC69748-2MS, JC69748-3MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.
- Matrix Spike Recovery(s) for Nitrogen, Nitrate + Nitrite are outside control limits. Spike recovery indicates possible matrix interference.

#### Batch ID: GP14645 Matrix: AQ

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-13DUP, JC69748-13MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

### **General Chemistry By Method EPA 365.3**

Matrix: AQ	Batch ID: GP14660
------------	-------------------

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-1DUP, JC69748-1MS were used as the QC samples for Phosphorus, Total.

|--|

All samples were prepared within the recommended method holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-1FDUP, JC69748-1FMS were used as the OC samples for Phosphorus, Total.



## General Chemistry By Method EPA353.2/SM4500NO2B

	Matrix: AQ	Batch ID:	R171493
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-11 for Nitrogen, Nitrate: Calcul	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171494
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-12 for Nitrogen, Nitrate: Calcul	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171495
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-13 for Nitrogen, Nitrate: Calcul	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171508
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-7 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171509
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-8 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171510
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
	JC69748-9 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171511
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-10 for Nitrogen, Nitrate: Calcul	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171524
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
	JC69748-2 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171568
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-1 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171569
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-3 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171571
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-4 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171572
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
-	JC69748-5 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R171573
-	The data for EPA353.2/SM4500NO2B r	neets quality cont	rol requirements.
	JC69748-6 for Nitrogen, Nitrate: Calcula	ted as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)

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### General Chemistry By Method SM2320 B-11

	Matrix: AQ	Batch ID:	GN83108
-	All samples were analyzed within	the recommended metho	d holding time.
	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC69920-3DUP were used as the QC samples for Alkalinity, Total as CaCO3.		
	JC69748-12 for Alkalinity, Total	as CaCO3: Sample was ti	itrated to a final pH of 4.2.
-	JC69748-11 for Alkalinity, Total	as CaCO3: Sample was ti	itrated to a final pH of 4.2.
	JC69748-1 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
-	JC69748-2 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
	JC69748-3 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
	JC69748-5 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
	JC69748-6 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
-	JC69748-4 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
-	JC69748-13 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
	JC69748-7 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
-	JC69748-8 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
-	JC69748-10 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.		
-	JC69748-9 for Alkalinity, Total a	s CaCO3: Sample was titr	rated to a final pH of 4.2.
Ge	eneral Chemistry By Me	thod SM2540 C-11	1
	Matrix: AQ	Batch ID:	GN82889
	All samples were analyzed within	the recommended metho	d holding time.
	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC69467-1DUP were	used as the QC samples for	for Solids, Total Dissolved.
	Matrix: AQ	Batch ID:	GN82957
	All samples were analyzed within	the recommended metho	d holding time.
	All method blanks for this batch meet method specific criteria.		
-	Sample(s) JC69748-3DUP were	used as the QC samples for	or Solids, Total Dissolved.

### General Chemistry By Method SM2540 D-11

	Matrix: AQ	Batch ID:	GN82948
-	All samples were analyzed within	the recommended metho	d holding time.
-	All method blanks for this batch meet method specific criteria.		
	Sample(s) JC69748-3DUP were	used as the OC samples f	or Solids, Total Suspended.

JC69748-11 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 500 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.

Batch ID: GN82984

### Matrix: AQ

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria. 

Sample(s) JC69748-1DUP were used as the QC samples for Solids, Total Suspended.



### General Chemistry By Method SM4500NH3 H-11LACHAT

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-2DUP, JC69748-2MS, JC69748-2MSD were used as the QC samples for Nitrogen, Ammonia.

### General Chemistry By Method SM4500NO2 B-11

Matrix: AQ Batch ID	GN82724
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- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-2DUP, JC69748-2MS were used as the QC samples for Nitrogen, Nitrite.

### General Chemistry By Method SM5210 B-11

	Matrix: AQ	Batch ID:	GP14429
1		 	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69712-1DUP were used as the QC samples for BOD, 5 Day.

Matrix: AQ Batch ID: GP14459

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-7DUP were used as the QC samples for BOD, 5 Day.

### General Chemistry By Method SM5310 B-11

_				
	Matrix: AQ	Batch ID:	GP14539	
-	All samples were prepared within	the recommended metho	od holding time.	
=	All method blanks for this batch	neet method specific crite	eria.	
	Sample(s) JC69467-12MS JC69	467-12MSD were used a	s the OC samples for Total Organic Carbon	

1 ()	,		<b>v</b> 1	8
Matrix: AQ	)	Batch ID:	GP14540	

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC69748-1MS, JC69748-1MSD were used as the QC samples for Total Organic Carbon.

### General Chemistry By Method SM9222 B-06

Matrix	AQ		Ba	atch II	D:	MB5304			
 	1 0			· a	• .	•			

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-11DUP were used as the QC samples for Coliform, Total.
- JC69748-8 for Coliform, Total: Analysis done out of holding time.
- JC69748-3 for Coliform, Total: Analysis done out of holding time.
- MB5304-MB1 for Coliform, Total: High RPD due to possible sample nonhomogeneity.



### General Chemistry By Method SM9222 D-06

Matrix: AQ Batch ID: MB5305

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC69748-11DUP were used as the QC samples for Coliform, Fecal.
- JC69748-8 for Coliform, Fecal: Analysis done out of holding time.
- JC69748-3 for Coliform, Fecal: Analysis done out of holding time.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover



Job Number:	JC69748
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/12/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC69748-1	BZ-1S					
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Gjeldahl solved rbon	10.9 64 82 0.76 0.78 0.020 0.28 228 1.2	5.0 4 2 0.11 0.10 0.010 0.20 10 1.0	4.0 b 0.11 0.10 0.0050 0.15 4.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC69748-1F	BZ-1S					
No hits reported i	in this sample.					
JC69748-2	BZ-2S					
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Kjeldahl solved pended rbon	4.7 J 12 90 0.24 0.24 0.19 J 4.0 J 1.9 J 1.1	5.0 2 2 0.11 0.10 0.20 10 4.0 1.0	4.0 b 0.11 0.10 0.15 4.0 1.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC69748-2F	BZ-2S					
No hits reported i	in this sample.					
JC69748-3	BZ-38					
Alkalinity, Total Coliform, Fecal <sup>C</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Kjeldahl solved pended rbon	9.4 2 0.39 0.40 0.0051 J 0.21 58.8 2.2 J 2.0	$5.0 \\ 2 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	4.0 b 0.11 0.10 0.0050 0.15 4.0 1.0 1.0	mg/l col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11



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Job Number:	JC69748
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/12/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC69748-3F	BZ-3S					
No hits reported i	n this sample.					
JC69748-4	BZ-3M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susp Total Organic Car JC69748-4F	as CaCO3 <sup>a</sup> c + Nitrite Gjeldahl solved bended rbon <b>BZ-3M</b>	10.4 0.82 0.82 0.22 64.0 1.3 J 1.4	$5.0 \\ 0.11 \\ 0.10 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0$	$\begin{array}{c} 4.0 \\ 0.11 \\ 0.10 \\ 0.15 \\ 4.0 \\ 1.0 \\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
No hits reported i	n this sample.					
JC69748-5	BZ-3D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Gjeldahl solved rbon	10.9 0.82 0.82 0.21 73.3 1.4	5.0 0.11 0.10 0.20 10 1.0	4.0 0.11 0.10 0.15 4.0 1.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC69748-5F	BZ-3D					
No hits reported i	n this sample.					
JC69748-6	BZ-4S					
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Total K Solids, Total Diss Total Organic Car	as CaCO3 <sup>a</sup> Geldahl solved rbon	4.7 J 20 22 0.26 27.5 1.3	5.0 2 2 0.20 10 1.0	4.0 b 0.15 4.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11

#### JC69748-6F BZ-4S

No hits reported in this sample.





Job Number:	JC69748
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/12/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC69748-7	BZ-5S					
Alkalinity, Total a Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total Kj Solids, Total Disso Solids, Total Susp	s CaCO3 <sup>a</sup> + Nitrite jeldahl olved ended	7.8 210 530 1.3 1.3 0.28 82.5 4.3	5.0 2 10 0.11 0.10 0.20 10 4.0	4.0 b 0.11 0.10 0.15 4.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11
<b>JC69748-7</b> F	BZ-5S					
No hits reported ir	this sample.					
<b>JC69748-8</b>	BZ-68					
Alkalinity, Total a Coliform, Fecal <sup>d</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total Kj Solids, Total Disso Solids, Total Susp Total Organic Car	s CaCO3 <sup>a</sup> + Nitrite jeldahl plved ended bon	11.4 5 0.42 0.43 0.0060 J 0.20 52.0 1.3 J 1.3	$5.0 \\ 2 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	4.0 b 0.11 0.10 0.0050 0.15 4.0 1.0 1.0	mg/l col/100ml mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC69748-8F	BZ-6S					
No hits reported ir	this sample.					
<b>JC69748-9</b>	BZ-6M					
Alkalinity, Total a Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total Kj Solids, Total Disso <b>JC69748-9F</b>	s CaCO3 <sup>a</sup> + Nitrite jeldahl Dived <b>BZ-6M</b>	10.4 0.87 0.87 0.19 J 58.0	5.0 0.11 0.10 0.20 10	$\begin{array}{c} 4.0 \\ 0.11 \\ 0.10 \\ 0.15 \\ 4.0 \end{array}$	mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11

No hits reported in this sample.

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Job Number:	JC69748
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/12/18

Lab Sample ID Client Sample ID Analyte	Result/ Qual	LOQ	LOD	Units	Method	
JC69748-10 BZ-6D						
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Solids, Total Suspended Total Organic Carbon	13.5 0.85 0.85 0.53 90.0 22.5 1.0	5.0 0.11 0.10 0.20 10 4.0 1.0	$\begin{array}{c} 4.0 \\ 0.11 \\ 0.10 \\ 0.15 \\ 4.0 \\ 1.0 \\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11	
JC69748-10F BZ-6D						
No hits reported in this sample.						
JC69748-11 BZ-7S						
Coliform, Total Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Solids, Total Suspended <sup>e</sup> Total Organic Carbon	4 0.40 0.40 0.27 50.0 1.6 J 1.3	4 0.11 0.10 0.20 10 4.0 1.0	b 0.11 0.10 0.15 4.0 1.0 1.0	col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11	
JC69748-11F BZ-7S						
No hits reported in this sample.						
JC69748-12 BZ-7M						
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Solids, Total Suspended	12.0 0.87 0.87 0.34 50.0 2.5 J	5.0 0.11 0.10 0.20 10 4.0	4.0 0.11 0.10 0.15 4.0 1.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11	
JC69748-12F BZ-7M						
No hits reported in this sample.						
JC69748-13 BZ-7D						
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup>	12.0 0.79	5.0 0.11	4.0 0.11	mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B	

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Job Number:	JC69748
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/12/18

Lab Sample ID Client Sample ID Analyte	Result/ Qual	LOQ	LOD	Units	Method
Nitrogen, Nitrate + Nitrite Nitrogen, Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved	0.80 0.014 0.26 25.0	0.10 0.010 0.20 10	0.10 0.0050 0.15 4.0	mg/l mg/l mg/l mg/l	EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11
Solids, Total Suspended	4.9	4.0	1.0	mg/l	SM2540 D-11

### JC69748-13F BZ-7D

No hits reported in this sample.

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(d) Analysis done out of holding time.

(e) Reported sample aliquot obtained from filtration of 500 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.

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Dayton, NJ

Section 4

Sample Results

Report of Analysis



4



Client Sample ID:	BZ-1S		
Lab Sample ID:	JC69748-1	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	4.0	mg/l	1	07/20/18 14:10 JO	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:02 SA	SM5210 B-11
Coliform, Fecal	64	4		col/100ml	2	07/12/18 16:34 SA	SM9222 D-06
Coliform, Total	82	2		col/100ml	2	07/12/18 16:28 MV	V SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:45 BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.76	0.11	0.11	mg/l	1	07/23/18 13:26 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.78	0.10	0.10	mg/l	1	07/23/18 13:26 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.020	0.010	0.0050	mg/l	1	07/12/18 19:20 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.28	0.20	0.15	mg/l	1	07/23/18 08:58 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35 LS	EPA 365.3
Solids, Total Dissolved	228	10	4.0	mg/l	1	07/17/18 14:00 RC	SM2540 C-11
Solids, Total Suspended	1.0 U	4.0	1.0	mg/l	1	07/19/18 09:20 RC	SM2540 D-11
Total Organic Carbon	1.2	1.0	1.0	mg/l	1	07/18/18 23:06 JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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4


Client Sample ID: Lab Sample ID: Matrix:	1F face H2O Fil	tered			Date S Date I Percer	Sampled: 07/12/18 Received: 07/12/18 nt Solids: n/a	
Project:	Philadelphia District, Reservoir Sampling						
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:16 MP EPA 365.3

## **Report of Analysis**

LOQ = Limit of Quantitation  $U = \ Indicates \ a \ result < \ LOD$ 

Page 1 of 1





Client Sample ID:	BZ-2S		
Lab Sample ID:	JC69748-2	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed B	y Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.7 J	5.0	4.0	mg/l	1	07/20/18 14:10 J	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:04 S	A SM5210 B-11
Coliform, Fecal	12	2		col/100ml	2	07/12/18 16:34 S	A SM9222 D-06
Coliform, Total	90	2		col/100ml	2	07/12/18 16:28 N	W SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:46 B	M SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.24	0.11	0.11	mg/l	1	07/20/18 15:08 B	M EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.24	0.10	0.10	mg/l	1	07/20/18 15:08 B	M EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:20 L	S SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	mg/l	1	07/23/18 08:59 B	M EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35 L	S EPA 365.3
Solids, Total Dissolved	4.0 J	10	4.0	mg/l	1	07/17/18 14:00 R	C SM2540 C-11
Solids, Total Suspended	1.9 J	4.0	1.0	mg/l	1	07/19/18 09:20 R	C SM2540 D-11
Total Organic Carbon	1.1	1.0	1.0	mg/l	1	07/18/18 23:41 JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix:	BZ-2S JC69748- AQ - Surf	2F face H2O Fil	tered	Date S Date J	Sampled: 07/12/18 Received: 07/12/18				
Project: Philadelphia District, Reservoir Sampling General Chemistry									
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method		
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:16 MP EPA 365.3		

## **Report of Analysis**

LOQ = Limit of Quantitation  $U = \ Indicates \ a \ result < \ LOD$ LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ 4.4

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### JC69748

Client Sample ID:	BZ-3S		
Lab Sample ID:	JC69748-3	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed H	By Method
Alkalinity, Total as CaCO3 <sup>a</sup>	9.4	5.0	4.0	mg/l	1	07/20/18 14:10 J	O SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:06 S	SA SM5210 B-11
Coliform, Fecal <sup>c</sup>	2	2		col/100ml	2	07/12/18 16:34 S	SA SM9222 D-06
Coliform, Total <sup>c</sup>	0	0		col/100ml	1	07/12/18 16:28 N	MW SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:50 E	3M SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.39	0.11	0.11	mg/l	1	07/23/18 13:30 E	3M EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.40	0.10	0.10	mg/l	1	07/23/18 13:30 E	BM EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0051 J	0.010	0.0050	mg/l	1	07/12/18 19:20 L	LS SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.21	0.20	0.15	mg/l	1	07/23/18 08:59 E	BM EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35 L	LS EPA 365.3
Solids, Total Dissolved	58.8	10	4.0	mg/l	1	07/18/18 14:35 R	RC SM2540 C-11
Solids, Total Suspended	2.2 J	4.0	1.0	mg/l	1	07/18/18 10:55 R	RC SM2540 D-11
Total Organic Carbon	2.0	1.0	1.0	mg/l	1	07/18/18 23:54 J	O SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Client Sample ID: Lab Sample ID: Matrix:	BZ-3S JC69748-3 AQ - Surf	3F ace H2O Fil	tered	Date S Date I Percer	Sampled: 07/12/18 Received: 07/12/18 nt Solids: n/a		
Project:	Philadelph	nia District,	Reservoir Sa				
General Chemistry	,						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:16 MP EPA 365.3

## **Report of Analysis**

LOQ = Limit of Quantitation  $U = \ Indicates \ a \ result < \ LOD$ LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ 4.6

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### JC69748

Client Sample ID:	BZ-3M		
Lab Sample ID:	JC69748-4	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed H	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.4	5.0	4.0	mg/l	1	07/20/18 14:10 J	0	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:07 S	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:52 B	ЗM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.82	0.11	0.11	mg/l	1	07/23/18 13:31 B	ЗM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.82	0.10	0.10	mg/l	1	07/23/18 13:31 B	ЗM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:20 L	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.22	0.20	0.15	mg/l	1	07/23/18 09:00 B	ЗM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35 L	LS	EPA 365.3
Solids, Total Dissolved	64.0	10	4.0	mg/l	1	07/18/18 14:35 R	RC	SM2540 C-11
Solids, Total Suspended	1.3 J	4.0	1.0	mg/l	1	07/18/18 10:55 R	RC	SM2540 D-11
Total Organic Carbon	1.4	1.0	1.0	mg/l	1	07/19/18 00:06 J	0	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





4.7 4

Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3M JC69748- AQ - Surr Philadelp	4F face H2O Fil hia District,	Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	/12/1 /12/1 1	8 8				
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	zed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18	3 16:1	6 MP	EPA 365.3	

 4.8

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JC69748

Client Sample ID:	BZ-3D		
Lab Sample ID:	JC69748-5	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed H	y Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	4.0	mg/l	1	07/20/18 14:10 J	O SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:08 S	A SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:53 E	M SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.82	0.11	0.11	mg/l	1	07/23/18 13:32 E	M EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.82	0.10	0.10	mg/l	1	07/23/18 13:32 E	M EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:20 L	S SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.21	0.20	0.15	mg/l	1	07/23/18 09:01 E	M EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35 L	S EPA 365.3
Solids, Total Dissolved	73.3	10	4.0	mg/l	1	07/18/18 14:35 R	C SM2540 C-11
Solids, Total Suspended	1.0 U	4.0	1.0	mg/l	1	07/18/18 10:55 R	C SM2540 D-11
Total Organic Carbon	1.4	1.0	1.0	mg/l	1	07/19/18 00:28 J	O SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3D JC69748- AQ - Surt Philadelph	5F face H2O Fil hia District,	Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	07/12/18 07/12/18 n/a					
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	ed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18	16:1	6 MP	EPA 365.3	

LOQ = Limit of Quantitation U = Indicates a result < LODLOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ 4.10 4

Client Sample ID:	BZ-4S		
Lab Sample ID:	JC69748-6	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.7 J	5.0	4.0	mg/l	1	07/20/18 14:10	JO	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/12/18 23:10	SA	SM5210 B-11
Coliform, Fecal	20	2		col/100ml	2	07/12/18 16:34	SA	SM9222 D-06
Coliform, Total	22	2		col/100ml	2	07/12/18 16:28	MW	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:55	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.11 U	0.11	0.11	mg/l	1	07/23/18 13:33	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	mg/l	1	07/23/18 13:33	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:20	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.26	0.20	0.15	mg/l	1	07/23/18 09:02	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:35	LS	EPA 365.3
Solids, Total Dissolved	27.5	10	4.0	mg/l	1	07/18/18 14:35	RC	SM2540 C-11
Solids, Total Suspended	1.0 U	4.0	1.0	mg/l	1	07/18/18 10:55	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	1.0	mg/l	1	07/19/18 01:03	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix:	BZ-4S JC69748- AQ - Sur	-6F face H2O Fil	tered	Date S Date 1	Sampled: 07/12/18 Received: 07/12/18				
Project:	Percent Solids: n/a Philadelphia District, Reservoir Sampling								
General Chemistry	7								
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method		
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:16 MP EPA 365.3		

## **Report of Analysis**

LOQ = Limit of Quantitation  $U = \ Indicates \ a \ result < \ LOD$ 

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SGS

JC69748

Client Sample ID:	BZ-5S		
Lab Sample ID:	JC69748-7	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyze	d By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	7.8	5.0	4.0	mg/l	1	07/20/18 1	4:48 JO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 2	0:56 MV	V SM5210 B-11
Coliform, Fecal	210	2		col/100ml	10	07/12/18 1	6:34 SA	SM9222 D-06
Coliform, Total	530	10		col/100ml	10	07/12/18 1	6:28 MV	V SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 1	1:56 BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	1.3	0.11	0.11	mg/l	1	07/20/18 1	5:21 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.3	0.10	0.10	mg/l	1	07/20/18 1	5:21 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 1	9:54 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.28	0.20	0.15	mg/l	1	07/23/18 0	9:04 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 1	2:56 LS	EPA 365.3
Solids, Total Dissolved	82.5	10	4.0	mg/l	1	07/18/18 1	4:35 RC	SM2540 C-11
Solids, Total Suspended	4.3	4.0	1.0	mg/l	1	07/18/18 1	0:55 RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	07/19/18 0	1:16 JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix:	BZ-5S JC69748- AQ - Surt	7F face H2O Fil		Date Sampled:07/12/18Date Received:07/12/18Percent Solids:n/a					
Project:	Philadelphia District, Reservoir Sampling								
General Chemistry	7								
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method		
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:37 MP EPA 365.3		

## **Report of Analysis**



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Client Sample ID:	BZ-6S		
Lab Sample ID:	JC69748-8	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	11.4	5.0	4.0	mg/l	1	07/20/18 14:48	JO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 20:59	MW	SM5210 B-11
Coliform, Fecal <sup>c</sup>	5	2		col/100ml	2	07/12/18 16:34	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0	0		col/100ml	1	07/12/18 16:28	MW	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:57	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.42	0.11	0.11	mg/l	1	07/20/18 15:22	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.43	0.10	0.10	mg/l	1	07/20/18 15:22	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0060 J	0.010	0.0050	mg/l	1	07/12/18 19:54	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.20	0.20	0.15	mg/l	1	07/23/18 09:05	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:56	LS	EPA 365.3
Solids, Total Dissolved	52.0	10	4.0	mg/l	1	07/18/18 14:35	RC	SM2540 C-11
Solids, Total Suspended	1.3 J	4.0	1.0	mg/l	1	07/18/18 10:55	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	1.0	mg/l	1	07/19/18 01:31	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-6S JC69748- AQ - Surt	8F face H2O Fil	tered	Date S Date I Perce	Sampled: 07/12/18 Received: 07/12/18 nt Solids: n/a		
Project:	Philadelph	hia District,					
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:37 MP EPA 365.3



Client Sample ID:	BZ-6M		
Lab Sample ID:	JC69748-9	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.4	5.0	4.0	mg/l	1	07/20/18 14:48	JO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 21:00	MW	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 11:59	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.87	0.11	0.11	mg/l	1	07/20/18 15:24	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.87	0.10	0.10	mg/l	1	07/20/18 15:24	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:54	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	mg/l	1	07/23/18 09:06	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:56	LS	EPA 365.3
Solids, Total Dissolved	58.0	10	4.0	mg/l	1	07/18/18 14:35	RC	SM2540 C-11
Solids, Total Suspended	1.0 U	4.0	1.0	mg/l	1	07/18/18 10:55	RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	07/19/18 01:43	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-6M JC69748- AQ - Surt Philadelph	9F face H2O Fil hia District,	tered Reservoir Sa	ampling		Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	/12/1 /12/1 1	8 8	
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	zed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18	3 16:3	7 MP	EPA 365.3	

LOQ = Limit of Quantitation U = Indicates a result < LODLOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ 4.18 4



Client Sample ID:	BZ-6D		
Lab Sample ID:	JC69748-10	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzee	d By	Method
Alkalinity Total as CaCO3 a	13.5	5.0	4.0	mg/l	1	07/20/18 1	4·48 IO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 2	1:01 MV	V SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 12	2:00 BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.85	0.11	0.11	mg/l	1	07/20/18 1	5:25 BN	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.85	0.10	0.10	mg/l	1	07/20/18 1	5:25 BN	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 1	9:54 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.53	0.20	0.15	mg/l	1	07/23/18 0	9:07 BN	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12	2:56 LS	EPA 365.3
Solids, Total Dissolved	90.0	10	4.0	mg/l	1	07/18/18 14	4:35 RC	SM2540 C-11
Solids, Total Suspended	22.5	4.0	1.0	mg/l	1	07/18/18 1	0:55 RC	SM2540 D-11
Total Organic Carbon	1.0	1.0	1.0	mg/l	1	07/19/18 0	1:56 JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-6D JC69748- AQ - Surt Philadelph	10F face H2O Fil hia District, ∃	tered Reservoir Sa	ampling		Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	/12/1 /12/1 1	8 8	
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	ed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18	16:3	7 MP	EPA 365.3	

LOQ = Limit of Quantitation  $U = \ Indicates \ a \ result < \ LOD$ LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ

SGS



Page 1 of 1

JC69748

Client Sample ID:	BZ-7S		
Lab Sample ID:	JC69748-11	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		
_	· · · ·		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzeo	l By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	07/20/18 14	4:48 JO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 2	1:03 MW	SM5210 B-11
Coliform, Fecal	0 J	4		col/100ml	1	07/12/18 10	5:34 SA	SM9222 D-06
Coliform, Total	4	4		col/100ml	4	07/12/18 10	5:28 MW	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 12	2:02 BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.40	0.11	0.11	mg/l	1	07/20/18 1	5:26 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.40	0.10	0.10	mg/l	1	07/20/18 1	5:26 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19	9:54 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.27	0.20	0.15	mg/l	1	07/23/18 09	9:08 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12	2:56 LS	EPA 365.3
Solids, Total Dissolved	50.0	10	4.0	mg/l	1	07/18/18 14	4:35 RC	SM2540 C-11
Solids, Total Suspended <sup>d</sup>	1.6 J	4.0	1.0	mg/l	1	07/18/18 10	0:55 RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	1.0	mg/l	1	07/19/18 2	1:58 CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(d) Reported sample aliquot obtained from filtration of 500 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.



Client Sample ID: Lab Sample ID: Matrix: Project:	<ul> <li><b>ID:</b> BZ-7S</li> <li><b>D:</b> JC69748-11F AQ - Surface H2O Filtered</li> <li>Philadelphia District, Reservoir Sampling</li> </ul>						Date Sampled:07/12/18Date Received:07/12/18Percent Solids:n/a					
General Chemistry	7											
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method					
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:37 MP EPA 365.3					

## **Report of Analysis**

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JC69748

4.22 **4** 

Client Sample ID:	BZ-7M		
Lab Sample ID:	JC69748-12	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	12.0	5.0	4.0	mg/l	1	07/20/18 14:48	JO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 21:04	MW	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 12:03	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.87	0.11	0.11	mg/l	1	07/20/18 15:27	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.87	0.10	0.10	mg/l	1	07/20/18 15:27	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/12/18 19:54	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.34	0.20	0.15	mg/l	1	07/23/18 09:09	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12:56	LS	EPA 365.3
Solids, Total Dissolved	50.0	10	4.0	mg/l	1	07/18/18 14:35	RC	SM2540 C-11
Solids, Total Suspended	2.5 J	4.0	1.0	mg/l	1	07/18/18 10:55	RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	07/19/18 22:32	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



4.23 **4** 



Client Sample ID: Lab Sample ID: Matrix:	BZ-7M JC69748- AQ - Sur	-12F face H2O Fil	tered			Date S Date J Barca	Sampled: 07/12/18 Received: 07/12/18
Project:	Philadelp	hia District, 1	Reservoir Sa	ampling		Perce	nt Sonds: m/a
General Chemistry	<i>y</i>						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:37 MP EPA 365.3

## **Report of Analysis**

 4.24 **4** 

# Page 1 of 1



Client Sample ID:	BZ-7D		
Lab Sample ID:	JC69748-13	Date Sampled:	07/12/18
Matrix:	AQ - Surface Water	Date Received:	07/12/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity. Total as CaCO3 <sup>a</sup>	12.0	5.0	4.0	mg/l	1	07/20/18 14	·48.IO	SM2320 B-11
BOD, 5 Day	5.0 U	5.0	5.0 <sup>b</sup>	mg/l	1	07/13/18 21	:06 MW	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	07/19/18 12	:08 BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.79	0.11	0.11	mg/l	1	07/20/18 15	:28 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.80	0.10	0.10	mg/l	1	07/20/18 15	:28 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.014	0.010	0.0050	mg/l	1	07/12/18 19	:54 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.26	0.20	0.15	mg/l	1	07/23/18 09	:10 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	07/21/18 12	:56 LS	EPA 365.3
Solids, Total Dissolved	25.0	10	4.0	mg/l	1	07/18/18 14	:35 RC	SM2540 C-11
Solids, Total Suspended	4.9	4.0	1.0	mg/l	1	07/18/18 10	:55 RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	07/19/18 22	:43 CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.25 **4** 

40 of 45

Client Sample ID:       BZ-7D         Lab Sample ID:       JC69748-13F         Matrix:       AQ - Surface H2O Filtered							Date Sampled:07/12/18Date Received:07/12/18Percent Solids:n/a					
Project:	Philadelphia District, Reservoir Sampling											
General Chemistry	7											
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method					
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	07/24/18 16:37 MP EPA 365.3					

## **Report of Analysis**



Page 1 of 1





Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

• Chain of Custody



SGS	5w) <b>c</b>	HAIN OF CUSTO	YDC		PAGE OF
		2235 Route 130, Dayton, NJ 088 TEL. 732-329-0200 FAX 732-329-	10 3499	FED-EX Tracking #	Bottle De Control # 25/8 - 64
		www.sgs.com/ehsusa		333 0000 #	363 JOB # JC69748
Client / Reporting Information	E construction of the second s	Project Information	na an ann an Anna an A Anna an Anna an	Requested Analysis ( see	TEST CODE sheet) Matrix Codes
Company Name	Project Name.	- 0 4	11. Den in		
USACE Phila District	tus army corps	of Eng Deltzi	mile reservar		GW - Ground Water
Street Address	Street	Part Manual Contraction of the		[ N 전 칠	WW - Water SW - Surface Water
100 Penn Sp. EAST	2145 Pohopaco	DR . Billing Information ( if different	t from Report to)	2 F B	SO - Soil
	Labianta 1	State Company Name		XJØ	SL- Sludge SED-Sediment
Philactesphia PA 19101	Leisigrion r	Street Address		1220	OI - Oil
Toge LANDA	DD-062518	-104		594 40	AIR - Air
Phone # Fax #	Client Purchase Order #	City	State Zip		SOL - Other Solid WP - Wine
					FB-Field Blank
Sampler(s) Name(s) (010 - Phone #	Project Manager	Attention:	m	EPRI	EB-Equipment Blank RB- Rinse Blank
Greau)acik 597-9780	1		č,		TB-Trip Blank
	Collection		Number of preserved bottles		
Lab Sample		# of	- HO SO B HO	1 월 이 집 이	
# Field ID / Point of Collection	MEOH/DI Vial # Date	Time Sampled by Matrix bottles	ME NO NO		LAB USE ONLY
IF BZ-IS	7/12/18/	120 MA SW 11	XXXXX	XXXXX	647
26 B7 18	1.07	10 6 541 11		XXXX	R7&
24 42 20					
JF 62-35		as sw 11	XXXX	X X X X	- G9675
4P BZ-3M	8	a5 1 SW 9	XXX	$\mathbf{X} \times \mathbf{X}$	
SF 87-3D		SW 9	XX	XXX	637
LE BY US		10 5411	Y Y Y	XXXX	1003
74 02-73	++				
1r BZ-55	+ / / / / / / / / / / / / / / / / /	040 500 11		XXXX	-++
8F BZ-65		745 SW 11	XXXX	$ \chi  \times  \chi  \chi$	
9F BZ-6M		745 / 500 9		XXX	
WE BZ-10D	V -	145 × SW 9	X X	$X \times X$	
Turnaround Time ( Business days)	Bandaran Banarana	Data	Deliverable Information	Co	omments / Special Instructions
	Approved by (SGS Project Manager)/D	ate: Commercial "A" (Lev	rel 1) NYASP Catego	ory A (I	NITIAL ASESSMENT
Std. 10 Business Days		Commercial "B" ( Lev	rel 2) NYASP Catego	ory B H	
5 Day RUSH		FULLT1 (Level 3+4)	State Forms		AREL VERIFICATION
	- <u></u>	Commercial "C"	Other	<b>_</b>	
		NJ Data of Known	Quality Protocol Reporting	_	
other		Commercial *A" = Results Only;	Commercial "B" = Results + QC Sun	nmary	
Emergency & Rush T/A data available via LabLink	$\sim$	NJ Reduced = Results + QC Sur	nmary + Bartial Raw data	Sample inventory is	verified upon receipt in the Laboratory
200	Sample Custody mus	t be documented below each time sam	ples change possessed, includ	ling courier delivery.	
Relingtished by Sampler:	12m 1	ferr	2 Of Alline	7-12-18 Date Ping 605	2
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3 Relinquished by: Data Time:	Beceived By:		4/	Intact Preserved where annitoshia	4 On ice Cooler Temp
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Form:SM088-03C (revised 2/12/18)			47.1+	http:	://www.sos.com/en/terms-and-contritions
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JC69748: Chain of Custody Page 1 of 3



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SGS			CHAI SGS 2235	N OF S North Am Route 130,	erica Inc Dayton	JST - Dayto	<b>OD`</b> m 310	1			ſ	FED-EX	Tracking	#			Bott	P/	AGE		OF	
			TEL. 732	2-329-0200	FAX	732-329	-349 <b>9</b>				ŀ	SGS Qu	ote #				SGS	Job #		516	9-	748
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Project Contact E-mail	Project #	1	~ /.//	Street Addr	ess							0Ľ	õ	Ø	9							LIQ - Other Liquid AIR - Air
Phone # Fax #	Client Purchase	Order #	8-04	City			Sta	te		Zip		à	F	$\sum_{n}$	F							SOL - Other Solid WP - Wipe
												2	0	۲Ľ	1							FB-Field Blank
Sampler(s) Name(s) 6/0 - Phone #	Project Manage	r		Attention:							M	W	P	2	5							RB- Rinse Blank TB-Trip Blank
BIEGU ACIN STI-1180	+	Collec	tion				N	lumber c	f preserv	ed bottle	· 2	4	. 1	ر م	ŭ						L	
Lab Sample						# of	E	8 8	UN N	н	S S	¥	ρ	5								
# Field ID / Point of Collection	MEOH/DI Vial #	Date	Time	Sampled by	Matrix	bottles	NaC HCI	HNG H	DZ Z	WE	ž	đ	F	H				_		$\vdash$		LAB USE ONL
11F BZ-75		7/12/18	0930	The	SW	11	X	2	4		×	X	X	X	X			_				
ZF BZ-7M		7/12/18	0930	Pr	SW	9	x	)				X	×	x								
3F BZ -7D		7/12/18	0930	Mr	SW	9	×	)	9			χ	X	x								
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3 Day RUSH			-		J Reduce	а. а				EDD Fo	ormat _							2				
2 Day RUSH			-		ommercia	1 "C"				Other _										1		
1 Day RUSH			-	Commercia	<i>NJ Data</i> A" = Res	of Known ults Only:	Comr	Protoc ercial "	:ol Rep B" = Re:	o <b>rting</b> sults + C	C Sum	mary	ŀ					,				
Emergency & Rush 7/A data available via LabLink			-	NJ Reduce	d = Result	s + QC Su	mmary +	Partial	Raw dat	a				Samp	le inve	ntory is	s verifie	ed upor	n receip	ot in the	Labo	oratory
Relievent of Sampleton for Same		Sample Custory I	nunt be doci	mented be	low each	time sar	nples c	hange	hose	seton,	includi	ng co	urier d	elivery	and Time		Race	ived By:	~	1	Gires	
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	ann an Anna Anna Anna A						C	)2	9	0	0	5, ,	/	0	£. 5	2	0	36	,	US.	26	£6

Form:SM088-03C (revised 2/12/18)

http://www.sgs.com/en/terms-and-conditions.

JC69748: Chain of Custody Page 2 of 3



### SGS Sample Receipt Summary

Job Number:	C69748	Client:	USACE-PHILADE	LPHIA DIS	STRICT	Project: PHILADELPHIA	DISTRICT, F	ESERVO	DIR SAMPL
Date / Time Received: 7/	/12/2018 1:45	:00 PM	Delivery Method	: Accu	utest Courier	Airbill #'s:			
Cooler Temps (Raw Measu	ured) °C: Co	ooler 1: (3.4);	Cooler 2: (3.1); C	Cooler 3: (3	.3); Cooler 4: (3.6)	); Cooler 5: (3.5);			
Cooler Temps (Correc	Cooler Temps (Corrected) °C: Cooler 1: (3.4); Cooler 2: (3.1); Cooler 3: (3.3); Cooler 4: (3.6); Cooler 5: (3.5);								
Cooler Security       .         1. Custody Seals Present:       .         2. Custody Seals Intact:       .	Y         or         N           ✓         □         □           ✓         □         □	3. COC Pr 4. Smpl Date	resent: ✓ s/Time OK ✓	<u>or N</u>	Sample Integrity 1. Sample labels p 2. Container labeli	resent on bottles: ng complete:	<u>Y</u> ✓ ✓	<u>r N</u>	
Cooler Temperature	<u>Y</u> or	N			3. Sample contain	er label / COC agree:			
<ol> <li>Temp criteria achieved:</li> <li>Cooler temp verification:</li> <li>Cooler media:</li> <li>No. Coolers:</li> </ol>		Gun Bag)			Sample Integrity 1. Sample recvd w 2. All containers ar 3. Condition of sar	<u>y - Condition</u> /ithin HT: ccounted for: nple:	<u>Y</u> o ✓ ✓	r <u>N</u>	
Quality Control_Preservat	tion <u>Y</u> oi	<u>N N/A</u>			Sample Integrit	v - Instructions	Y o	r N	 N/A
<ol> <li>Trip Blank present / cooler</li> <li>Trip Blank listed on COC:</li> </ol>					1. Analysis reque	sted is clear: d for unspecified tests			
3. Samples preserved proper	rly: 🔽				3. Sufficient volum	ne recvd for analysis:			
4. VOUS neadspace free:					<ol> <li>Compositing in</li> <li>Filtering instruct</li> </ol>	structions clear:			
Test Strip Lot #s:	рН 1-12:	216017	p⊢	112+:	208717	Other: (Specify)			

Comments -1 thru -13 Please note Total Diss LF Phosphorous was rec'd but not noted as such on COC. Filtration request has been sent.

SM089-03 Rev. Date 12/7/17

> JC69748: Chain of Custody Page 3 of 3



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### Dayton, NJ

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0 Automated Report

08/21/18

### Technical Report for

USACE-Philadelphia District

Philadelphia District, Reservoir Sampling

W25PHS81145379

SGS Job Number: JC71016



Sampling Date: 07/31/18

Report to:

Army Corps of Engineers

joseph.m.loeper@usace.army.mil

ATTN: Joseph Loeper

Total number of pages in report: 46



-A. Paul Ioannidis General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Tammy McCloskey 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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SGS North America Inc. • 2235 Route 130 • Dayton, NJ 08810 • tel: 732-329-0200 • fax: 732-329-3499

Please share your ideas about how we can serve you better at: EHS.US.CustomerCare@sgs.com



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## Sample Summary

USACE-Philadelphia District

**Job No:** JC71016

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC71016-1	07/31/18	15:50 SW	07/31/18	AQ	Surface Water	BZ-1S
JC71016-1F	07/31/18	15:50 SW	07/31/18	AQ	Surface H2O Filtered	BZ-1S
JC71016-2	07/31/18	15:35 SW	07/31/18	AQ	Surface Water	BZ-2S
JC71016-2F	07/31/18	15:35 SW	07/31/18	AQ	Surface H2O Filtered	BZ-2S
JC71016-3	07/31/18	13:10 SW	07/31/18	AQ	Surface Water	BZ-3S
JC71016-3F	07/31/18	13:10 SW	07/31/18	AQ	Surface H2O Filtered	BZ-3S
JC71016-4	07/31/18	13:10 SW	07/31/18	AQ	Surface Water	BZ-3M
JC71016-4F	07/31/18	13:10 SW	07/31/18	AQ	Surface H2O Filtered	BZ-3M
JC71016-5	07/31/18	13:10 SW	07/31/18	AQ	Surface Water	BZ-3D
JC71016-5F	07/31/18	13:10 SW	07/31/18	AQ	Surface H2O Filtered	BZ-3D
JC71016-6	07/31/18	15:20 SW	07/31/18	AQ	Surface Water	BZ-4S
JC71016-6F	07/31/18	15:20 SW	07/31/18	AQ	Surface H2O Filtered	BZ-4S
JC71016-7	07/31/18	15:10 SW	07/31/18	AQ	Surface Water	BZ-5S



## Sample Summary (continued)

USACE-Philadelphia District

Job No:

JC71016

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC71016-7F	07/31/18	15:10 SW	07/31/18	AQ	Surface H2O Filtered	BZ-5S
JC71016-8	07/31/18	12:15 SW	07/31/18	AQ	Surface Water	BZ-6S
JC71016-8F	07/31/18	12:15 SW	07/31/18	AQ	Surface H2O Filtered	BZ-6S
JC71016-9	07/31/18	12:15 SW	07/31/18	AQ	Surface Water	BZ-6M
JC71016-9F	07/31/18	12:15 SW	07/31/18	AQ	Surface H2O Filtered	BZ-6M
JC71016-10	07/31/18	12:15 SW	07/31/18	AQ	Surface Water	BZ-6D
JC71016-10F	07/31/18	12:15 SW	07/31/18	AQ	Surface H2O Filtered	BZ-6D
JC71016-11	07/31/18	14:00 SW	07/31/18	AQ	Surface Water	BZ-7S
JC71016-11F	07/31/18	14:00 SW	07/31/18	AQ	Surface H2O Filtered	BZ-7S
JC71016-12	07/31/18	14:00 SW	07/31/18	AQ	Surface Water	BZ-7M
JC71016-12F	07/31/18	14:00 SW	07/31/18	AQ	Surface H2O Filtered	BZ-7M
JC71016-13	07/31/18	14:00 SW	07/31/18	AQ	Surface Water	BZ-7D
JC71016-13F	07/31/18	14:00 SW	07/31/18	AQ	Surface H2O Filtered	BZ-7D



### CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	USACE-Philadelphia District	Job No	JC71016
Site:	Philadelphia District, Reservoir Sampling	Report Date	8/14/2018 12:47:09 P

On 07/31/2018, 26 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.2 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC71016 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

### General Chemistry By Method EPA 351.2/LACHAT

	Matrix: AQ	Batch ID:	GP15213
_	A 11 1 1 1 1 1 1 1 1 1 1 1 1 1	4 1.1.4	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-2DUP, JC71016-2MS were used as the QC samples for Nitrogen, Total Kjeldahl.

### General Chemistry By Method EPA 353.2/LACHAT

Γ	Matrix: AQ	Batch ID:	GP15148
-	All samples were prepared within	n the recommended metho	od holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC70944-2DUP, JC70944-2MB, JC70944-2MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

Matrix: AQ	Batch ID:	GP15199

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-2DUP, JC71016-11MS, JC71016-2MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.
- Matrix Spike Recovery(s) for Nitrogen, Nitrate + Nitrite are outside control limits. Spike recovery indicates possible matrix interference.
- RPD(s) for Duplicate for Nitrogen, Nitrate + Nitrite are outside control limits for sample GP15199-D1. RPD acceptable due to low duplicate and sample concentrations.

### **General Chemistry By Method EPA 365.3**

_	<i>v v</i>		
	Matrix: AQ	Batch ID:	GP15093
_	All	الم من الم	- d h - Lin - time

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-1DUP, JC71016-1MS were used as the QC samples for Phosphorus, Total.

Matrix: AQ	Batch ID: GP15175	
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- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-1FMS, JC71016-1FDUP were used as the QC samples for Phosphorus, Total.
- RPD(s) for Duplicate for Phosphorus, Total are outside control limits for sample GP15175-D1. RPD acceptable due to low duplicate and sample concentrations.

### General Chemistry By Method EPA353.2/SM4500NO2B

	Matrix: AQ	Batch ID:	R172075
T	he data for EPA353.2/SM45	00NO2B meets quality contr	rol requirements.
JC	C71016-1 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172116
T	he data for EPA353.2/SM45	00NO2B meets quality contr	rol requirements.
JC	C71016-3 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172117
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-2 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172118
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-4 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172119
T	he data for EPA353.2/SM45	500NO2B meets quality contr	rol requirements.
JC	C71016-5 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172120
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-6 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172121
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-7 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172122
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-8 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172123
T	he data for EPA353.2/SM45	600NO2B meets quality contr	rol requirements.
= JC	C71016-9 for Nitrogen, Nitra	te: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172124
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-10 for Nitrogen, Nitr	ate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172125
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
J	C71016-11 for Nitrogen, Niti	ate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172126
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-12 for Nitrogen, Nitr	ate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172127
T	he data for EPA353.2/SM45	000NO2B meets quality contr	rol requirements.
JC	C71016-13 for Nitrogen, Nitr	ate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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### General Chemistry By Method SM2320 B-11

	Matrix: AQ	Batch ID:	GN83832
	All samples were analyzed within	the recommended metho	od holding time.
	All method blanks for this batch	neet method specific crite	teria.
	Sample(s) JC71016-1DUP were	used as the QC samples f	for Alkalinity, Total as CaCO3.
	RPD(s) for Duplicate for Alkalin to low duplicate and sample conc	ity, Total as CaCO3 are c entrations.	outside control limits for sample GN83832-D1. RPD acceptable due
	JC71016-7 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
1	JC71016-2 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
1	JC71016-9 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-8 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
I	JC71016-1 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-3 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-4 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-5 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-6 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC71016-10 for Alkalinity, Total	as CaCO3: Sample was t	titrated to a final pH of 4.2.
	JC71016-12 for Alkalinity, Total	as CaCO3: Sample was t	titrated to a final pH of 4.2.
	JC71016-11 for Alkalinity, Total	as CaCO3: Sample was t	titrated to a final pH of 4.2.
I	JC71016-13 for Alkalinity, Total	as CaCO3: Sample was t	titrated to a final pH of 4.2.
j	eneral Chemistry By Me	thod SM2540 C-11	1
_	Matrix: AO	Betek ID:	CN102600

All method blanks for this batch meet method specific criteria.

Sample(s) JC71016-1DUP were used as the QC samples for Solids, Total Dissolved.

### General Chemistry By Method SM2540 D-11

	U U		
Matrix	: AQ	Batch ID:	GN83682

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC71016-1DUP were used as the QC samples for Solids, Total Suspended.

### General Chemistry By Method SM4500NH3 H-11LACHAT

	Matrix: AQ	Batch ID:	GP15168	
-	<ul> <li>All samples were prepared within the recommended method holding time.</li> </ul>			
	All mothed bloply for this hotal	most mathed analific arity		

All method blanks for this batch meet method specific criteria.

Sample(s) JC71016-1DUP, JC71016-1MS, JC71016-1MSD were used as the QC samples for Nitrogen, Ammonia.

### General Chemistry By Method SM4500NO2 B-11

Γ	Matrix: AQ	Batch ID:	GN83553
	<ul> <li>All samples were analyzed within the recommended method holding time.</li> </ul>		

All method blanks for this batch meet method specific criteria.

Sample(s) JC71016-2DUP, JC71016-2MS were used as the QC samples for Nitrogen, Nitrite.

#### Tuesday, August 14, 2018

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### General Chemistry By Method SM5210 B-11

	Matrix: AQ	Batch ID: GP14918	
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- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC70984-1DUP were used as the QC samples for BOD, 5 Day.

### General Chemistry By Method SM5310 B-11

M	latrix: AQ	Batch ID:	GP15246

All samples were prepared within the recommended method holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-11MS, JC71016-11MSD were used as the QC samples for Total Organic Carbon.

Matrix: AQ	Batch ID:	GP15248
 _		

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC71016-1MS, JC71016-1MSD were used as the QC samples for Total Organic Carbon.

#### General Chemistry By Method SM9222 B-06

Matrix: AQ	Batch ID:	MB5320	
All samples were analyzed within the recommended method holding time.			

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-1DUP were used as the QC samples for Coliform, Total.
- JC71016-8 for Coliform, Total: Analysis done out of holding time.
- JC71016-7 for Coliform, Total: Analysis done out of holding time.
- JC71016-6 for Coliform, Total: Analysis done out of holding time.
- JC71016-11 for Coliform, Total: Analysis done out of holding time.
- JC71016-2 for Coliform, Total: Analysis done out of holding time.
- JC71016-3 for Coliform, Total: Analysis done out of holding time.

#### General Chemistry By Method SM9222 D-06

	Matrix: AQ	Batch ID:	MB5321	
-	All samples were analyzed within the recommended method holding time.			

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71016-1DUP were used as the QC samples for Coliform, Fecal.
- JC71016-8 for Coliform, Fecal: Analysis done out of holding time.
- JC71016-11 for Coliform, Fecal: Analysis done out of holding time.
- JC71016-3 for Coliform, Fecal: Analysis done out of holding time.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

#### Tuesday, August 14, 2018

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Job Number:	JC71016
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/31/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC71016-1	BZ-1S					
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total F Solids, Total Dis Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Kjeldahl solved pended rbon	4.7 J 43 84 0.84 0.86 0.016 0.34 65.7 3.3 J 2.0	$5.0 \\ 10 \\ 4 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 \\$	4.0 b 0.11 0.10 0.0050 0.15 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71016-1F	<b>BZ-1S</b> in this sample.					
JC71016-2	BZ-2S					
Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Solids, Total Dis Solids, Total Sus	c + Nitrite solved pended	160 214 0.31 0.31 35.0 2.3 J	10 10 0.11 0.10 10 4.0	b b 0.11 0.10 4.0 2.0	col/100ml col/100ml mg/l mg/l mg/l	SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM2540 C-11 SM2540 D-11
JC71016-2F	BZ-2S					
No hits reported	in this sample.					
JC71016-3	BZ-3S					
Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total F Solids, Total Dis Total Organic Ca	c + Nitrite Kjeldahl solved rbon	0.32 0.33 0.0051 J 0.18 J 43.0 1.1	0.11 0.10 0.010 0.20 10 1.0	$\begin{array}{c} 0.11 \\ 0.10 \\ 0.0050 \\ 0.15 \\ 4.0 \\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l	EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11

#### JC71016-3F BZ-3S

No hits reported in this sample.



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Job Number:	JC71016
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/31/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC71016-4	BZ-3M					
Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss	c + Nitrite Gjeldahl solved	0.93 0.93 0.17 J 47.0	0.11 0.10 0.20 10	0.11 0.10 0.15 4.0	mg/l mg/l mg/l mg/l	EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11
JC71016-4F	BZ-3M					
No hits reported i	n this sample.					
JC71016-5	BZ-3D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susp Total Organic Ca	as CaCO3 <sup>a</sup> <sup>c</sup> + Nitrite Gjeldahl solved pended rbon	8.8 0.78 0.78 0.15 J 55.7 6.8 1.3	5.0 0.11 0.10 0.20 10 4.0 1.0	4.0 0.11 0.10 0.15 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71016-5F	BZ-3D					
No hits reported i	n this sample.					
JC71016-6	BZ-4S					
Coliform, Fecal Coliform, Total <sup>d</sup> Nitrogen, Nitrate Nitrogen, Nitrate Solids, Total Diss Total Organic Ca	c + Nitrite solved rbon	132 151 0.14 0.14 20.0 1.6	4 10 0.11 0.10 10 1.0	b b 0.11 0.10 4.0 1.0	col/100ml col/100ml mg/l mg/l mg/l mg/l	SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM2540 C-11 SM5310 B-11
JC71016-6F	BZ-4S					
No hits reported i	n this sample.					
JC71016-7	BZ-5S					
Alkalinity, Total Coliform, Fecal Coliform, Total <sup>d</sup> Nitrogen, Nitrate Nitrogen, Nitrate	as CaCO3 <sup>a</sup> c + Nitrite	9.8 320 530 1.3 1.3	5.0 10 10 0.11 0.10	4.0 b 0.11 0.10	mg/l col/100ml col/100ml mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT



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JC71016

Job Number:	JC71016
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/31/18

Lab Sample ID Client Sample Analyte	ID Result/ Qual	LOQ	LOD	Units	Method
Nitrogen, Total Kjeldahl Solids, Total Dissolved	0.19 J 78.6	0.20 10	0.15 4.0	mg/l mg/l	EPA 351.2/LACHAT SM2540 C-11
Solids, Total Suspended Total Organic Carbon	29.3 1.0	4.0 1.0	2.0 1.0	mg/l mg/l	SM2540 D-11 SM5310 B-11
JC71016-7F BZ-5S					
Phosphorus, Total	0.10	0.050	0.050	mg/l	EPA 365.3
JC71016-8 BZ-6S					
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Total Organic Carbon	8.8 0.44 0.45 0.0065 J 0.20 59.0 1.1	5.0 0.11 0.10 0.010 0.20 10 1.0	$\begin{array}{c} 4.0\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC71016-8F BZ-6S					
No hits reported in this sample.					
JC71016-9 BZ-6M					
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved	7.8 0.94 0.94 0.15 J 55.0	5.0 0.11 0.10 0.20 10	4.0 0.11 0.10 0.15 4.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11
JC71016-9F BZ-6M					
No hits reported in this sample.					
JC71016-10 BZ-6D					
Alkalinity, Total as CaCO3 <sup>a</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved	9.3 0.85 0.85 0.19 J 22.9	5.0 0.11 0.10 0.20 10	4.0 0.11 0.10 0.15 4.0	mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11



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Job Number:	JC71016
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	07/31/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC71016-10F	BZ-6D					
Phosphorus, Tota	1	0.22	0.050	0.050	mg/l	EPA 365.3
JC71016-11	BZ-7S					
Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Total Organic Ca	c + Nitrite Geldahl olved rbon	0.21 0.22 0.0051 J 0.18 J 33.0 1.0	$\begin{array}{c} 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 1.0 \end{array}$	$\begin{array}{c} 0.11 \\ 0.10 \\ 0.0050 \\ 0.15 \\ 4.0 \\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l	EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC71016-11F	BZ-7S					
Phosphorus, Tota	1	0.082	0.050	0.050	mg/l	EPA 365.3
JC71016-12	BZ-7M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Solids, Total Susp Total Organic Car	as CaCO3 <sup>a</sup> <sup>c</sup> <sup>+</sup> Nitrite <sup>(jeldahl</sup> <sup>(jeldahl</sup> <sup>(jeldahl</sup> <sup>(jeldahl</sup> <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl</sup> ) <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeldahl)</sup> <sup>(jeld</sup>	7.8 0.89 0.90 0.0060 J 0.24 58.8 2.1 J 1.0	$5.0 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	$\begin{array}{c} 4.0\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 2.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71016-12F	BZ-7M					
Phosphorus, Tota	1	0.056	0.050	0.050	mg/l	EPA 365.3
JC71016-13	BZ-7D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> c + Nitrite Geldahl solved tbon	8.3 0.95 0.95 0.19 J 50.0 1.1	5.0 0.11 0.10 0.20 10 1.0	4.0 0.11 0.10 0.15 4.0 1.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
JC71016-13F	BZ-7D					
Phosphorus, Tota	1	1.8	0.50	0.50	mg/l	EPA 365.3

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JC71016

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Job Number: JC71016 Account: USACE-Philadelphia District Philadelphia District, Reservoir Sampling **Project:** Collected: 07/31/18

Lab Sample ID Client	Sample ID Result/				
Analyte	Qual	LOQ	LOD	Units	Method

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(d) Analysis done out of holding time.

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Dayton, NJ

Section 4

Sample Results

Report of Analysis



4



Client Sample ID:	BZ-1S		
Lab Sample ID:	JC71016-1	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.7 J	5.0	4.0	mg/l	1	08/06/18 09:55 CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:25 SA	SM5210 B-11
Coliform, Fecal	43	10		col/100ml	10	07/31/18 23:48 SA	SM9222 D-06
Coliform, Total	84	4		col/100ml	4	07/31/18 23:41 SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:05 RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.84	0.11	0.11	mg/l	1	08/08/18 14:12 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.86	0.10	0.10	mg/l	1	08/08/18 14:12 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.016	0.010	0.0050	mg/l	1	07/31/18 22:25 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.34	0.20	0.15	mg/l	1	08/13/18 11:01 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55 LS	EPA 365.3
Solids, Total Dissolved	65.7	10	4.0	mg/l	1	08/02/18 10:50 RC	SM2540 C-11
Solids, Total Suspended	3.3 J	4.0	2.0	mg/l	1	08/02/18 11:03 RC	SM2540 D-11
Total Organic Carbon	2.0	1.0	1.0	mg/l	1	08/14/18 05:02 CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-1S JC71016-1 AQ - Surfa	F ice H2O Fil	tered			Date S Date I Percei	Sampled: Received: nt Solids:	07/ 07/ n/a	/31/1 /31/1	8 8	
Project:	Philadelphi	ia District, 1									
General Chemistry											
Analyte	]	Result	LOQ	LOD	Units	DF	Analyz	zed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18	3 21:0	6 LS	EPA 365.3	

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$





SGS

Client Sample ID:	BZ-2S		
Lab Sample ID:	JC71016-2	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	08/06/18 09:55 CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:29 SA	SM5210 B-11
Coliform, Fecal	160	10		col/100ml	10	07/31/18 23:48 SA	SM9222 D-06
Coliform, Total <sup>c</sup>	214	10		col/100ml	10	07/31/18 23:41 SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:06 RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.31	0.11	0.11	mg/l	1	08/13/18 09:31 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.31	0.10	0.10	mg/l	1	08/13/18 09:31 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 22:25 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	mg/l	1	08/13/18 11:02 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55 LS	EPA 365.3
Solids, Total Dissolved	35.0	10	4.0	mg/l	1	08/02/18 10:50 RC	SM2540 C-11
Solids, Total Suspended	2.3 J	4.0	2.0	mg/l	1	08/02/18 11:03 RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	08/14/18 06:07 CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-2S JC71016- AQ - Surf	2F face H2O Fi	ltered			Date S Date I Perce	Sampled: 07/31/18 Received: 07/31/18 nt Solids: n/a
Project:	Philadelpl						
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18 21:06 LS EPA 365.3

# **Report of Analysis**

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$



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SGS

07/31/18
07/31/18
n/a
0 0 n

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	08/06/18 09:55	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:31	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:48	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:41	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:08	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.32	0.11	0.11	mg/l	1	08/13/18 09:32	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.33	0.10	0.10	mg/l	1	08/13/18 09:32	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0051 J	0.010	0.0050	mg/l	1	07/31/18 22:25	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.18 J	0.20	0.15	mg/l	1	08/13/18 11:03	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55	LS	EPA 365.3
Solids, Total Dissolved	43.0	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.1	1.0	1.0	mg/l	1	08/14/18 06:29	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-3S JC71016- AQ - Surt	3F face H2O Fil	tered			Date S Date I Perce	Sampled: 07/31/18 Received: 07/31/18 nt Solids: n/a
Project:	Philadelphia District, Reservoir Sampling						
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18 21:06 LS EPA 365.3

# **Report of Analysis**

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$

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Client Sample ID:	BZ-3M		
Lab Sample ID:	JC71016-4	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water I	Date Received:	07/31/18
	H	Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed B	7 Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	08/06/18 09:55 CI	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:34 SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:09 RF	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.93	0.11	0.11	mg/l	1	08/13/18 09:33 BM	1 EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.93	0.10	0.10	mg/l	1	08/13/18 09:33 BM	1 EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 22:25 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.17 J	0.20	0.15	mg/l	1	08/13/18 11:03 BM	1 EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55 LS	EPA 365.3
Solids, Total Dissolved	47.0	10	4.0	mg/l	1	08/02/18 10:50 RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03 RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	08/14/18 06:40 CI	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Client Sample ID: Lab Sample ID: Matrix:	BZ-3M JC71016-4F AQ - Surface H2O Fil	ltered			Date S Date I Perce	Sampled: 07/31/18 Received: 07/31/18 nt Solids: n/a			
Project:	Philadelphia District, Reservoir Sampling								
General Chemistry									
Analyte	Result	LOQ	LOD	Units	DF	Analyzed By Method			
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 21:06 LS EPA 365.3			

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$

4.8



Client Sample ID:	BZ-3D		
Lab Sample ID:	JC71016-5	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.8	5.0	4.0	mg/l	1	08/06/18 09:55	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:36	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:11	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.78	0.11	0.11	mg/l	1	08/13/18 09:34	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.78	0.10	0.10	mg/l	1	08/13/18 09:34	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 22:25	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 J	0.20	0.15	mg/l	1	08/13/18 11:04	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55	LS	EPA 365.3
Solids, Total Dissolved	55.7	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	6.8	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	1.0	mg/l	1	08/14/18 06:52	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-3D JC71016- AQ - Surr Philadelp	BZ-3D JC71016-5F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling						07/ 07/ n/a	/31/1 /31/1 1	8 8	
General Chemistry	General Chemistry										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	ed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18	3 21:0	6 LS	EPA 365.3	



SGS

Client Sample ID:	BZ-4S		
Lab Sample ID:	JC71016-6	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	<b>Date Received:</b>	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	08/06/18 09:55 CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:37 SA	SM5210 B-11
Coliform, Fecal	132	4		col/100ml	4	07/31/18 23:48 SA	SM9222 D-06
Coliform, Total <sup>c</sup>	151	10		col/100ml	10	07/31/18 23:41 SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:12 RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.14	0.11	0.11	mg/l	1	08/13/18 09:36 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.14	0.10	0.10	mg/l	1	08/13/18 09:36 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 22:25 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	mg/l	1	08/13/18 11:05 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 17:55 LS	EPA 365.3
Solids, Total Dissolved	20.0	10	4.0	mg/l	1	08/02/18 10:50 RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03 RC	SM2540 D-11
Total Organic Carbon	1.6	1.0	1.0	mg/l	1	08/14/18 07:04 CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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4.11



Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-4S JC71016-6F AQ - Surface H2O Filtered Philadelphia District, Reservoir Sampling						Date Sampled:07/31/18Date Received:07/31/18Percent Solids:n/a				
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	æd	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18	21:0	6 LS	EPA 365.3	

# **Report of Analysis**

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$ LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = LOD but < LOQ



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#### JC71016

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Client Sample ID:	BZ-5S		
Lab Sample ID:	JC71016-7	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	9.8	5.0	4.0	mg/l	1	08/06/18 10:11 CE	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:39 SA	SM5210 B-11
Coliform, Fecal	320	10		col/100ml	10	07/31/18 23:48 SA	SM9222 D-06
Coliform, Total <sup>c</sup>	530	10		col/100ml	10	07/31/18 23:41 SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:14 RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	1.3	0.11	0.11	mg/l	1	08/13/18 09:39 BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.3	0.10	0.10	mg/l	1	08/13/18 09:39 BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 22:25 LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	mg/l	1	08/13/18 11:08 BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00 LS	EPA 365.3
Solids, Total Dissolved	78.6	10	4.0	mg/l	1	08/02/18 10:50 RC	SM2540 C-11
Solids, Total Suspended	29.3	4.0	2.0	mg/l	1	08/02/18 11:03 RC	SM2540 D-11
Total Organic Carbon	1.0	1.0	1.0	mg/l	1	08/14/18 07:15 CE	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-5S JC71016- AQ - Surt Philadelph	7F face H2O Fi hia District,	lltered Reservoir Sa	ampling		Date S Date J Perce	Sampled: 07/31/18   Received: 07/31/18   nt Solids: n/a
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.10	0.050	0.050	mg/l	1	08/13/18 21:20 LS EPA 365.3

# **Report of Analysis**

 4.14 4



Client Sample ID:	BZ-6S		
Lab Sample ID:	JC71016-8	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.8	5.0	4.0	mg/l	1	08/06/18 10:11	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:41	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:48	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:41	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:15	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.44	0.11	0.11	mg/l	1	08/13/18 09:40	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.45	0.10	0.10	mg/l	1	08/13/18 09:40	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0065 J	0.010	0.0050	mg/l	1	07/31/18 23:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.20	0.20	0.15	mg/l	1	08/13/18 11:08	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00	LS	EPA 365.3
Solids, Total Dissolved	59.0	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.1	1.0	1.0	mg/l	1	08/14/18 07:28	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



JC71016

4.15

Client Sample ID: Lab Sample ID: Matrix:	BZ-6S JC71016- AQ - Surf	8F Face H2O Fil	tered			Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	31/1 31/1	8 8	
Project:	Philadelph	nia District, 1	Reservoir Sa	ampling							
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	zed	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18	3 21:20	)LS	EPA 365.3	

# **Report of Analysis**

 4.16 4

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#### JC71016

Client Sample ID:	BZ-6M			
Lab Sample ID:	JC71016-9 Date S	Sampled:	07/31/18	
Matrix:	AQ - Surface Water Date H	<b>Received:</b>	07/31/18	
	Percer	nt Solids:	n/a	
Project:	Philadelphia District, Reservoir Sampling			

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	7.8	5.0	4.0	mg/l	1	08/06/18 10:11	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:43	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:17	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.94	0.11	0.11	mg/l	1	08/13/18 09:41	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.94	0.10	0.10	mg/l	1	08/13/18 09:41	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 23:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 J	0.20	0.15	mg/l	1	08/13/18 11:09	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00	LS	EPA 365.3
Solids, Total Dissolved	55.0	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	08/14/18 07:39	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.17 4



Client Sample ID: Lab Sample ID: Matrix:	BZ-6M JC71016- AQ - Surf	9F Face H2O Fil	tered			Date S Date I Percer	Sampled: Received: nt Solids:	07/ 07/ n/a	31/1 31/1	8 8	
Project:	Philadelpl	nia District,	Reservoir Sa	ampling							
General Chemistry											
Analyte		Result	LOQ	LOD	Units	DF	Analyz	æd	By	Method	
Phosphorus, Total		0.050 U	0.050	0.050	mg/l	1	08/13/18	21:20	0 LS	EPA 365.3	



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**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	9.3	5.0	4.0	mg/l	1	08/06/18 10:11	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:45	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:18	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.85	0.11	0.11	mg/l	1	08/13/18 09:42	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.85	0.10	0.10	mg/l	1	08/13/18 09:42	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 23:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	mg/l	1	08/13/18 11:10	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00	LS	EPA 365.3
Solids, Total Dissolved	22.9	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.0 U	1.0	1.0	mg/l	1	08/14/18 08:18	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Page 1 of 1



Client Sample ID: Lab Sample ID: Matrix:	BZ-6D JC71016- AQ - Surf	10F Face H2O Fi	ltered			Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	31/1 31/1	8 8	
Project:	Philadelpl	nia District,	Reservoir Sa	ampling							
General Chemistry	7										
Analyte		Result	LOQ	LOD	Units	DF	Analyz	ed	By	Method	
Phosphorus, Total		0.22	0.050	0.050	mg/l	1	08/13/18	3 21:20	0 LS	EPA 365.3	

# **Report of Analysis**

#### LOQ = Limit of Quantitation $U = \ Indicates \ a \ result < \ LOD$



Client Sample ID:	BZ-7S		
Lab Sample ID:	JC71016-11	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.0 U	5.0	4.0	mg/l	1	08/06/18 10:11	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:47	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:48	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4		col/100ml	4	07/31/18 23:41	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:22	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.21	0.11	0.11	mg/l	1	08/13/18 09:43	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.22	0.10	0.10	mg/l	1	08/13/18 09:43	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0051 J	0.010	0.0050	mg/l	1	07/31/18 23:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.18 J	0.20	0.15	mg/l	1	08/13/18 11:11	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00	LS	EPA 365.3
Solids, Total Dissolved	33.0	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.0	1.0	1.0	mg/l	1	08/13/18 16:41	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix: Project:	BZ-7S JC71016- AQ - Surf Philadelph	11F ace H2O Fi iia District,	ltered Reservoir Sa	ampling		Date S Date I Perce	Sampled: 07/31/18 Received: 07/31/18 nt Solids: n/a
General Chemistry	7						
Analyte		Result	LOQ	LOD	Units	DF	Analyzed By Method
Phosphorus, Total		0.082	0.050	0.050	mg/l	1	08/13/18 21:20 LS EPA 365.3

# **Report of Analysis**

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4.22 **4** 



SGS

Client Sample ID:	BZ-7M		
Lab Sample ID:	JC71016-12	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed 1	By Method
Alkalinity, Total as CaCO3 <sup>a</sup>	7.8	5.0	4.0	mg/l	1	08/06/18 10:11 0	CD SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:49 \$	A SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:24 H	RP SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.89	0.11	0.11	mg/l	1	08/13/18 09:45 H	BM EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.90	0.10	0.10	mg/l	1	08/13/18 09:45 H	BM EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0060 J	0.010	0.0050	mg/l	1	07/31/18 23:00 I	S SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.24	0.20	0.15	mg/l	1	08/13/18 11:12 H	BM EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:00 I	S EPA 365.3
Solids, Total Dissolved	58.8	10	4.0	mg/l	1	08/02/18 10:50 H	RC SM2540 C-11
Solids, Total Suspended	2.1 J	4.0	2.0	mg/l	1	08/02/18 11:03 H	RC SM2540 D-11
Total Organic Carbon	1.0	1.0	1.0	mg/l	1	08/13/18 17:55 0	CD SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-7M JC71016-12F AQ - Surface H	20 Filtered	Date S Date I Perce	Sampled: Received: nt Solids:	07/ 07/ n/a	07/31/18 07/31/18 p/a								
Project:	Philadelphia Dis	strict, Reservoir S	Sampling											
General Chemistry														
Analyte	Resu	lt LOQ	LOD	Units	DF	Analyz	ed	By	Method					
Phosphorus, Total	0.056	6 0.050	0.050	mg/l	1	08/13/18	21:20	)LS	EPA 365.3					

SGS



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Client Sample ID:	BZ-7D		
Lab Sample ID:	JC71016-13	Date Sampled:	07/31/18
Matrix:	AQ - Surface Water	Date Received:	07/31/18
		<b>Percent Solids:</b>	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.3	5.0	4.0	mg/l	1	08/06/18 10:11	CD	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	mg/l	1	07/31/18 23:50 \$	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	mg/l	1	08/09/18 14:25 1	RP	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.95	0.11	0.11	mg/l	1	08/13/18 09:461	BM	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.95	0.10	0.10	mg/l	1	08/13/18 09:461	BM	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	mg/l	1	07/31/18 23:00 1	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	mg/l	1	08/13/18 11:13 1	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	mg/l	1	08/13/18 18:001	LS	EPA 365.3
Solids, Total Dissolved	50.0	10	4.0	mg/l	1	08/02/18 10:50	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	mg/l	1	08/02/18 11:03	RC	SM2540 D-11
Total Organic Carbon	1.1	1.0	1.0	mg/l	1	08/13/18 18:09	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Client Sample ID: Lab Sample ID: Matrix:	BZ-7D JC71016- AQ - Surf	13F Face H2O Fi	ltered	Date S Date I Perce	Sampled: Received: nt Solids:	07/31/18 07/31/18 p/a								
Project:	Philadelpl	nia District,	Reservoir Sa	ampling										
General Chemistry														
Analyte		Result	LOQ	LOD	Units	DF	Analyz	ed	By	Method				
Phosphorus, Total		1.8	0.50	0.50	mg/l	10	08/13/18	21:25	LS	EPA 365.3				

# **Report of Analysis**









Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

• Chain of Custody



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Company Name	Project Name:			_								6									
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Project Contact E	-mail Project #	-0.0	-	Street Addr	ess						A	ĭ≽	20	-							LIQ - Other Liquid
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215-650-6545	dx # Client Purchase	Order#		City					Σφ			LP		3	4						FB-Field Blank
Sampler(s) Name(s) 010 - F	Phone # Project Manager			Attention:						m	Ş	្ល	n Ba	Ň		.					EB-Equipment Blank RB- Rinse Blank
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YF BZ-3M			110	£1	SW	8	X	X			X	X	1×	Х	-						
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Form:SM088-03C (revised 2/12/18)

JC71016: Chain of Custody Page 1 of 5

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			-	Contraction Register.	www.sgs	.com/eh	susa				600 Y 100		SGS Q	uote #					SGS Jo	.b#		Jι	710/6
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	other			-	Commercial	"A" = Res	sults Only;	Com	nercial	"B" = F	Results	+ QC Su	mmary		/				$\circ \mu$	213	1104	11//	00111-27
Eme	rgency & Bursh T/A data awailable via LabLink				NJ Reduce	d = Result	s + QC Su	mmary +	Partia	Raw	lata				Samp	le inv	entory	y is ve	rified	upon r	receipt	in the L	aboratory
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Form:SM088-03C (revised 2/12/18)

JC71016: Chain of Custody Page 2 of 5

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CHAIN	OF	CUSTODY	
SGS No	rth Ameri	ica Inc Dayton	
2235 Rout	te 130. E	Davton, NJ 08810	
### SGS Sample Receipt Summary

Job Number:	JC710	16		Client:	USACE-PI	HILADEL	PHIA DI	STRICT	Project: PHILADELPHIA	DISTRICT,	RESERVO	OIR SAMPL
Date / Time Received:	7/31/20	)18 7	:30:00 P	M	Delivery N	lethod:	Acc	utest Courier	Airbill #'s:			
Cooler Temps (Raw Mea	sured)	°C:	Cooler	1: (2.1);	Cooler 2:	(2.3); Co	oler 3: (3	.3); Cooler 4: (2	.9); Cooler 5: (2.4);			
Cooler Temps (Cor	rected)	°C:	Cooler	1: (2.0);	Cooler 2:	(2.2); Co	oler 3: (3	.2); Cooler 4: (2	.8); Cooler 5: (2.3);			
Cooler Security	<u>Y</u>	or N	_			<u>Y</u> or	N	Sample Integri	ity - Documentation	Y	<u>or N</u>	
1. Custody Seals Present:	✓		] 3.	COC P	resent:	✓		1. Sample labels	s present on bottles:	$\checkmark$		
2. Custody Seals Intact:	✓		] 4. Sr	mpl Date	s/Time OK	$\checkmark$		2. Container lab	eling complete:	$\checkmark$		
Cooler Temperature		<u>Y</u>	or N					3. Sample conta	iner label / COC agree:	$\checkmark$		
1. Temp criteria achieved:		✓						Sample Integ	rity - Condition	Y	or N	
2. Cooler temp verification			IR Gun					1. Sample recvo	within HT:	$\checkmark$		
3. Cooler media:		lo	e (Bag)					2. All containers	accounted for:	$\checkmark$		
4. No. Coolers:			5					3. Condition of s	sample:	Ir	ntact	
Quality Control Preserv	<u>ation</u>	Y	or N	N/A				Sample Integr	rity - Instructions	Y	or N	N/A
1. Trip Blank present / coo	ler:		$\checkmark$					1. Analysis reg	uested is clear:			
2. Trip Blank listed on COC	D:		$\checkmark$					2. Bottles recei	ved for unspecified tests		$\checkmark$	
3. Samples preserved prop	perly:	$\checkmark$						<ol> <li>Sufficient vol</li> </ol>	ume recvd for analysis:			
4. VOCs headspace free:				$\checkmark$				4. Compositing	instructions clear:			$\checkmark$
								5. Filtering instr	ructions clear:			
Test Strip Lot #s:	рН 1	-12:	2	16017		pH 1	2+:	208717	Other: (Specify)			
Comments 1) -2 Collectio 2) Lab to verify	n time o r which s	n labe ample	ls is 15:3 ∋s made ł	5, not 15 8 hour h	5:55. ID and old time for T	date is ok <sup>r</sup> CF and F	CF.					

SM089-02 Rev. Date 12/1/16

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collect time is 15:35 per Gregory Wacik
 Proceed as noted, client is following 30 day hold time for TCF / FCF on this project.



JC71016: Chain of Custody Page 4 of 5



Requested Date: 8/13/2018 Account Name: USACE-Philadelphia District Project Description: Philadelphia District, Reservoir Sampling C/O Initiated By: TAMMY PM: TM Sample #: JC71016-all Change: Sample #: JC71016-all revise deliverables to REDT2 TAT: 14 TAT: 14		
Account Name: USACE-Philadelphia District Project Description: Philadelphia District, Reservoir Sampling C/O Initiated By: TAMMY PM: TM Sample #: JC71016-all Change: TAT: 14 TAT:	sceived Date:	7/31/2018
Project Description: Philadelphia District, Reservoir Sampling C/O Initiated By: TAMMY PM: TM Sample #: JC71016-all Change: Dept: TAT: 14 TAT: 14 TAT: 14	ue Date:	8/14/2015
Col Initiated By: TAMMY PM: TM Sample #: JC71016-all Change: Dept: TAT: 14 TAT: 14 TAT: 14	eliverable:	FULT1
Sample #: JC71016-all Change: Dept: TAT: 14 revise deliverables to REDT2 TAT: 14 revise deliverables to REDT2 TAT: 14 revise deliverables to REDT2	AT (Days):	14
Dept: TAT: 14 14 14 14 14 14 14 14 14 14 14 14 14 1		
TAT: 14		
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	e/Time: 8/13/2	:018 12:38:58 PM
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JC71016: Chain of Custody Page 5 of 5



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### Dayton, NJ

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0 Automated Report

09/13/18

### Technical Report for

USACE-Philadelphia District

Philadelphia District, Reservoir Sampling

W25PHS81145379

SGS Job Number: JC71959



Sampling Date: 08/15/18

Report to:

Army Corps of Engineers

joseph.m.loeper@usace.army.mil

ATTN: Joseph Loeper

Total number of pages in report: 44



-A. Paul Ioannidis General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Tammy McCloskey 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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SGS North America Inc. • 2235 Route 130 • Dayton, NJ 08810 • tel: 732-329-0200 • fax: 732-329-3499

Please share your ideas about how we can serve you better at: EHS.US.CustomerCare@sgs.com



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# Sample Summary

USACE-Philadelphia District

Job No: JC71959

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC71959-1	08/15/18	15:45 GW	08/15/18	AQ	Surface Water	BZ-1S
JC71959-1F	08/15/18	15:45 GW	08/15/18	AQ	Surface H2O Filtered	BZ-1S
JC71959-2	08/15/18	15:35 GW	08/15/18	AQ	Surface Water	BZ-2S
JC71959-2F	08/15/18	15:35 GW	08/15/18	AQ	Surface H2O Filtered	BZ-2S
JC71959-3	08/15/18	13:05 GW	08/15/18	AQ	Surface Water	BZ-3S
JC71959-3F	08/15/18	13:05 GW	08/15/18	AQ	Surface H2O Filtered	BZ-3S
JC71959-4	08/15/18	13:05 GW	08/15/18	AQ	Surface Water	BZ-3M
JC71959-4F	08/15/18	13:05 GW	08/15/18	AQ	Surface H2O Filtered	BZ-3M
JC71959-5	08/15/18	15:25 GW	08/15/18	AQ	Surface Water	BZ-3D
JC71959-5F	08/15/18	15:25 GW	08/15/18	AQ	Surface H2O Filtered	BZ-3D
JC71959-6	08/15/18	15:10 GW	08/15/18	AQ	Surface Water	BZ-4S
JC71959-6F	08/15/18	15:10 GW	08/15/18	AQ	Surface H2O Filtered	BZ-4S
JC71959-7	08/15/18	12:10 GW	08/15/18	AQ	Surface Water	BZ-5S



# Sample Summary (continued)

USACE-Philadelphia District

JC71959 Job No:

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC71959-7F	08/15/18	12:10 GW	08/15/18	AQ	Surface H2O Filtered	BZ-5S
JC71959-8	08/15/18	12:10 GW	08/15/18	AQ	Surface Water	BZ-6S
JC71959-8F	08/15/18	12:10 GW	08/15/18	AQ	Surface H2O Filtered	BZ-6S
JC71959-9	08/15/18	12:10 GW	08/15/18	AQ	Surface Water	BZ-6M
JC71959-9F	08/15/18	12:10 GW	08/15/18	AQ	Surface H2O Filtered	BZ-6M
JC71959-10	08/15/18	12:10 GW	08/15/18	AQ	Surface Water	BZ-6D
JC71959-10F	08/15/18	12:10 GW	08/15/18	AQ	Surface H2O Filtered	BZ-6D
JC71959-11	08/15/18	13:55 GW	08/15/18	AQ	Surface Water	BZ-7S
JC71959-11F	08/15/18	13:55 GW	08/15/18	AQ	Surface H2O Filtered	BZ-7S
JC71959-12	08/15/18	13:55 GW	08/15/18	AQ	Surface Water	BZ-7M
JC71959-12F	08/15/18	13:55 GW	08/15/18	AQ	Surface H2O Filtered	BZ-7M
JC71959-13	08/15/18	13:55 GW	08/15/18	AQ	Surface Water	BZ-7D
JC71959-13F	08/15/18	13:55 GW	08/15/18	AQ	Surface H2O Filtered	BZ-7D



### CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	USACE-Philadelphia District	Job No	JC71959
Site:	Philadelphia District, Reservoir Sampling	Report Date	8/29/2018 4:27:44 PM

On 08/15/2018, 26 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.7 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC71959 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

### General Chemistry By Method EPA 351.2/LACHAT

Matrix: AQ	Batch ID:	GP15412
 _	 	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1MS, JC71959-1DUP were used as the QC samples for Nitrogen, Total Kjeldahl.
- RPD(s) for Duplicate for Nitrogen, Total Kjeldahl are outside control limits for sample GP15412-D1. RPD acceptable due to low duplicate and sample concentrations.

#### General Chemistry By Method EPA 353.2/LACHAT

Matrix: AQ Batch ID: GP15495
------------------------------

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1DUP, JC71959-2MS, JC71959-1MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.
- Matrix Spike Recovery(s) for Nitrogen, Nitrate + Nitrite are outside control limits. Spike recovery indicates possible matrix interference.

#### **General Chemistry By Method EPA 365.3**

	Matrix: AQ	Batch ID:	GP15438
-	All samples were prepared within	the recommended metho	d holding time.
-	All method blanks for this batch n	neet method specific crite	eria.
-	Sample(s) JC71959-1DUP, JC71	959-1MS were used as th	ne QC samples for Phosphorus, Total.
	Matrix: AQ	Batch ID:	GP15474

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC71959-8FDUP, JC71959-8FMS were used as the QC samples for Phosphorus, Total.



### General Chemistry By Method EPA353.2/SM4500NO2B

Matrix: AQ	Batch ID:	R172343
The data for EPA353.2/SM4	1500NO2B meets quality cont	rol requirements.
JC71959-9 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172364
The data for EPA353.2/SM4	4500NO2B meets quality cont	rol requirements.
JC71959-1 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172365
The data for EPA353.2/SM4	4500NO2B meets quality cont	rol requirements.
JC71959-2 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172366
The data for EPA353.2/SM4	4500NO2B meets quality cont	rol requirements.
JC71959-3 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172367
The data for EPA353.2/SM4	4500NO2B meets quality cont	rol requirements.
JC71959-4 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172368
The data for EPA353.2/SM4	4500NO2B meets quality cont	rol requirements.
JC71959-5 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172369
The data for EPA353.2/SM4	4500NO2B meets quality contr	rol requirements.
JC71959-6 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172370
The data for EPA353.2/SM4	4500NO2B meets quality contr	rol requirements.
JC71959-7 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172371
The data for EPA353.2/SM4	4500NO2B meets quality contr	rol requirements.
JC71959-8 for Nitrogen, Nit	rate: Calculated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172372
The data for EPA353.2/SM4	1500NO2B meets quality contr	rol requirements.
JC71959-10 for Nitrogen, N	trate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172373
The data for EPA353.2/SM4	1500NO2B meets quality contr	rol requirements.
JC71959-11 for Nitrogen, N	trate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172374
The data for EPA353.2/SM4	1500NO2B meets quality contr	rol requirements.
JC71959-12 for Nitrogen, N	trate: Calculated as: (Nitrogen	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
Matrix: AQ	Batch ID:	R172375
The data for EPA353.2/SM4	4500NO2B meets quality contr	rol requirements.
JC71959-13 for Nitrogen, N	trate: Calculated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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#### General Chemistry By Method SM2320 B-11

	Matrix: AQ	Batch ID:	GN84701		
-	All samples were analyzed within the recomm	ended metho	od holding time.		
-	All method blanks for this batch meet method specific criteria.				
-	Sample(s) JC71959-1DUP were used as the QC samples for Alkalinity, Total as CaCO3.				
-	JC71959-8 for Alkalinity, Total as CaCO3: Sa	JC71959-8 for Alkalinity, Total as CaCO3: Sample was titrated to a final pH of 4.2.			
-	JC71959-1 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-10 for Alkalinity, Total as CaCO3: S	Sample was ti	titrated to a final pH of 4.2.		
-	JC71959-12 for Alkalinity, Total as CaCO3: S	Sample was ti	titrated to a final pH of 4.2.		
-	JC71959-13 for Alkalinity, Total as CaCO3: S	Sample was ti	titrated to a final pH of 4.2.		
-	JC71959-2 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-3 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-4 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-5 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-6 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-11 for Alkalinity, Total as CaCO3: S	Sample was ti	titrated to a final pH of 4.2.		
-	JC71959-9 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.2.		
-	JC71959-7 for Alkalinity, Total as CaCO3: Sa	ample was tit	trated to a final pH of 4.5.		
Ge	eneral Chemistry By Method SM2	2540 C-11	1		
	Matrix: AQ	Batch ID:	GN84415		
-	All samples were analyzed within the recomm	ended metho	od holding time.		
-	All method blanks for this batch meet method	specific crite	teria.		
	Sample(s) JC71959-1DUP were used as the C	QC samples f	for Solids, Total Dissolved.		

### General Chemistry By Method SM2540 D-11

	e e		
	Matrix: AQ	Batch ID:	GN84414
-	All samples were analyzed within	the recommended metho	d holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1DUP were used as the QC samples for Solids, Total Suspended.
- JC71959-1 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 550 mL of sample. Volume was reduced from 1 liter due to limited volume.

### General Chemistry By Method SM4500NH3 H-11LACHAT

	Matrix: AQ	Batch ID:	GP15448
-	All samples were prepared within the	he recommended metho	d holding time.
-	All method blanks for this batch me	eet method specific crite	eria.

Sample(s) JC71959-2DUP, JC71959-2MS, JC71959-2MSD were used as the QC samples for Nitrogen, Ammonia.

### General Chemistry By Method SM4500NO2 B-11

	Matrix: AQ	Batch ID:	GN84347
-	All samples were analyzed within t	he recommended metho	od holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-2DUP, JC71959-2MS were used as the QC samples for Nitrogen, Nitrite.

### Wednesday, August 29, 2018

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### General Chemistry By Method SM5210 B-11

	Matrix: AQ	Batch ID:	GP15315
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- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1DUP were used as the QC samples for BOD, 5 Day.

### General Chemistry By Method SM5310 B-11

Matrix: AQ	Batch ID:	GP15463

All samples were prepared within the recommended method holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1MS, JC71959-1MSD were used as the QC samples for Total Organic Carbon.

Matrix: AQ	Batcl	ו ID:	GP15505

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-11MS, JC71959-11MSD were used as the QC samples for Total Organic Carbon.

### General Chemistry By Method SM9222 B-06

	Matrix: AQ	Batch ID:	MB5343
_	A 11	4 1 1 4	

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1DUP were used as the QC samples for Coliform, Total.
- JC71959-8 for Coliform, Total: Analysis done out of holding time.
- JC71959-7 for Coliform, Total: Analysis done out of holding time.
- JC71959-3 for Coliform, Total: Analysis done out of holding time.
- JC71959-11 for Coliform, Total: Analysis done out of holding time.

### General Chemistry By Method SM9222 D-06

	Matrix: AQ	Batch ID:	MB5344
-	All samples were analyzed with	in the recommended metho	d holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC71959-1DUP were used as the QC samples for Coliform, Fecal.
- JC71959-3 for Coliform, Fecal: Analysis done out of holding time.
- JC71959-7 for Coliform, Fecal: Analysis done out of holding time.
- JC71959-8 for Coliform, Fecal: Analysis done out of holding time.
- JC71959-11 for Coliform, Fecal: Analysis done out of holding time.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

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Job Number:	JC71959
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	08/15/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method		
JC71959-1	BZ-1S							
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Solids, Total Dis Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> c e + Nitrite solved pended <sup>d</sup> urbon	11.9 160 580 0.92 0.93 0.0074 J 82.9 3.1 J 1.9	$5.0 \\ 4 \\ 10 \\ 0.11 \\ 0.10 \\ 0.010 \\ 10 \\ 4.0 \\ 1.0$	4.0 b 0.11 0.10 0.0050 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 SM2540 C-11 SM2540 D-11 SM5310 B-11		
JC71959-1F BZ-1S								
No hits reported	in this sample.							
JC71959-2	BZ-2S							
Alkalinity, Total Coliform, Fecal Coliform, Total Nitrogen, Nitrate Nitrogen, Nitrate Solids, Total Dis Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> c e + Nitrite solved pended urbon	6.2 183 231 0.23 0.23 31.3 2.5 J 1.1	$5.0 \\ 10 \\ 10 \\ 0.11 \\ 0.10 \\ 10 \\ 4.0 \\ 1.0$	4.0 b 0.11 0.10 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11		
JC71959-2F	BZ-2S							
No hits reported	in this sample.							
JC71959-3	BZ-38							
Alkalinity, Total Coliform, Fecal	as CaCO3 <sup>a</sup>	10.9 4	5.0 4	4.0 b	mg/l col/100ml	SM2320 B-11 SM9222 D-06		

Coliform, Fecal <sup>e</sup>	4	4	D	col/100ml	SM9222 D-06
Nitrogen, Nitrate <sup>c</sup>	0.26	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.26	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0045 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 J	0.20	0.15	mg/l	EPA 351.2/LACHAT
Solids, Total Dissolved	35.0	10	4.0	mg/l	SM2540 C-11
Solids, Total Suspended	1.7 J	4.0	2.0	mg/l	SM2540 D-11
Total Organic Carbon	1.8	1.0	1.0	mg/l	SM5310 B-11





Job Number:	JC71959
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	08/15/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method		
JC71959-3F	BZ-3S							
No hits reported i	n this sample.							
JC71959-4	BZ-3M							
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Total Organic Car	as CaCO3 <sup>a</sup> c + Nitrite Gjeldahl solved rbon	14.0 0.86 0.87 0.0057 J 0.16 J 66.3 2.2	$5.0 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 1.0$	$\begin{array}{c} 4.0\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11		
JC71959-4F	JC71959-4F BZ-3M							
No hits reported in this sample.								
JC71959-5	BZ-3D							
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Solids, Total Diss Solids, Total Susp Total Organic Ca	as CaCO3 <sup>a</sup> <sup>c</sup> <sup>+</sup> Nitrite solved pended rbon	12.9 0.84 0.84 54.0 1.5 J 1.4	5.0 0.11 0.10 10 4.0 1.0	4.0 0.11 0.10 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11		
JC71959-5F	BZ-3D							
No hits reported in this sample.								
JC71959-6 BZ-4S								
Alkalinity, Total Coliform, Fecal Coliform, Total Solids, Total Diss Solids, Total Susp Total Organic Ca	as CaCO3 <sup>a</sup> solved bended rbon	3.6 J 92 140 22.2 3.3 J 1.7	5.0 4 4 10 4.0 1.0	4.0 b 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 SM2540 C-11 SM2540 D-11 SM5310 B-11		

#### JC71959-6F BZ-4S

No hits reported in this sample.





Job Number:	JC71959
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	08/15/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC71959-7	BZ-5S					
Alkalinity, Total as CaCO3 <sup>f</sup> Coliform, Fecal <sup>e</sup> Coliform, Total <sup>e</sup> Nitrogen, Nitrate <sup>c</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Solids, Total Suspended Total Organic Carbon		24.3 350 963.6 1.2 1.2 0.23 71.3 3.4 J 2.2	$5.0 \\ 10 \\ 10 \\ 0.11 \\ 0.10 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0$	4.0 b 0.11 0.10 0.15 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM2540 D-11 SM5310 B-11
JC71959-7F	BZ-5S					
No hits reported in	n this sample.					
JC71959-8	BZ-6S					
Alkalinity, Total a Coliform, Fecal <sup>e</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Solids, Total Disso Solids, Total Susp Total Organic Car	us CaCO3 <sup>a</sup> c + Nitrite olved ended bon	11.4 4 0.33 0.34 0.0054 J 35.0 2.0 J 1.7	$5.0 \\ 4 \\ 0.11 \\ 0.10 \\ 0.010 \\ 10 \\ 4.0 \\ 1.0 $	4.0 b 0.11 0.10 0.0050 4.0 2.0 1.0	mg/l col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71959-8F	BZ-6S					
No hits reported in	n this sample.					
JC71959-9	BZ-6M					
Alkalinity, Total a Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Disso Solids, Total Susp Total Organic Car	s CaCO3 <sup>a</sup> + Nitrite jeldahl olved ended bon	11.9 0.75 0.78 0.027 0.13 J 50.0 1.5 J 2.3	$5.0 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0$	$\begin{array}{c} 4.0\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 2.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11

### JC71959-9F BZ-6M

No hits reported in this sample.

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Job Number:	JC71959
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	08/15/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC71959-10	BZ-6D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> <sup>c</sup> + Nitrite Kjeldahl solved pended rbon	14.5 0.72 0.72 0.14 J 60.0 3.2 J 1.3	5.0 0.11 0.10 0.20 10 4.0 1.0	4.0 0.11 0.10 0.15 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71959-10F	BZ-6D					
No hits reported i	in this sample.					
JC71959-11	BZ-7S					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> <sup>c</sup> + Nitrite Kjeldahl solved pended rbon	9.3 0.26 0.26 0.18 J 26.7 2.0 J 2.6	5.0 0.11 0.10 0.20 10 4.0 1.0	4.0 0.11 0.10 0.15 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC71959-11F	BZ-7S					
No hits reported i	in this sample.					
JC71959-12	BZ-7M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> - + Nitrite Kjeldahl solved pended rbon	8.8 0.16 0.16 0.12 J 37.8 1.8 J 1.8	$5.0 \\ 0.11 \\ 0.10 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	4.0 0.11 0.10 0.15 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11

### JC71959-12F BZ-7M

No hits reported in this sample.

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Job Number:	JC71959
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	08/15/18

Lab Sample ID Client Sample ID Analyte	Result/ Qual	LOQ	LOD	Units	Method
JC71959-13 BZ-7D					
Alkalinity, Total as CaCO3 <sup>a</sup>	14.0	5.0	4.0	mg/l	SM2320 B-11
Nitrogen, Nitrate <sup>c</sup>	0.94	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.94	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Total Kjeldahl	0.21	0.20	0.15	mg/l	EPA 351.2/LACHAT
Solids, Total Dissolved	50.0	10	4.0	mg/l	SM2540 C-11
Solids, Total Suspended	4.4	4.0	2.0	mg/l	SM2540 D-11
Total Organic Carbon	2.5	1.0	1.0	mg/l	SM5310 B-11

#### JC71959-13F BZ-7D

No hits reported in this sample.

- (a) Sample was titrated to a final pH of 4.2.
- (b) Value reported is laboratory DL (MDL).
- (c) Calculated as: (Nitrogen, Nitrate + Nitrite) (Nitrogen, Nitrite)
- (d) Reported sample aliquot obtained from filtration of 550 mL of sample. Volume was reduced from 1 liter due to limited volume.
- (e) Analysis done out of holding time.
- (f) Sample was titrated to a final pH of 4.5.









Dayton, NJ

Section 4

Sample Results

Report of Analysis



4



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Client Sample ID:	BZ-1S		
Lab Sample ID:	JC71959-1	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	L00	LOD	DL	Units	DF	Analyzed	Bv	Method
		<b>x</b>					<u>y</u>	-5	
Alkalinity, Total as CaCO3 <sup>a</sup>	11.9	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:14	SA	SM5210 B-11
Coliform, Fecal	160	4			col/100ml	4	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total	580	10			col/100ml	10	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:14	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.92	0.11	0.11	0.046	mg/l	1	08/23/18 16:45	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.93	0.10	0.10	0.043	mg/l	1	08/23/18 16:45	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0074 J	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	0.12	mg/l	1	08/22/18 09:58	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
Solids, Total Dissolved	82.9	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended d	3.1 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.9	1.0	1.0	0.72	mg/l	1	08/23/18 09:48	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(d) Reported sample aliquot obtained from filtration of 550 mL of sample. Volume was reduced from 1 liter due to limited volume.



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Client Sample ID:	BZ-1S								
Lab Sample ID:	JC71959-1F		Date S	ampled:	08/15/18				
Matrix:	AQ - Surface I		Date R	08/15/18					
					Percen	t Solids:	n/a		
Project:	Philadelphia D	r Sampling							
General Chemistry	,								_
Analyte	Res	ult LOC	Q LOD	DL	Units	DF	Analyzed	By 1	Method
Phosphorus, Total	0.05	50 U 0.05	0 0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3



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Client Sample ID:	BZ-2S		
Lab Sample ID:	JC71959-2	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	6.2	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:18	SA	SM5210 B-11
Coliform, Fecal	183	10			col/100ml	10	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total	231	10			col/100ml	10	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:16	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.23	0.11	0.11	0.046	mg/l	1	08/23/18 16:46	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.23	0.10	0.10	0.043	mg/l	1	08/23/18 16:46	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	0.12	mg/l	1	08/22/18 09:59	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
Solids, Total Dissolved	31.3	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	2.5 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.1	1.0	1.0	0.72	mg/l	1	08/23/18 10:45	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-2S								
Lab Sample ID:	JC71959-2F				Date S	ampled:	08/15/18		
Matrix: AQ - Surface H2O Filtered					Date F	Received:	08/15/18		
					Percer	nt Solids:	n/a		
Project:	Philadelphia D								
General Chemistry									_
Analyte	Res	ult LOC	Q LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.05	0 U 0.05	0 0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3

4.4



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BZ-3S		
JC71959-3	Date Sampled:	08/15/18
AQ - Surface Water	Date Received:	08/15/18
	Percent Solids:	n/a
Philadelphia District, Reservoir Sampling		
	BZ-3S JC71959-3 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-3S JC71959-3 Date Sampled: AQ - Surface Water Date Received: Percent Solids:

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.9	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:19	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	4	4			col/100ml	4	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4			col/100ml	1	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:17	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate d	0.26	0.11	0.11	0.046	mg/l	1	08/23/18 16:47	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.26	0.10	0.10	0.043	mg/l	1	08/23/18 16:47	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0045 J	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:00	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
Solids, Total Dissolved	35.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	1.7 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.8	1.0	1.0	0.72	mg/l	1	08/23/18 10:56	HP	SM5310 B-11

(a) Sample was titrated to a final pH  $\,$  of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-3S								
Lab Sample ID:	JC71959-3F	JC71959-3F				Date Sampled:			
Matrix:	AQ - Surface H	20 Filtered			Date Received: 08/15/18				
					Percer	nt Solids:	n/a		
Project:	Philadelphia District, Reservoir Sampling								
General Chemistry	,								_
Analyte	Resu	t LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.050	U 0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3

4.6



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Client Sample ID:	BZ-3M		
Lab Sample ID:	JC71959-4	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.0	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:20	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:21	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.86	0.11	0.11	0.046	mg/l	1	08/23/18 16:48	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.87	0.10	0.10	0.043	mg/l	1	08/23/18 16:48	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0057 J	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.16 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:01	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
Solids, Total Dissolved	66.3	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	2.2	1.0	1.0	0.72	mg/l	1	08/23/18 11:08	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.7 4



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Client Sample ID:	BZ-3M									
Lab Sample ID:	JC71959-4F				Date Sampled:			08/15/18		
Matrix:	AQ - Surface	e H2O Filtere	ed		<b>Date Received:</b> 08/15/18			08/15/18		
						Percent	Solids:	n/a		
Project:	t: Philadelphia District, Reservoir Sampling									
General Chemistry	,									
Analyte	R	esult	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.	050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:57	MP	EPA 365.3

4.8



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Client Sample ID:	BZ-3D		
Lab Sample ID:	JC71959-5	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	12.9	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:22	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:23	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.84	0.11	0.11	0.046	mg/l	1	08/23/18 16:53	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.84	0.10	0.10	0.043	mg/l	1	08/23/18 16:53	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	0.12	mg/l	1	08/22/18 10:02	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
Solids, Total Dissolved	54.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	1.5 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.4	1.0	1.0	0.72	mg/l	1	08/23/18 11:22	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





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Client Sample ID:	BZ-3D									
Lab Sample ID:	JC71959-	5F			Date S	08/15/18				
Matrix:	AQ - Surf	face H2O Filt	ered			<b>Date Received:</b> 08/15/18				
						Percer	nt Solids:	n/a		
Project:	Philadelphia District, Reservoir Sampling									
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:57	MP	EPA 365.3

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BZ-4S		
JC71959-6	Date Sampled:	08/15/18
AQ - Surface Water	Date Received:	08/15/18
	Percent Solids:	n/a
Philadelphia District, Reservoir Sampling		
	BZ-4S JC71959-6 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-4S JC71959-6 Date Sampled: AQ - Surface Water Date Received: Philadelphia District, Reservoir Sampling

**General Chemistry** 

Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
3.6 J	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:24	SA	SM5210 B-11
92	4			col/100ml	4	08/15/18 23:02	SA	SM9222 D-06
140	4			col/100ml	4	08/15/18 22:53	SA	SM9222 B-06
0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:24	BM	SM4500NH3 H-11LACHAT
0.11 U	0.11	0.11	0.046	mg/l	1	08/23/18 16:54	RP	EPA353.2/SM4500NO2B
0.10 U	0.10	0.10	0.043	mg/l	1	08/23/18 16:54	RP	EPA 353.2/LACHAT
0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:00	LS	SM4500NO2 B-11
0.15 U	0.20	0.15	0.12	mg/l	1	08/22/18 10:02	BM	EPA 351.2/LACHAT
0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:41	MP	EPA 365.3
22.2	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
3.3 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
1.7	1.0	1.0	0.72	mg/l	1	08/23/18 11:35	HP	SM5310 B-11
	Result 3.6 J 3.4 U 92 140 0.20 U 0.10 U 0.10 U 0.0050 U 0.15 U 0.050 U 22.2 3.3 J 1.7	Result         LOQ           3.6 J         5.0           3.4 U         3.4           92         4           140         4           0.20 U         0.20           0.11 U         0.11           0.10 U         0.10           0.0050 U         0.010           0.15 U         0.20           0.050 U         0.050           22.2         10           3.3 J         4.0           1.7         1.0	LOQ         LOD           3.6 J         5.0         4.0           3.4 U         3.4         3.4 b           92         4         -           140         4         -           0.20 U         0.20         0.20           0.11 U         0.11         0.11           0.10 U         0.10         0.10           0.15 U         0.20         0.250           0.50 U         0.050         0.050           22.2         10         4.0           3.3 J         4.0         2.0           1.7         1.0         1.0	Result         LOQ         LOD         DL           3.6 J         5.0         4.0         3.6           3.4 U         3.4         3.4 b         3.4           92         4         -           140         4         -           0.20 U         0.20         0.20         0.089           0.11 U         0.11         0.11         0.046           0.10 U         0.10         0.10         0.043           0.0050 U         0.010         0.0050         0.0030           0.15 U         0.20         0.15         0.12           0.050 U         0.050         0.027         22.2           10         4.0         1.8           3.3 J         4.0         2.0         1.5           1.7         1.0         1.0         0.72	Result         LOQ         LOD         DL         Units           3.6 J         5.0         4.0         3.6         mg/l           3.4 U         3.4         3.4 b         3.4         mg/l           92         4         col/100ml           140         4         col/100ml           0.20 U         0.20         0.20         0.089         mg/l           0.11 U         0.11         0.11         0.046         mg/l           0.10 U         0.10         0.10         0.043         mg/l           0.11 U         0.11         0.110         0.043         mg/l           0.15 U         0.20         0.15         0.12         mg/l           0.500 U         0.050         0.050         0.027         mg/l           2.2.2         10         4.0         1.8         mg/l           3.3 J         4.0         2.0         1.5         mg/l           1.7         1.0         1.0         0.72         mg/l	Result         LOQ         LOD         DL         Units         DF           3.6 J         5.0         4.0         3.6         mg/1         1           3.4 U         3.4         3.4 b         3.4         mg/1         1           92         4         col/100m         4           140         4         col/100m         4           0.20 U         0.20         0.20         0.089         mg/1         1           0.11 U         0.11         0.11         0.046         mg/1         1           0.10 U         0.10         0.10         0.043         mg/1         1           0.10 U         0.10         0.050         0.030         mg/1         1           0.15 U         0.20         0.15         0.12         mg/1         1           0.505 U         0.050         0.050         0.027         mg/1         1           22.2         10         4.0         1.8         mg/1         1           3.3 J         4.0         2.0         1.5         mg/1         1	Result         LOQ         LOD         DL         Units         DF         Analyzed           3.6 J         5.0         4.0         3.6         mg/1         1         08/23/18 12:00           3.4 U         3.4         3.4 b         3.4         mg/1         1         08/23/18 12:02           92         4         -         col/100ml         4         08/15/18 23:22           140         4         -         col/100ml         4         08/15/18 23:53           0.20 U         0.20         0.20         0.089         mg/1         1         08/22/18 12:24           0.11 U         0.11         0.14         0.046         mg/1         08/23/18 16:54           0.10 U         0.10         0.10         0.046         mg/1         08/23/18 16:54           0.10 U         0.10         0.10         0.046         mg/1         08/23/18 16:54           0.10 U         0.10         0.10         0.046         mg/1         08/23/18 16:54           0.050 U         0.010         0.050         0.0030         mg/1         1         08/22/18 10:02           0.15 U         0.20         0.15         0.12         mg/1         1         08/24/18 15:41	Result         LOQ         LOD         DL         Units         DF         Analyzed         By           3.6 J         5.0         4.0         3.6         mg/1         1         08/23/18 12:00         ST           3.4 U         3.4         3.4 b         3.4         mg/1         1         08/15/18 23:24         SA           92         4         -         col/100m         4         08/15/18 23:24         SA           140         4         -         col/100m         4         08/15/18 23:24         SA           0.20 U         0.20         0.20         0.089         mg/1         1         08/22/18 12:24         BM           0.11 U         0.11         0.11         0.046         mg/1         1         08/23/18 16:54         RP           0.10 U         0.10         0.100         0.043         mg/1         1         08/23/18 16:54         RP           0.050 U         0.100         0.0050         0.0030         mg/1         1         08/23/18 16:54         RP           0.15 U         0.20         0.15         0.12         mg/1         1         08/21/18 10:02         BM           0.50 U         0.050         0.050

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Client Sample ID:	BZ-4S									
Lab Sample ID:	JC71959-6	F				Date S	08/15/18			
Matrix:	AQ - Surfa	ce H2O Fil	tered			<b>Date Received:</b> 08/15/18				
						Percer	nt Solids:	n/a		
Project:	Philadelphia District, Reservoir Sampling									
General Chemistry	,									-
Analyte	]	Result	LOQ	LOD	DL	Units	DF	Analyzed	By 1	Method
Phosphorus, Total	(	).050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:57	MP	EPA 365.3



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Client Sample ID:	BZ-5S		
Lab Sample ID:	JC71959-7	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	24.3	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:25	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	350	10			col/100ml	10	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	963.6	10			col/100ml	100	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:26	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	1.2	0.11	0.11	0.046	mg/l	1	08/23/18 16:55	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.2	0.10	0.10	0.043	mg/l	1	08/23/18 16:55	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.23	0.20	0.15	0.12	mg/l	1	08/22/18 10:05	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	71.3	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	3.4 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	2.2	1.0	1.0	0.72	mg/l	1	08/23/18 11:48	HP	SM5310 B-11

(a) Sample was titrated to a final pH  $\,$  of 4.5.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.13



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Client Sample ID:	BZ-5S									
Lab Sample ID:	JC71959-7	F				Date S	Sampled:	08/15/18		
Matrix:	AQ - Surface H2O Filtered					<b>Date Received:</b> 08/15/18				
					Percent Solids:			n/a		
Project:	Philadelphi	a District, I	Reservoir Sa	ampling						
General Chemistry	r									_
Analyte	]	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	(	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:57	MP	EPA 365.3

4.14 4



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Client Sample ID:	BZ-6S		
Lab Sample ID:	JC71959-8	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	11.4	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:27	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	4	4			col/100ml	4	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4			col/100ml	1	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:27	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate d	0.33	0.11	0.11	0.046	mg/l	1	08/23/18 16:56	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.34	0.10	0.10	0.043	mg/l	1	08/23/18 16:56	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0054 J	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.15 U	0.20	0.15	0.12	mg/l	1	08/22/18 10:06	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	35.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	2.0 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.7	1.0	1.0	0.72	mg/l	1	08/23/18 11:59	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-6S									
Lab Sample ID:	JC71959-8	F				Date S	ampled:	08/15/18		
Matrix:	AQ - Surface H2O Filtered					<b>Date Received:</b> 08/15/18				
					Percent Solids:			n/a		
Project:	Philadelphi	a District, 1	Reservoir Sa	mpling						
General Chemistry	r									_
Analyte	]	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	(	0.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3



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Client Sample ID:	BZ-6M		
Lab Sample ID:	JC71959-9	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	11.9	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:28	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:29	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate c	0.75	0.11	0.11	0.046	mg/l	1	08/23/18 16:57	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.78	0.10	0.10	0.043	mg/l	1	08/23/18 16:57	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.027	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.13 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:07	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	50.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	1.5 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	2.3	1.0	1.0	0.72	mg/l	1	08/23/18 12:11	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.17 4



Page 1 of 1

Client Sample ID:	BZ-6M									
Lab Sample ID:	JC71959-9	θF				Date S	Sampled:	08/15/18		
Matrix:	AQ - Surf	ace H2O Fil	tered			<b>Date Received:</b> 08/15/18				
						Percer	nt Solids:	n/a		
Project:	Philadelph	nia District,	Reservoir S	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3

4.18



Page 1 of 1

Client Sample ID:	BZ-6D		
Lab Sample ID:	JC71959-10	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.5	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:29	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:30	BM	I SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.72	0.11	0.11	0.046	mg/l	1	08/23/18 16:58	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.72	0.10	0.10	0.043	mg/l	1	08/23/18 16:58	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.14 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:07	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	60.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	3.2 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.3	1.0	1.0	0.72	mg/l	1	08/23/18 12:55	HP	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)




Page 1 of 1

Client Sample ID:	BZ-6D									
Lab Sample ID:	JC71959-	10F				Date S	Sampled:	08/15/18		
Matrix:	AQ - Surf	ace H2O Fil	tered			Date I	Received:	08/15/18		
						Percer	nt Solids:	n/a		
Project:	Philadelph	nia District, 1	Reservoir S	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3

Page 1 of 1

Client Sample ID:	BZ-7S		
Lab Sample ID:	JC71959-11	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	9.3	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:31	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0 J	4			col/100ml	1	08/15/18 23:02	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	0 J	4			col/100ml	1	08/15/18 22:53	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:32	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate d	0.26	0.11	0.11	0.046	mg/l	1	08/23/18 17:00	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.26	0.10	0.10	0.043	mg/l	1	08/23/18 17:00	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.18 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:08	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	26.7	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	2.0 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	2.6	1.0	1.0	0.72	mg/l	1	08/24/18 02:55	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Page 1 of 1

Client Sample ID:	BZ-7S									
Lab Sample ID:	JC71959-1	1F				Date S	Sampled:	08/15/18		
Matrix:	AQ - Surfa	ce H2O Fil	tered			Date I	Received:	08/15/18		
						Percer	nt Solids:	n/a		
Project:	Philadelphi	a District, 1	Reservoir Sa	mpling						
General Chemistry	,									_
Analyte	]	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	(	0.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3

4.22

Page 1 of 1

Client Sample ID:	BZ-7M		
Lah Commis ID.	1071050 12	Doto Comulada	09/15/19
Lab Sample ID:	JC/1959-12	Date Sampled:	08/13/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	8.8	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:32	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:33	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.16	0.11	0.11	0.046	mg/l	1	08/23/18 17:01	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.16	0.10	0.10	0.043	mg/l	1	08/23/18 17:01	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.12 J	0.20	0.15	0.12	mg/l	1	08/22/18 10:09	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	37.8	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	1.8 J	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	1.8	1.0	1.0	0.72	mg/l	1	08/24/18 04:03	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Page 1 of 1

Client Sample ID:	BZ-7M									
Lab Sample ID:	JC71959-12	F				Date Sa	mpled:	08/15/18		
Matrix:	AQ - Surfac	e H2O Filter	red			Date Re	ceived:	08/15/18		
						Percent	Solids:	n/a		
Project:	Philadelphia	District, Re	eservoir Sa	ampling						
General Chemistry										_
Analyte	R	lesult	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.	.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3



4.24 4

JC71959

Page 1 of 1

Client Sample ID:	BZ-7D		
Lab Sample ID:	JC71959-13	Date Sampled:	08/15/18
Matrix:	AQ - Surface Water	Date Received:	08/15/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.0	5.0	4.0	3.6	mg/l	1	08/23/18 12:00	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	08/15/18 23:33	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	08/22/18 12:34	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>C</sup>	0.94	0.11	0.11	0.046	mg/l	1	08/23/18 17:02	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.94	0.10	0.10	0.043	mg/l	1	08/23/18 17:02	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	08/15/18 21:10	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.21	0.20	0.15	0.12	mg/l	1	08/22/18 10:10	BM	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	08/24/18 15:49	MP	EPA 365.3
Solids, Total Dissolved	50.0	10	4.0	1.8	mg/l	1	08/17/18 14:36	RC	SM2540 C-11
Solids, Total Suspended	4.4	4.0	2.0	1.5	mg/l	1	08/17/18 11:02	RC	SM2540 D-11
Total Organic Carbon	2.5	1.0	1.0	0.72	mg/l	1	08/24/18 04:13	JO	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Page 1 of 1

Client Sample ID:	BZ-7D									
Lab Sample ID:	JC71959-1	13F				Date S	Sampled:	08/15/18		
Matrix:	AQ - Surf	ace H2O Fil	tered			Date I	Received:	08/15/18		
						Percer	nt Solids:	n/a		
Project:	Philadelph	ia District, 1	Reservoir Sa	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	08/25/18 14:35	LS	EPA 365.3

4.26 **4** 







Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

• Chain of Custody



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Form:SM088-03C (revised 2/12/18)

JC71959: Chain of Custody Page 1 of 3

http://www.sgs.com/en/terms-and-conditions.



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JC71959: Chain of Custody Page 2 of 3



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#### SGS Sample Receipt Summary

Job Number: J	C71959 Clie	nt: USACE-PHILADELPHIA DI	STRICT Project: PHILADELPHIA D	ISTRICT, RESERVOIR SAMPL	
Date / Time Received: 8	15/2018 6:18:00 PM	Delivery Method:	Airbill #'s:		
Cooler Temps (Raw Measured) °C:       Cooler 1: (3.3); Cooler 2: (2.9); Cooler 3: (3.8); Cooler 4: (3.4); Cooler 5: (3.5);         Cooler Temps (Corrected) °C:       Cooler 1: (3.2); Cooler 2: (2.8); Cooler 3: (3.7); Cooler 4: (3.3); Cooler 5: (3.4);					
Cooler Security 1. Custody Seals Present: 2. Custody Seals Intact: Cooler Temperature 1. Tomo criterio achieved:	<u>Y or N</u> <u>✓</u> □ 3. CO <u>✓</u> □ 4. Smpl I <u>Y or N</u>	Y     or     N       C Present:     ✓     □       Dates/Time OK     ✓     □	Sample Integrity - Documentation 1. Sample labels present on bottles: 2. Container labeling complete: 3. Sample container label / COC agree:	Y or N V U V U V U	
<ol> <li>Cooler temp verification:</li> <li>Cooler media:</li> <li>No. Coolers:</li> </ol>	✓ □     IR Gun     Ice (Bag)     5		Sample Integrity - Condition 1. Sample recvd within HT: 2. All containers accounted for: 3. Condition of sample:	V Intact	
Quality Control_Preservar 1. Trip Blank present / cooler 2. Trip Blank listed on COC: 3. Samples preserved proper 4. VOCs headspace free:	ion Y or N :		<ol> <li>Sample Integrity - Instructions</li> <li>Analysis requested is clear:</li> <li>Bottles received for unspecified tests</li> <li>Sufficient volume recvd for analysis:</li> <li>Compositing instructions clear:</li> <li>Filtering instructions clear:</li> </ol>	Y or N N/A V V V V V V V V V V V V V	
Test Strip Lot #s:         pH 1-12:         216017         pH 12+:         208717         Other:         (Specify)					
Comments					

SM089-03 Rev. Date 12/7/17

> JC71959: Chain of Custody Page 3 of 3

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# Dayton, NJ

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0 Automated Report

09/27/18

# Technical Report for

USACE-Philadelphia District

Philadelphia District, Reservoir Sampling

W25PHS81145379

SGS Job Number: JC73277



Sampling Date: 09/06/18

Report to:

Army Corps of Engineers

joseph.m.loeper@usace.army.mil

ATTN: Joseph Loeper

Total number of pages in report: 46



-A. Paul Ioannidis General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: Tammy McCloskey 732-329-0200

Certifications: NJ(12129), NY(10983), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (CL0056), AK (UST-103), AZ (AZ0786), PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB L2248)

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SGS North America Inc. • 2235 Route 130 • Dayton, NJ 08810 • tel: 732-329-0200 • fax: 732-329-3499

Please share your ideas about how we can serve you better at: EHS.US.CustomerCare@sgs.com



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JC73277

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# Sample Summary

USACE-Philadelphia District

**Job No:** JC73277

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC73277-1	09/06/18	07:20 GW	09/06/18	AQ	Surface Water	BZ-1S
JC73277-1F	09/06/18	07:20 GW	09/06/18	AQ	Surface H2O Filtered	BZ-1S
JC73277-2	09/06/18	11:20 GW	09/06/18	AQ	Surface Water	BZ-2S
JC73277-2F	09/06/18	11:20 GW	09/06/18	AQ	Surface H2O Filtered	BZ-2S
JC73277-3	09/06/18	09:15 GW	09/06/18	AQ	Surface Water	BZ-3S
JC73277-3F	09/06/18	09:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-3S
JC73277-4	09/06/18	09:15 GW	09/06/18	AQ	Surface Water	BZ-3M
JC73277-4F	09/06/18	09:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-3M
JC73277-5	09/06/18	09:15 GW	09/06/18	AQ	Surface Water	BZ-3D
JC73277-5F	09/06/18	09:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-3D
JC73277-6	09/06/18	10:10 GW	09/06/18	AQ	Surface Water	BZ-4S
JC73277-6F	09/06/18	10:10 GW	09/06/18	AQ	Surface H2O Filtered	BZ-4S
JC73277-7	09/06/18	10:50 GW	09/06/18	AQ	Surface Water	BZ-5S



# Sample Summary (continued)

USACE-Philadelphia District

Job No:

JC73277

Philadelphia District, Reservoir Sampling Project No: W25PHS81145379

Sample Number	Collected Date	Time By	Received	Matri Code	ix Type	Client Sample ID
JC73277-7F	09/06/18	10:50 GW	09/06/18	AQ	Surface H2O Filtered	BZ-5S
JC73277-8	09/06/18	08:15 GW	09/06/18	AQ	Surface Water	BZ-6S
JC73277-8F	09/06/18	08:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-6S
JC73277-9	09/06/18	08:15 GW	09/06/18	AQ	Surface Water	BZ-6M
JC73277-9F	09/06/18	08:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-6M
JC73277-10	09/06/18	08:15 GW	09/06/18	AQ	Surface Water	BZ-6D
JC73277-10F	09/06/18	08:15 GW	09/06/18	AQ	Surface H2O Filtered	BZ-6D
JC73277-11	09/06/18	09:45 GW	09/06/18	AQ	Surface Water	BZ-7S
JC73277-11F	09/06/18	09:45 GW	09/06/18	AQ	Surface H2O Filtered	BZ-7S
JC73277-12	09/06/18	09:45 GW	09/06/18	AQ	Surface Water	BZ-7M
JC73277-12F	09/06/18	09:45 GW	09/06/18	AQ	Surface H2O Filtered	BZ-7M
JC73277-13	09/06/18	09:45 GW	09/06/18	AQ	Surface Water	BZ-7D
JC73277-13F	09/06/18	09:45 GW	09/06/18	AQ	Surface H2O Filtered	BZ-7D



## CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	USACE-Philadelphia District	Job No	JC73277
Site:	Philadelphia District, Reservoir Sampling	Report Date	9/20/2018 10:25:48 A

On 09/06/2018, 13 Sample(s), 0 Trip Blank(s) and 0 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 3.2 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC73277 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

#### General Chemistry By Method EPA 351.2/LACHAT

Matrix: AC	Batch ID:	GP15964

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73277-1DUP, JC73277-1MS were used as the QC samples for Nitrogen, Total Kjeldahl.

Matrix Spike Recovery(s) for Nitrogen, Total Kjeldahl are outside control limits. Spike recovery indicates possible matrix interference.

#### General Chemistry By Method EPA 353.2/LACHAT

Matrix: AQ	Batch ID: GP16001	
------------	-------------------	--

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73277-5DUP, JC73277-5MS, JC73277-6MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

#### **General Chemistry By Method EPA 365.3**

Matrix: AQ	Batch ID: GP15970	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73277-1MS, JC73277-1DUP were used as the QC samples for Phosphorus, Total.
- RPD(s) for Duplicate for Phosphorus, Total are outside control limits. RPD acceptable due to low duplicate and sample concentrations.

Matrix: AQ Batch ID: GP16009	
------------------------------	--

All samples were prepared within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73277-1FDUP, JC73277-1FMS were used as the QC samples for Phosphorus, Total.



### General Chemistry By Method EPA353.2/SM4500NO2B

	Matrix: AQ	Batch ID:	R172803
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-1 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172804
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-2 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172805
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-3 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172806
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-4 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172807
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-5 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172808
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-6 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172809
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-7 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172810
-	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-8 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172811
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-9 for Nitrogen, Nitrate: Calcul	ated as: (Nitrogen,	Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172812
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-10 for Nitrogen, Nitrate: Calcu	alated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172813
-	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-11 for Nitrogen, Nitrate: Calcu	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172814
-	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-12 for Nitrogen, Nitrate: Calcu	lated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)
	Matrix: AQ	Batch ID:	R172815
	The data for EPA353.2/SM4500NO2B	meets quality cont	rol requirements.
	JC73277-13 for Nitrogen, Nitrate: Calcu	ilated as: (Nitroger	n, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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#### General Chemistry By Method SM2320 B-11

	Matrix: AQ	Batch ID:	GN85778
	All samples were analyzed within	the recommended metho	od holding time.
	All method blanks for this batch	meet method specific crite	eria.
	Sample(s) JC73277-1DUP were	used as the QC samples f	for Alkalinity, Total as CaCO3.
	RPD(s) for Duplicate for Alkalin sample concentrations.	ity, Total as CaCO3 are c	outside control limits. RPD acceptable due to low duplicate and
	JC73277-6 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-9 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-1 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-3 for Alkalinity, Total a	s CaCO3: Sample was tit	trated to a final pH of 4.2.
	JC73277-5 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-10 for Alkalinity, Total	as CaCO3: Sample was t	itrated to a final pH of 4.2.
	JC73277-11 for Alkalinity, Total	as CaCO3: Sample was t	itrated to a final pH of 4.2.
	JC73277-12 for Alkalinity, Total	as CaCO3: Sample was t	itrated to a final pH of 4.2.
	JC73277-13 for Alkalinity, Total	as CaCO3: Sample was t	itrated to a final pH of 4.2.
	JC73277-7 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-8 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-4 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
	JC73277-2 for Alkalinity, Total a	s CaCO3: Sample was tit	rated to a final pH of 4.2.
G	eneral Chemistry By Me	thod SM2540 C-11	1
	Matrix: AQ	Batch ID:	GN85465

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73277-1DUP were used as the QC samples for Solids, Total Dissolved.

Matrix: AQ Batch ID: GN85507	Matrix: AQ Batch ID:	GN85507
------------------------------	----------------------	---------

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73414-1DUP were used as the QC samples for Solids, Total Dissolved.

#### General Chemistry By Method SM2540 D-11

_			
	Matrix: AQ	Batch ID:	GN85450
	All samples were analyzed withi	n the recommended metho	od holding time.

= An samples were analyzed within the recommended method holding this

All method blanks for this batch meet method specific criteria.

Sample(s) JC73277-1DUP were used as the QC samples for Solids, Total Suspended.

JC73277-5 for Solids, Total Suspended: Reported sample aliquot obtained from filtration of 800 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.

#### Batch ID: GN85503

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) JC73360-1DUP were used as the QC samples for Solids, Total Suspended.

Matrix: AQ

#### General Chemistry By Method SM4500NH3 H-11LACHAT

Matrix: AQ	Batch ID:	GP15893	
------------	-----------	---------	--

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73236-5DUP, JC73236-5MS, JC73236-5MSD were used as the QC samples for Nitrogen, Ammonia.

Matrix:	AQ	Batch ID:	GP15894

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73533-1DUP, JC73533-1MS, JC73533-1MSD were used as the QC samples for Nitrogen, Ammonia.

#### General Chemistry By Method SM4500NO2 B-11

Matrix: AQ	Batch ID:	GN85403		

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73277-1DUP, JC73277-1MS were used as the QC samples for Nitrogen, Nitrite.

#### General Chemistry By Method SM5210 B-11

Matrix: AQ	Batch ID:	GP15794	

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73201-4DUP were used as the QC samples for BOD, 5 Day.

#### General Chemistry By Method SM5310 B-11

_			
	Matrix: AQ	Batch ID:	GP16047
	All samples were prepared within	the recommended metho	d holding time.
	All method blanks for this batch r	neet method specific crite	eria.
	Sample(s) JC73277-1MS, JC732	.77-1MSD were used as t	he QC samples for Total Organic Carbon.
Γ	Matrix: AQ	Batch ID:	GP16048

All samples were prepared within the recommended method holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73277-11MS, JC73277-11MSD were used as the QC samples for Total Organic Carbon.



#### General Chemistry By Method SM9222 B-06

	Matrix:	AQ	Batch ID:	MB5375	

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73277-1DUP were used as the QC samples for Coliform, Total.
- JC73277-2 for Coliform, Total: Analysis done out of holding time.
- JC73277-8 for Coliform, Total: Analysis done out of holding time.
- JC73277-7 for Coliform, Total: Analysis done out of holding time.
- JC73277-6 for Coliform, Total: Analysis done out of holding time.
- JC73277-3 for Coliform, Total: Analysis done out of holding time.
- JC73277-1 for Coliform, Total: Analysis done out of holding time.
- JC73277-11 for Coliform, Total: Analysis done out of holding time.

#### General Chemistry By Method SM9222 D-06

	Matrix: AQ	Batch ID:	MB5376
-	All samples were analyzed	d within the recommended metho	od holding time.

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC73277-1DUP were used as the QC samples for Coliform, Fecal.
- JC73277-3 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-6 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-7 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-8 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-11 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-1 for Coliform, Fecal: Analysis done out of holding time.
- JC73277-2 for Coliform, Fecal: Analysis done out of holding time.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover



Job Number:	JC73277
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	09/06/18

Lab Sample ID Analyte	Client Sample ID	Result/ Oual	100	LOD	Units	Method
			201	202		
JC73277-1	BZ-1S					
Alkalinity, Total	as CaCO3 <sup>a</sup>	14.8	5.0	4.0	mg/l	SM2320 B-11
Coliform, Fecal <sup>b</sup>	)	96	4	с	col/100ml	SM9222 D-06
Coliform, Total <sup>b</sup>	)	104	4	с	col/100ml	SM9222 B-06
Nitrogen, Nitrate	d	0.81	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate	+ Nitrite	0.81	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Total k	Kjeldahl	0.23	0.20	0.15	mg/l	EPA 351.2/LACHAT
Solids, Total Diss	solved	95.0	10	4.0	mg/l	SM2540 C-11
Solids, Total Sus	pended	1.6 J	4.0	2.0	mg/l	SM2540 D-11
Total Organic Ca	rbon	4.0	1.0	1.0	mg/l	SM5310 B-11
JC73277-1F	BZ-1S					
No hits reported i	in this sample.					
JC73277-2	BZ-2S					
Alkalinity, Total Coliform, Fecal <sup>b</sup>	as CaCO3 <sup>a</sup>	8.4 29	5.0 4	4.0 c	mg/l col/100ml	SM2320 B-11 SM9222 D-06
Coliform, Total <sup>b</sup>	)	144	4	с	col/100ml	SM9222 B-06
Nitrogen, Nitrate	d	0.20	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate	+ Nitrite	0.20	0.10	0.10	mg/l	EPA 353.2/LACHAT
Solids, Total Diss	solved	48.8	10	4.0	mg/l	SM2540 C-11
Total Organic Ca	rbon	1.8	1.0	1.0	mg/l	SM5310 B-11
JC73277-2F	BZ-2S					
No hits reported	in this sample.					
JC73277-3	BZ-3S					
Alkalinity, Total	as CaCO3 <sup>a</sup>	10.6	5.0	4.0	mg/l	SM2320 B-11
Coliform, Total <sup>b</sup>	)	8	4	с	col/100ml	SM9222 B-06
Nitrogen, Nitrate	d	0.21	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate	+ Nitrite	0.21	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Total k	Kjeldahl	0.24	0.20	0.15	mg/l	EPA 351.2/LACHAT
Solids, Total Dise	solved	46.7	10	4.0	mg/l	SM2540 C-11
Solids, Total Sus	pended	1.8 J	4.0	2.0	mg/l	SM2540 D-11
I otal Organic Ca	rbon	2.9	1.0	1.0	mg/1	SM2310 B-11

JC73277-3F BZ-3S

No hits reported in this sample.

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SGS



Job Number:	JC73277
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	09/06/18

Lab Sample ID	Client Sample ID	Result/				
Analyte		Qual	LOQ	LOD	Units	Method
JC73277-4	BZ-3M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl solved pended rbon	12.7 0.74 0.74 0.18 J 60.0 1.6 J 3.5	5.0 0.11 0.10 0.20 10 4.0 1.0	4.0 0.11 0.10 0.15 4.0 2.0 1.0	mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC73277-4F	BZ-3M					
No hits reported i	in this sample.					
JC73277-5	BZ-3D					
Alkalinity, Total Nitrogen, Ammor Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Solids, Total Susp Total Organic Ca JC73277-5F	as CaCO3 <sup>a</sup> nia d + Nitrite Kjeldahl solved pended <sup>e</sup> rbon <b>BZ-3D</b>	12.7 0.11 J 0.66 0.67 0.0091 J 0.30 77.1 4.1 4.7	$5.0 \\ 0.20 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0$	$\begin{array}{c} 4.0 \\ 0.20 \\ 0.11 \\ 0.10 \\ 0.0050 \\ 0.15 \\ 4.0 \\ 2.0 \\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM4500NH3 H-11LACHAT EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
No hits reported i	in this sample.					
JC73277-6	BZ-4S					
Alkalinity, Total Coliform, Fecal <sup>b</sup> Coliform, Total <sup>b</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl solved rbon	4.2 J 112 43 1.0 1.0 0.26 57.1 3.3	5.0 4 4 0.11 0.10 0.20 10 1.0	4.0 c 0.11 0.10 0.15 4.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11

## JC73277-6F BZ-4S

No hits reported in this sample.

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Job Number:	JC73277
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	09/06/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC73277-7	BZ-5S					
Alkalinity, Total as CaCO3 <sup>a</sup> Coliform, Fecal <sup>b</sup> Coliform, Total <sup>b</sup> Nitrogen, Nitrate <sup>d</sup> Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Solids, Total Dissolved Solids, Total Suspended Total Organic Carbon		13.2 168 96 1.4 1.4 0.19 J 83.8 2.5 J 2.4	$5.0 \\ 4 \\ 4 \\ 0.11 \\ 0.10 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	4.0 c 0.11 0.10 0.15 4.0 2.0 1.0	mg/l col/100ml col/100ml mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC73277-7F	BZ-5S	0.078	0.050	0.050	mg/l	EDA 265 2
JC73277-8	BZ-6S	0.078	0.050	0.050	iiig/ i	EFA 303.3
Alkalinity, Total Coliform, Total <sup>b</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total K Solids, Total Diss Solids, Total Susj Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl solved pended rbon	11.6 4 0.19 0.20 0.0051 J 0.22 53.0 1.8 J 2.8	$5.0 \\ 4 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0 $	4.0 c 0.11 0.10 0.0050 0.15 4.0 2.0 1.0	mg/l col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC73277-8F	BZ-6S					
No hits reported i	n this sample.					
JC73277-9	BZ-6M					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total K Solids, Total Diss Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Gjeldahl solved rbon	11.6 0.78 0.78 0.17 J 63.3 3.5	5.0 0.11 0.10 0.20 10 1.0	4.0 0.11 0.10 0.15 4.0 1.0	mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11

No hits reported in this sample.

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SGS

JC73277

Job Number:	JC73277
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	09/06/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC73277-10	BZ-6D					
Alkalinity, Total Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total F Solids, Total Dis Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> d + Nitrite Kjeldahl solved pended irbon	17.4 0.73 0.74 0.0085 J 0.19 J 86.7 2.2 J 4.0	5.0 0.11 0.10 0.010 0.20 10 4.0 1.0	$\begin{array}{c} 4.0\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 2.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11
JC73277-10F	BZ-6D					
No hits reported	in this sample.					
JC73277-11	BZ-7S					
Alkalinity, Total Coliform, Fecal <sup>1</sup> Coliform, Total <sup>1</sup> Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Nitrite Nitrogen, Total F Solids, Total Dis: Total Organic Ca JC73277-11F No hits reported T	as CaCO3 <sup>a</sup> d + Nitrite Geldahl solved urbon <b>BZ-7S</b> in this sample. <b>BZ-7M</b>	11.6 4 4 0.48 0.49 0.0062 J 0.18 J 64.0 2.6	5.0 4 4 0.11 0.10 0.010 0.20 10 1.0	4.0 c 0.11 0.10 0.0050 0.15 4.0 1.0	mg/l col/100ml mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM9222 D-06 SM9222 B-06 EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM5310 B-11
Alkalinity, Total Nitrogen, Ammo Nitrogen, Nitrate Nitrogen, Nitrate Nitrogen, Total F Solids, Total Dis Solids, Total Sus Total Organic Ca	as CaCO3 <sup>a</sup> nia d + Nitrite Kjeldahl solved pended irbon	14.8 0.14 J 0.82 0.83 0.0054 J 0.28 70.0 49.3 2.9	$5.0 \\ 0.20 \\ 0.11 \\ 0.10 \\ 0.010 \\ 0.20 \\ 10 \\ 4.0 \\ 1.0$	$\begin{array}{c} 4.0\\ 0.20\\ 0.11\\ 0.10\\ 0.0050\\ 0.15\\ 4.0\\ 2.0\\ 1.0 \end{array}$	mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l	SM2320 B-11 SM4500NH3 H-11LACHAT EPA353.2/SM4500NO2B EPA 353.2/LACHAT SM4500NO2 B-11 EPA 351.2/LACHAT SM2540 C-11 SM2540 D-11 SM5310 B-11





Job Number:	JC73277
Account:	USACE-Philadelphia District
Project:	Philadelphia District, Reservoir Sampling
Collected:	09/06/18

Lab Sample ID Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC73277-12F	BZ-7M					

No hits reported in this sample.

#### JC73277-13 BZ-7D

Alkalinity, Total as CaCO3 <sup>a</sup>	13.2	5.0	4.0	mg/l	SM2320 B-11
Nitrogen, Ammonia	0.11 J	0.20	0.20	mg/l	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.86	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.86	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0043 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.23	0.20	0.15	mg/l	EPA 351.2/LACHAT
Solids, Total Dissolved	66.3	10	4.0	mg/l	SM2540 C-11
Solids, Total Suspended	45.8	4.0	2.0	mg/l	SM2540 D-11
Total Organic Carbon	2.9	1.0	1.0	mg/l	SM5310 B-11

#### JC73277-13F BZ-7D

No hits reported in this sample.

- (a) Sample was titrated to a final pH of 4.2.
- (b) Analysis done out of holding time.
- (c) Value reported is laboratory DL (MDL).
- (d) Calculated as: (Nitrogen, Nitrate + Nitrite) (Nitrogen, Nitrite)
- (e) Reported sample aliquot obtained from filtration of 800 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.







Dayton, NJ

Section 4

Sample Results

Report of Analysis



4



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BZ-1S		
JC73277-1	Date Sampled:	09/06/18
AQ - Surface Water	Date Received:	09/06/18
	Percent Solids:	n/a
Philadelphia District, Reservoir Sampling		
	BZ-1S JC73277-1 AQ - Surface Water Philadelphia District, Reservoir Sampling	BZ-1S JC73277-1 Date Sampled: AQ - Surface Water Date Received: Philadelphia District, Reservoir Sampling

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.8	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:25	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	96	4			col/100ml	4	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	104	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:47	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.81	0.11	0.11	0.093	mg/l	1	09/17/18 15:59	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.81	0.10	0.10	0.090	mg/l	1	09/17/18 15:59	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.23	0.20	0.15	0.12	mg/l	1	09/18/18 10:10	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
Solids, Total Dissolved	95.0	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	1.6 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	4.0	1.0	1.0	0.72	mg/l	1	09/20/18 02:14	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-1S									
Lab Sample ID:	JC73277-1	lF				Date S	ampled:	09/06/18		
Matrix:	AQ - Surface H2O Filtered					<b>Date Received:</b> 09/06/18				
						Percer	nt Solids:	n/a		
Project:	Philadelph	ia District, 1	Reservoir Sa	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3



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 Client Sample ID:
 BZ-2S

 Lab Sample ID:
 JC73277-2

 Date Sampled:
 09/06/18

 Matrix:
 AQ - Surface Water

 Project:
 Philadelphia District, Reservoir Sampling

**General Chemistry** 

Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
8.4	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	ST	SM2320 B-11
3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:26	SA	SM5210 B-11
29	4			col/100ml	10	09/06/18 21:18	SA	SM9222 D-06
144	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:48	BM	SM4500NH3 H-11LACHAT
0.20	0.11	0.11	0.093	mg/l	1	09/17/18 16:00	RP	EPA353.2/SM4500NO2B
0.20	0.10	0.10	0.090	mg/l	1	09/17/18 16:00	RP	EPA 353.2/LACHAT
0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
0.15 U	0.20	0.15	0.12	mg/l	1	09/18/18 10:10	RP	EPA 351.2/LACHAT
0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
48.8	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
2.0 U	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
1.8	1.0	1.0	0.72	mg/l	1	09/20/18 02:47	CD	SM5310 B-11
	Result 8.4 3.4 U 29 144 0.20 U 0.20 U 0.20 0.0050 U 0.15 U 0.050 U 48.8 2.0 U 1.8	ResultLOQ8.45.03.4 U3.429414440.20 U0.200.200.110.20 U0.100.0050 U0.0100.15 U0.200.050 U0.05048.8102.0 U4.01.81.0	LOQ         LOD           8.4         5.0         4.0           3.4 U         3.4         3.4 <sup>b</sup> 29         4         4           144         4         1           0.20 U         0.20         0.20           0.20         0.11         0.11           0.20         0.10         0.10           0.20         0.10         0.050           0.15 U         0.20         0.15           0.050 U         0.050         0.050           48.8         10         4.0           2.0 U         4.0         2.0	LOQ         LOD         DL           8.4         5.0         4.0         3.6           3.4 U         3.4         3.4 <sup>b</sup> 3.4           29         4         3.4           144         4         1.000         0.089           0.20 U         0.20         0.20         0.089           0.20         0.11         0.11         0.093           0.20         0.10         0.10         0.090           0.0050 U         0.010         0.0050         0.0030           0.15 U         0.20         0.15         0.12           0.050 U         0.050         0.050         0.027           48.8         10         4.0         1.8           2.0 U         4.0         2.0         1.5           1.8         1.0         1.0         0.72	Result         LOQ         LOD         DL         Units           8.4         5.0         4.0         3.6         mg/1           3.4 U         3.4         3.4 b         3.4         mg/1           29         4         col/100ml           144         4         col/100ml           0.20 U         0.20         0.20         0.089         mg/1           0.20 U         0.10         0.11         0.093         mg/1           0.20         0.10         0.0050         mg/1         mg/1           0.20         0.10         0.10         0.093         mg/1           0.20         0.10         0.0050         mg/1         mg/1           0.050 U         0.010         0.050         0.0030         mg/1           0.15 U         0.20         0.15         0.12         mg/1           0.050 U         0.050         0.050         0.027         mg/1           48.8         10         4.0         1.8         mg/1           2.0 U         4.0         2.0         1.5         mg/1	Result         LOQ         LOD         DL         Units         DF           8.4         5.0         4.0         3.6         mg/1         1           3.4 U         3.4         3.4 <sup>b</sup> 3.4         mg/1         1           29         4         col/100m         10           144         4         col/100m         4           0.20 U         0.20         0.20         0.089         mg/1         1           0.20 U         0.11         0.13         0.093         mg/1         1           0.20 U         0.10         0.10         0.093         mg/1         1           0.20 U         0.10         0.010         0.093         mg/1         1           0.20 U         0.10         0.050         0.030         mg/1         1           0.050 U         0.050         0.050         0.027         mg/1         1           0.48         10         4.0         1.8         mg/1         1           48.8         10         4.0         1.5         mg/1         1           1.8         1.0         1.0         0.72         mg/1         1	Result         LOQ         LOD         DL         Units         DF         Analyzed           8.4         5.0         4.0         3.6         mg/1         1         09/17/18 16:16           3.4 U         3.4         3.4 b         3.4         mg/1         1         09/06/18 22:26           29         4         -         col/100ml         10         09/06/18 22:26           29         4         -         col/100ml         10         09/06/18 22:26           29         4         -         col/100ml         10         09/06/18 21:12           0.20         0.20         0.089         mg/1         09/12/18 10:48           0.20         0.10         0.093         mg/1         09/17/18 16:00           0.20         0.10         0.090         mg/1         09/17/18 16:00           0.20         0.10         0.090         mg/1         09/17/18 16:00           0.20         0.10         0.090         mg/1         09/07/18 14:30           0.15 U         0.20         0.15         0.12         mg/1         09/18/18 10:10           0.505 U         0.050         0.050         0.027         mg/1         1         09/10/18 15:30 <td>Result         LOQ         LOD         DL         Units         DF         Analyzed         By           8.4         5.0         4.0         3.6         mg/1         1         09/17/18 16:16         ST           3.4 U         3.4         3.4 b         3.4         mg/1         1         09/06/18 22:26         SA           29         4         -         col/100m         10         09/06/18 21:16         SA           144         4         -         col/100m         4         09/06/18 21:12         SA           0.20 U         0.20         0.20         0.089         mg/1         1         09/17/18 16:00         RP           0.20 U         0.10         0.10         0.093         mg/1         1         09/17/18 16:00         RP           0.20 0.11         0.110         0.090         mg/1         1         09/17/18 16:00         RP           0.20 0.100         0.0100         0.0030         mg/1         1         09/17/18 16:00         RP           0.15 U         0.20         0.15         0.12         mg/1         1         09/17/18 16:00         RP           0.505 U         0.050         0.050         0.027         mg/1</td>	Result         LOQ         LOD         DL         Units         DF         Analyzed         By           8.4         5.0         4.0         3.6         mg/1         1         09/17/18 16:16         ST           3.4 U         3.4         3.4 b         3.4         mg/1         1         09/06/18 22:26         SA           29         4         -         col/100m         10         09/06/18 21:16         SA           144         4         -         col/100m         4         09/06/18 21:12         SA           0.20 U         0.20         0.20         0.089         mg/1         1         09/17/18 16:00         RP           0.20 U         0.10         0.10         0.093         mg/1         1         09/17/18 16:00         RP           0.20 0.11         0.110         0.090         mg/1         1         09/17/18 16:00         RP           0.20 0.100         0.0100         0.0030         mg/1         1         09/17/18 16:00         RP           0.15 U         0.20         0.15         0.12         mg/1         1         09/17/18 16:00         RP           0.505 U         0.050         0.050         0.027         mg/1

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



JC73277

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Client Sample ID:	BZ-2S									
Lab Sample ID:	JC73277-2	JC73277-2F				Date S	09/06/18			
Matrix:	AQ - Surf	ace H2O Fil	tered			<b>Date Received:</b> 09/06/18				
						Percent Solids: n/a				
Project:	Philadelph	nia District,	Reservoir S	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3

SGS

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Client Sample ID:	BZ-3S		
Lab Sample ID:	JC73277-3	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	10.6	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:28	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0	0			col/100ml	1	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	8	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:50	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.21	0.11	0.11	0.093	mg/l	1	09/17/18 16:01	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.21	0.10	0.10	0.090	mg/l	1	09/17/18 16:01	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.24	0.20	0.15	0.12	mg/l	1	09/18/18 10:11	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
Solids, Total Dissolved	46.7	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	1.8 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	2.9	1.0	1.0	0.72	mg/l	1	09/20/18 02:58	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-3S									
Lab Sample ID:	JC73277-3F				<b>Date Sampled:</b> 09/06/18					
Matrix:	AQ - Surface	H2O Filtered			<b>Date Received:</b> 09/06/18			09/06/18		
						Percent Solids:		n/a		
Project:	Philadelphia I	District, Reser	npling							
General Chemistry										_
Analyte	Re	sult I	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.0	50 U 0	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3



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 Client Sample ID:
 BZ-3M

 Lab Sample ID:
 JC73277-4

 Matrix:
 AQ - Surface Water

 Date Received:
 09/06/18

 Project:
 Philadelphia District, Reservoir Sampling

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	12.7	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:30	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:51	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>C</sup>	0.74	0.11	0.11	0.093	mg/l	1	09/17/18 16:02	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.74	0.10	0.10	0.090	mg/l	1	09/17/18 16:02	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.18 J	0.20	0.15	0.12	mg/l	1	09/18/18 10:12	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
Solids, Total Dissolved	60.0	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	1.6 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	3.5	1.0	1.0	0.72	mg/l	1	09/20/18 03:10	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.7



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Client Sample ID:	BZ-3M									
Lab Sample ID:	JC73277-4F				<b>Date Sampled:</b> 09/06/18			09/06/18		
Matrix:	AQ - Surface	H2O Filtere	d		<b>Date Received:</b> 09/06/18			09/06/18		
						Percent Solids:		n/a		
Project:	Philadelphia	District, Res	mpling							
General Chemistry										_
Analyte	Re	esult	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.0	050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3



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Client Sample ID:	BZ-3D		
Lab Sample ID:	JC73277-5	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity Total as CaCO3 a	12.7	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	SТ	SM2320 B-11
BOD 5 Day	34U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:32	SA	SM5210 B-11
Nitrogen, Ammonia	0.11 J	0.20	0.20	0.089	mg/l	1	09/12/18 10:56	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.66	0.11	0.11	0.093	mg/l	1	09/17/18 16:03	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.67	0.10	0.10	0.090	mg/l	1	09/17/18 16:03	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0091 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.30	0.20	0.15	0.12	mg/l	1	09/18/18 10:13	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
Solids, Total Dissolved	77.1	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended d	4.1	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	4.7	1.0	1.0	0.72	mg/l	1	09/20/18 03:21	CD	SM5310 B-11

(a) Sample was titrated to a final pH  $\,$  of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

(d) Reported sample aliquot obtained from filtration of 800 mL of sample. Volume was reduced from 1 liter due to nature of sample matrix.

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Client Sample ID:	BZ-3D								
Lab Sample ID:	JC73277-5F				Date S	09/06/18			
Matrix:	AQ - Surface H2O H	AQ - Surface H2O Filtered				<b>Date Received:</b> 09/06/18			
				Perce	nt Solids:	n/a			
Project:	Philadelphia District	, Reservoir S	ampling						
General Chemistry	,								
Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3


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Client Sample ID:	BZ-4S		
Lab Sample ID:	JC73277-6	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	4.2 J	5.0	4.0	3.6	mg/l	1	09/17/18 16:16	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:33	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	112	4			col/100ml	4	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	43	4			col/100ml	10	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:57	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	1.0	0.11	0.11	0.093	mg/l	1	09/17/18 16:07	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.0	0.10	0.10	0.090	mg/l	1	09/17/18 16:07	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:30	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.26	0.20	0.15	0.12	mg/l	1	09/18/18 10:14	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:08	MP	EPA 365.3
Solids, Total Dissolved	57.1	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	3.3	1.0	1.0	0.72	mg/l	1	09/20/18 03:54	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-4S									
Lab Sample ID:	JC73277-6	F				Date Sa	ampled:	09/06/18		
Matrix:	AQ - Surfa	ice H2O Filte	red			Date R	eceived:	09/06/18		
						Percent	t Solids:	n/a		
Project:	Philadelphi	ia District, Ro	eservoir Sa	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:35	LS	EPA 365.3

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Client Sample ID:	BZ-5S		
Lab Sample ID:	JC73277-7	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	13.2	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:35	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	168	4			col/100ml	4	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	96	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 10:58	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate d	1.4	0.11	0.11	0.093	mg/l	1	09/17/18 16:08	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	1.4	0.10	0.10	0.090	mg/l	1	09/17/18 16:08	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	0.12	mg/l	1	09/18/18 10:16	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	83.8	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	2.5 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	2.4	1.0	1.0	0.72	mg/l	1	09/20/18 04:05	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



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Client Sample ID:	BZ-5S									
Lab Sample ID:	JC73277-7	Έ				Date S	Sampled:	09/06/18		
Matrix:	AQ - Surfa	ace H2O Fi	ltered			Date 1	Received:	09/06/18		
						Perce	nt Solids:	n/a		
Project:	Philadelph	ia District,	Reservoir	Sampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.078	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



JC73277

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Client Sample ID:	BZ-6S		
Lab Sample ID:	JC73277-8	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	11.6	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:37	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	0	0			col/100ml	1	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	4	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 11:00	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate d	0.19	0.11	0.11	0.093	mg/l	1	09/17/18 16:09	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.20	0.10	0.10	0.090	mg/l	1	09/17/18 16:09	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0051 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.22	0.20	0.15	0.12	mg/l	1	09/18/18 10:17	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	53.0	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	1.8 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	2.8	1.0	1.0	0.72	mg/l	1	09/20/18 04:16	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

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Client Sample ID:	BZ-6S									
Lab Sample ID:	JC73277-8	3F				Date S	Sampled:	09/06/18		
Matrix:	AQ - Surf	ace H2O Fil	tered			Date H	Received:	09/06/18		
						Percer	nt Solids:	n/a		
Project:	Philadelph	ia District, 1	Reservoir S	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



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 Client Sample ID:
 BZ-6M

 Lab Sample ID:
 JC73277-9

 Matrix:
 AQ - Surface Water

 Project:
 Philadelphia District, Reservoir Sampling

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
All-1'-' T1 C-CO2 a	11.6	5.0	4.0	2.6		1	00/17/19 16:55	ст	GM2220 D 11
Alkalinity, Total as CaCO3	11.0	5.0	4.0	3.0	mg/1	1	09/1//18 10:55	51	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:39	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 11:01	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.78	0.11	0.11	0.093	mg/l	1	09/17/18 16:10	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.78	0.10	0.10	0.090	mg/l	1	09/17/18 16:10	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.17 J	0.20	0.15	0.12	mg/l	1	09/18/18 10:18	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	63.3	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	3.5	1.0	1.0	0.72	mg/l	1	09/20/18 04:28	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.17 4



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Client Sample ID:	BZ-6M									
Lab Sample ID:	JC73277-9	ΡF				Date S	ampled:	09/06/18		
Matrix:	AQ - Surfa	ace H2O Filt	ered			Date R	eceived:	09/06/18		
						Percen	t Solids:	n/a		
Project:	Philadelph	ia District, F	Reservoir Sa	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



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Client Sample ID:	BZ-6D		
Lab Sample ID:	JC73277-10	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	17.4	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:40	SA	SM5210 B-11
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 11:13	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.73	0.11	0.11	0.093	mg/l	1	09/17/18 16:11	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.74	0.10	0.10	0.090	mg/l	1	09/17/18 16:11	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0085 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.19 J	0.20	0.15	0.12	mg/l	1	09/18/18 10:19	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	86.7	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	2.2 J	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	4.0	1.0	1.0	0.72	mg/l	1	09/20/18 04:39	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

4.19 4



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Client Sample ID:	BZ-6D									
Lab Sample ID:	JC73277-10	0F				Date S	ampled:	09/06/18		
Matrix:	AQ - Surfa	ce H2O Filt	ered			Date R	eceived:	09/06/18		
								n/a		
Project:	Philadelphi	a District, F	Reservoir Sa	mpling						
General Chemistry	7									_
Analyte	1	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	(	).050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



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Client Sample ID:	BZ-7S		
Lab Sample ID:	JC73277-11	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	11.6	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:42	SA	SM5210 B-11
Coliform, Fecal <sup>c</sup>	4	4			col/100ml	4	09/06/18 21:18	SA	SM9222 D-06
Coliform, Total <sup>c</sup>	4	4			col/100ml	4	09/06/18 21:12	SA	SM9222 B-06
Nitrogen, Ammonia	0.20 U	0.20	0.20	0.089	mg/l	1	09/12/18 11:14	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>d</sup>	0.48	0.11	0.11	0.093	mg/l	1	09/17/18 16:12	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.49	0.10	0.10	0.090	mg/l	1	09/17/18 16:12	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0062 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.18 J	0.20	0.15	0.12	mg/l	1	09/18/18 10:20	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	64.0	10	4.0	1.8	mg/l	1	09/10/18 15:30	RC	SM2540 C-11
Solids, Total Suspended	2.0 U	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	2.6	1.0	1.0	0.72	mg/l	1	09/20/18 05:12	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Analysis done out of holding time.

(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Page 1 of 1

Client Sample ID:	BZ-7S									
Lab Sample ID:	JC73277-11	F				Date Sa	ampled:	09/06/18		
Matrix:	AQ - Surfac	e H2O Filte	ered			Date R	eceived:	09/06/18		
						Percen	t Solids:	n/a		
Project:	Philadelphia	District, R	eservoir Sa	ampling						
General Chemistry	7									_
Analyte	R	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total	0	.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



Page 1 of 1

Client Sample ID:	BZ-7M		
Lab Sample ID:	JC73277-12	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	14.8	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:43	SA	SM5210 B-11
Nitrogen, Ammonia	0.14 J	0.20	0.20	0.089	mg/l	1	09/12/18 11:16	BM	SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.82	0.11	0.11	0.093	mg/l	1	09/17/18 16:13	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.83	0.10	0.10	0.090	mg/l	1	09/17/18 16:13	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0054 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.28	0.20	0.15	0.12	mg/l	1	09/18/18 10:20	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	70.0	10	4.0	1.8	mg/l	1	09/11/18 14:40	RC	SM2540 C-11
Solids, Total Suspended	49.3	4.0	2.0	1.5	mg/l	1	09/10/18 11:10	RC	SM2540 D-11
Total Organic Carbon	2.9	1.0	1.0	0.72	mg/l	1	09/20/18 06:16	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)



Page 1 of 1

Client Sample ID: Lab Sample ID: Matrix:	BZ-7M JC73277-1 AQ - Surfa	12F ace H2O Filt	ered			Date S Date F Bargar	ampled: Received:	09/06/18 09/06/18		
Project: General Chemistry	iia District, F		Percer	it Solids:	n/ a					
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3



Page 1 of 1

Client Sample ID:	BZ-7D		
Lab Sample ID:	JC73277-13	Date Sampled:	09/06/18
Matrix:	AQ - Surface Water	Date Received:	09/06/18
		Percent Solids:	n/a
Project:	Philadelphia District, Reservoir Sampling		

**General Chemistry** 

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Alkalinity, Total as CaCO3 <sup>a</sup>	13.2	5.0	4.0	3.6	mg/l	1	09/17/18 16:55	ST	SM2320 B-11
BOD, 5 Day	3.4 U	3.4	3.4 <sup>b</sup>	3.4	mg/l	1	09/06/18 22:45	SA	SM5210 B-11
Nitrogen, Ammonia	0.11 J	0.20	0.20	0.089	mg/l	1	09/12/18 11:17	BM	I SM4500NH3 H-11LACHAT
Nitrogen, Nitrate <sup>c</sup>	0.86	0.11	0.11	0.093	mg/l	1	09/17/18 16:14	RP	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.86	0.10	0.10	0.090	mg/l	1	09/17/18 16:14	RP	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0043 J	0.010	0.0050	0.0030	mg/l	1	09/07/18 14:55	LS	SM4500NO2 B-11
Nitrogen, Total Kjeldahl	0.23	0.20	0.15	0.12	mg/l	1	09/18/18 10:21	RP	EPA 351.2/LACHAT
Phosphorus, Total	0.050 U	0.050	0.050	0.027	mg/l	1	09/18/18 11:25	MP	EPA 365.3
Solids, Total Dissolved	66.3	10	4.0	1.8	mg/l	1	09/11/18 14:40	RC	SM2540 C-11
Solids, Total Suspended	45.8	4.0	2.0	1.5	mg/l	1	09/11/18 11:00	RC	SM2540 D-11
Total Organic Carbon	2.9	1.0	1.0	0.72	mg/l	1	09/20/18 06:27	CD	SM5310 B-11

(a) Sample was titrated to a final pH of 4.2.

(b) Value reported is laboratory DL (MDL).

(c) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)





Page 1 of 1

Client Sample ID:	BZ-7D									
Lab Sample ID:	JC73277-1	3F				Date Sa	ampled:	09/06/18		
Matrix:	AQ - Surfa	ace H2O Filt	ered			Date R	eceived:	09/06/18		
						Percen	t Solids:	n/a		
Project:	Philadelph	ia District, F	Reservoir Sa	ampling						
General Chemistry										_
Analyte		Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Phosphorus, Total		0.050 U	0.050	0.050	0.027	mg/l	1	09/19/18 16:55	LS	EPA 365.3







Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

• Chain of Custody



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000			2235 F	Route 130,	Dayton,	NJ 088	10				FE	D-EX T	racking	#				Bottle Orc	der Cor	itrol #			
			1EL. 732	-329-0200 www.sgs.	com/ehs	usa	3499				so	3S Quot	ie #					SGS Job	#	JC	73	27	7
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Phone # Fax #	Client Purchase	Order #	J	City			State	)	Z	lip	-	ଷ	20	E	Š	Щ							SOL - Other Solid WP - Wipe
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Grea Wacik 597-9780	Project Manager			Attention.							3	ξ	3	P	ĕ	7	.						RB- Rinse Blank TB-Trip Blank
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JC73277: Chain of Custody Page 1 of 4



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SGS	CHAIN OF CUSTODY SGS North America Inc Dayton																			
		2235 Route 130, Dayton, NJ 08810 FED-EX Tracking # TEL. 732-329-0200 FAX 732-329-3499 906 Output						Bottle Order Control #												
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	City State Company Name												SL- Sludge SED-Sediment							
Project Contact E-mail	Protect Address											OI - Oil LIQ - Other Liquid								
Joe Loeper	PD-08318-113								Zio		A	202	Ă	-0,	1					AIR - Air SOL - Other Solid
215-6510-6545											-	FB-Field Blank								
Sampler(s) Name(s) 6/0 Phone #	Project Manager											RB- Rinse Blank								
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### SGS Sample Receipt Summary

Job Number: JC73277 Client: USACE-	PHILADELPHIA DI	STRICT	Project: PHILADELPHIA DIS	STRICT, RESERVOIR SAMPL					
Date / Time Received: 9/6/2018 6:35:00 PM Delivery	y Method:	FedEx	Airbill #s:						
Cooler Temps (Raw Measured) °C: Cooler 1: (3.7); Cooler 2 Cooler Temps (Corrected) °C: Cooler 1: (3.1); Cooler 2	2: (3.4); Cooler 3: (3 2: (2.8); Cooler 3: (3	3.6); Cooler 4: (3.6 3.0); Cooler 4: (3.0	); Cooler 5: (3.8); ); Cooler 5: (3.2);						
Cooler Security     Y or N       1. Custody Seals Present:     Image: Cooler Temperature       2. Custody Seals Intact:     Image: Cooler Temperature	<u>Y</u> or N ✓ □ ✓ ✓ □	Sample Integrity 1. Sample labels p 2. Container labeli 3. Sample contain	y - Documentation present on bottles: ing complete: ter label / COC agree:	Y or N □					
1. Temp criteria achieved:     Image: Cooler temp verification:       2. Cooler temp verification:     IR Gun       3. Cooler media:     Ice (Bag)       4. No. Coolers:     5		Sample Integrit 1. Sample recvd w 2. All containers a 3. Condition of sau	ty - Condition vithin HT: accounted for: mple:	Y or N V U Intact					
Quality Control PreservationY or NN/A1. Trip Blank present / cooler:Image: Cooler - Co		Sample Integrit 1. Analysis reque 2. Bottles receive 3. Sufficient volur 4. Compositing in 5. Filtering instruct	ty - Instructions ested is clear: ed for unspecified tests me recvd for analysis: estructions clear: ctions clear:	Y     or     N/A       V     -       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·       ·     ·					
Test Strip Lot #s:       pH 1-12:       216017         Comments       -1,-3,-6 thru -8,-11: Received and processed TCF/FCF volume within hold, processed ou         -2: Received TCF/FCF volume within hold, processed ou	pH 12+:	208717	Other: (Specify)						

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Please proceed with analysis. TCF and FCF have 30 hour hold time for this project per Joseph Loeper.



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