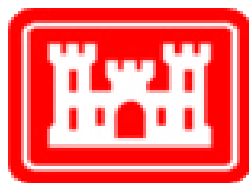


**2014 WATER QUALITY MONITORING
F.E. WALTER RESERVOIR
WHITE HAVEN, PENNSYLVANIA**



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

December 2014

**2014 Water Quality Monitoring
F.E. Walter Reservoir
White Haven, Pennsylvania**

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1.0 INTRODUCTION

1.1 DESCRIPTION OF F.E. WALTER RESERVOIR

The U.S. Army Corps of Engineers (USACE) manages F.E. Walter Reservoir located in northeastern Pennsylvania within the Delaware River Basin. F.E. Walter Reservoir is an integral part of the Lehigh River Flood Control Program. The authorized purpose of this project is flood control. The reservoir project was authorized for recreation and specifically white water recreation as part of Public Law 100-676, Section 6, dated November 17, 1988. Located about 9 miles southeast of Wilkes-Barre, PA, the reservoir dams a drainage area of 288 square miles. The dam can impound up to 35.8 billion gallons of floodwater. The primary surface water input into the reservoir is the Lehigh River as it flows west between Luzerne and Carbon Counties. Bear Creek, a secondary surface water input, enters the reservoir from the north. Tobyhanna Creek drains an area to the southeast and joins the Lehigh River near the headwaters of the reservoir. The reservoir is approximately 3 miles long and approximately 50 feet deep when not operating for flood control or recreation. In an effort to maximize recreational potential in the reservoir and on the Lehigh River downstream, specifically recreational boating and fishing, the normal operating pool of 50 feet was raised an additional 70 feet in April of 2014. The additional storage was used to augment low flows in the Lehigh River downstream as a fishery management tool and increase the number of recreational boating releases throughout the summer recreation season.

1.2 PURPOSE OF THE MONITORING PROGRAM

Foremost, F.E. Walter Reservoir provides flood control to downstream communities on the Lehigh River. Additionally, the reservoir provides important habitat for fish, waterfowl, and other wildlife, and recreational opportunities through fishing and boating both within the lake and downstream. Drinking water intakes exist at various locations on the Lehigh River downstream of the dam. Due to the broad range of uses and demands F.E. Walter Reservoir serves, the USACE monitors water quality and other aspects related to reservoir health primarily to ensure public health safety and protection of the environment. Water quality monitoring results are compared to state water quality standards and used to diagnose problems that commonly effect reservoir health such as nutrient enrichment and toxic loadings. This report summarizes the results of water quality monitoring at F.E. Walter Reservoir and its tributaries from May through September 2014.

1.3 ELEMENTS OF THE STUDY

The USACE, Philadelphia District, has been monitoring the water quality of F.E. Walter Reservoir since 1975. Over this time, yearly monitoring program designs have evolved to address new areas of concern such as human health aspects of drinking water, sediment contaminants within the reservoir basin, and a 2002 investigation of a hydrogen sulfide smell near the tail water of the dam. The 2014 monitoring program was similar to those in recent

years. The major element of the monitoring includes monthly physical and chemical water quality and bacteria monitoring from May through September to evaluate compliance with the Pennsylvania state water quality standards and to monitor the overall health of the reservoir.

2.0 METHODS

2.1 PHYSICAL STRATIFICATION MONITORING

Physical stratification monitoring of the water column of F.E. Walter Reservoir was conducted five times between May and September 2014 at all stations (Table 2-1). Physical stratification parameters included temperature, dissolved oxygen (DO), pH, ORP, Chlorophyll a, depth, turbidity, and conductivity. Monitoring was conducted at seven fixed stations located throughout the reservoir watershed (Fig. 2-1). Surface water quality was monitored at stations downstream (outfall discharge) of the reservoir (WA-1S) and tributary upstream stations on Tobyhanna Creek (WA-3S), the Lehigh River (WA-4S), and Bear Creek (WA-5S). Stratification monitoring was conducted within the reservoir at a reservoir tower station (WA-2), Bear Creek arm of the lake (WA-6), and Lehigh River arm of the lake (WA-7) with water quality measured from the water surface to the bottom at 5-ft intervals. All of the water quality monitoring was conducted with a calibrated YSI 6600 V2-4 multi-parameter water quality sonde.

In this report, water quality data recorded from stratification monitoring were compared to applicable water quality standards mandated by the Pennsylvania Department of Environmental Protection (PADEP Chapter 93). The standard for DO is a minimum concentration of 5 mg/L, and that for pH is an acceptable range from 6 to 9. All of the water quality data collected during physical stratification monitoring is summarized in Appendix A.

2.2 WATER COLUMN CHEMISTRY MONITORING

Water column chemistry monitoring was conducted five times at F.E. Walter Reservoir between May and September 2014 (Table 2-1). Water samples were collected at the seven fixed stations throughout the reservoir drainage area (Fig. 2-1). Surface water samples were collected at stations downstream of the reservoir (WA-1S) and upstream on Tobyhanna Creek (WA-3S), the Lehigh River (WA-4S), and Bear Creek (WA-5S). Surface, middle, and bottom water samples were collected at each of the reservoir-body stations WA-2, WA-6, and WA-7. Surface water samples were collected by opening the sample containers approximately 1 foot below the water's surface. Middle and bottom samples were collected with a Van Dorn design water bottle sampler. All samples were placed on ice in a cooler and shipped to a certified laboratory for testing. MJ Reider Associates in Reading, Pennsylvania conducted the laboratory water analysis for 2014.

Water samples collected from surface, middle, and bottom depths were analyzed for ammonia, nitrite, nitrate, total Kjeldahl nitrogen (TKN), total phosphorus, diss./ortho-phosphate, soluble phosphorus, total dissolved solids (TDS), total suspended solids (TSS), biochemical oxygen demand (BOD), alkalinity, total organic carbon (TOC), total inorganic carbon (TIC), and total carbon (TC). Table 2-2 summarizes the water quality parameters; laboratory method detection limits, laboratory required reporting limits, state water quality standards, and allowable maximum hold times for each.

Table 2-1. F.E. Walter Reservoir water quality schedule for 2014 monitoring							
Date of Sample Collection	(3) Physical Stratification Monitoring (All Stations)	Water Column Chemistry Monitoring (All Stations)	Trophic State Determination (WA-2)	Coliform Bacteria Monitoring (All Stations)	(4) Sediment Priority Pollutant Monitoring (WA-2)	(2) Lehigh Temperature Probes	(1) Drinking Water Monitoring
21 May	X	X	X	X	NS	NS	NS
18 June	X	X	X	X	NS	NS	NS
23 July	X	X	X	X	NS	NS	NS
12 August	X	X	X	X	NS	NS	NS
10 September	X	X	X	X	NS	NS	NS
<p>(1) Drinking water samples are sampled quarterly by personnel at each reservoir. (2) Lehigh River temperature probes continuously monitor river temperatures throughout the sampling period. They are periodically downloaded. (3) Physical stratification monitoring is conducted at all stations during routine monthly sampling. (4) Sediment Sampling was not conducted in 2014 based on historic sampling results showing low probability of sediment contamination. NS- Not Sampled</p>							

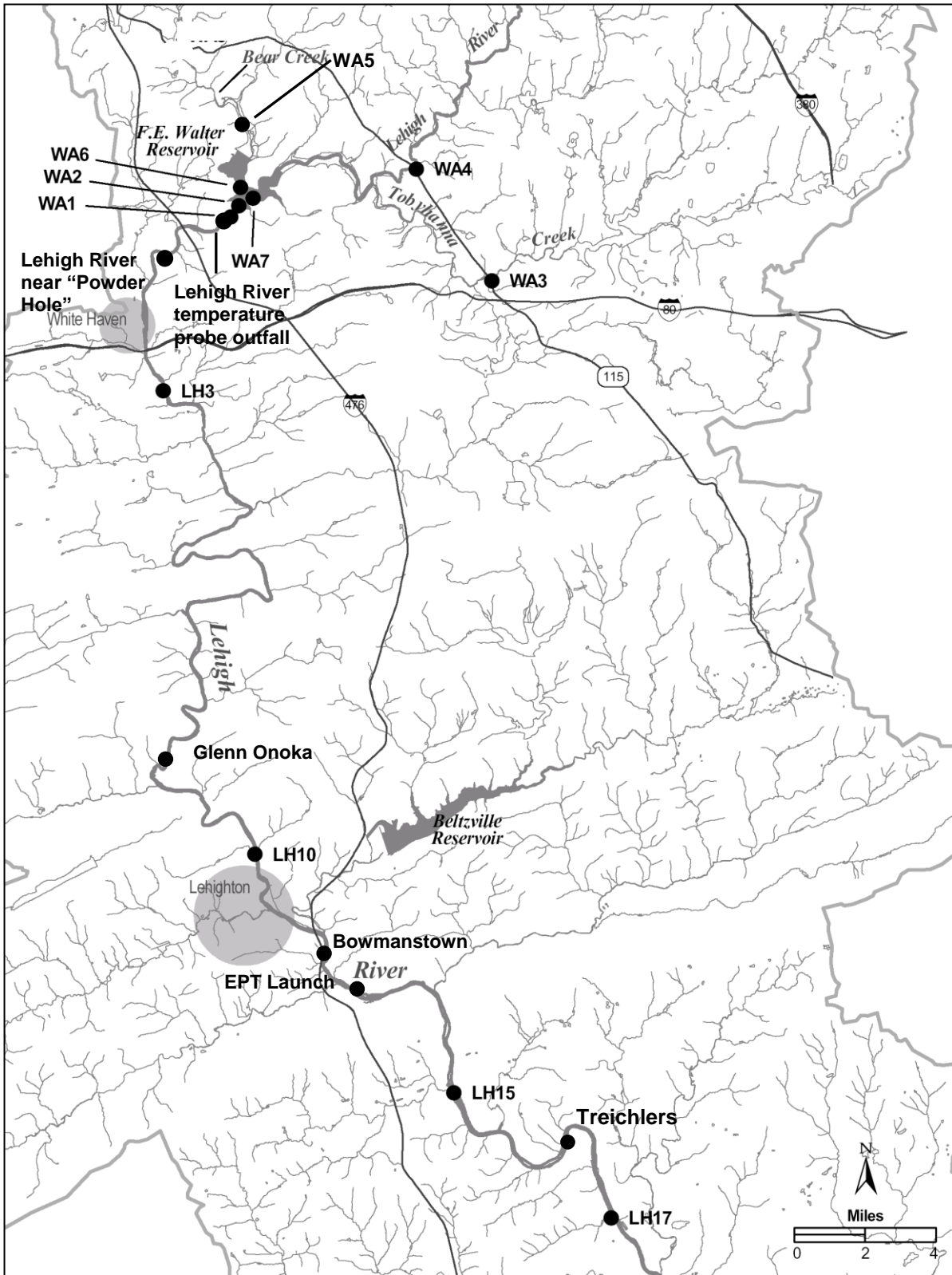


Figure 2-1. Location map for F.E. Walter Reservoir and Lehigh River temperature probe monitoring stations.

Table 2-2. Water quality test methods, detection limits, state regulatory criteria, and sample holding times for water quality parameters monitored at F.E. Walter Reservoir in 2014				
Parameter	(2) Method	Reporting Limit	PADEP Surface Water Quality Criteria	Allowable Hold Times (Days)
Total Alkalinity	SM20 2320B	1.0 mg/L	Min. 20 mg/L CaCO ₃	14
Biochemical Oxygen Demand (BOD)	SM20 5210B	2.0 mg/L	None	2
Total Phosphorus	SM20 4500P-E	0.01 mg/L	None	28
Diss./Ortho-Phosphate	SM20 4500P-E	0.05 mg/L	None	28
Soluble Phosphorus	SM-20 4500-PE	0.01 mg/L	None	28
Total Organic Carbon (TOC)	SM-20 5310C	1.0 mg/L	None	28
Total Inorganic Carbon (TIC)	SM-20 5310B	1.0 mg/L	None	28
Total Carbon (TOC + TIC)	SM-20 5310B	1.0 mg/L	None	28
(1) Chlorophyll <i>a</i>			None	
Total Kjeldahl Nitrogen	MCAWW 351.2	0.25 mg/L	None	28
Ammonia	D6919-03	0.05 mg/L	Temp. and pH dependent	28
Nitrate	MCAWW 353.2	0.05 mg/L	Maximum 10 mg/L (nitrate + nitrite)	28
Nitrite	MCAWW 353.2	0.05 mg/L		28
Total Dissolved Solids	SM20 2540C	5.0 mg/L	Maximum 750 mg/L	7
Total Suspended Solids	SM20 2540D	3.0 mg/L	None	7

(1) Chlorophyll *a* samples were recorded using a YSI 6600 V2-4 with a chlorophyll sensor.
(2) Laboratory Methods Reference:
MCAWW- "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.
SM-20- "Standard Methods for the Examination of Water and Wastewater", 22nd Edition, 2012.
SW846- "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", 3rd. Edition, November 1986 and updates.

2.3 TROPHIC STATE DETERMINATION

The trophic state of F.E. Walter Reservoir was determined by methods outlined by Carlson (1977). In general, this method calculates trophic state indices (TSIs) independently for total phosphorus and chlorophyll a concentrations, and secchi disk depth. Surface water measures of total phosphorus and chlorophyll a from chemistry monitoring were used independently in determining monthly TSI values. Secchi disk depth was measured only in surface waters in the reservoir-body. Trophic state determinations were made using criteria defined by Carlson (1977) and EPA (1983) and calculated only for Station WA-2 within the reservoir.

2.4 RESERVOIR BACTERIA MONITORING

Monitoring for coliform bacteria contaminants was conducted five times between May and September 2014 at F.E. Walter Reservoir. Surface water samples were collected in the same manner as for chemical parameter samples, and analyzed for total and fecal coliform and e-coli bacteria contamination. Table 2-3 presents the test methods, detection limits, PADEP standards, and sample holding times for the bacteria parameters monitored at F.E. Walter Reservoir in 2014. The bacteria analytical method was based on a membrane filtration technique. All of the samples were analyzed within their maximum allowable hold times. MJ Reider Associates Laboratory in Reading, Pennsylvania conducted the bacteria analysis for 2014.

Monthly coliform bacteria counts were compared to the PADEP single sample and swimming beach water quality standard for bacteria. The multiple beach sample standards is defined as a maximum geometric mean of 200 colonies/100-ml based on five samples collected on different days within a 30-day period. Application of this standard is not necessary at F.E. Walter because swimming and other human/water contact recreation is prohibited in the reservoir. However, it is used in evaluating the bacteria results.

Table 2-3. Water quality test methods, detection limits, PADEP water quality standards, and sample holding times for bacteria parameters monitored at F.E. Walter Reservoir in 2014		
Parameter	Total coliform	Fecal coliform
Test method	SM 9223B	SM9222D
Detection limit	1 clns/100-mls	2 clns/100-ml
PADEP standard	-	Geometric mean less than 200 clns/100-ml (application of this standard is conservative because swimming is not permitted in the reservoir)
Maximum allowable holding time	30 hours	30 hours
Achieved holding time	< 30 hours	< 30 hours

3.0 RESULTS AND DISCUSSION

3.1 STRATIFICATION MONITORING

The following sections describe temporal and spatial patterns for the water quality parameters of temperature, dissolved oxygen (DO) and pH measured throughout the F.E. Walter Reservoir watershed during 2014. Additionally, patterns related to season and depths are described for station WA-2 which is located near the operations tower and maintains the greatest water depths in the reservoir. Maximum depths for WA-2, during five monthly sampling days, vary between approximately 63 to 120 feet due to 2014 reservoir operations at the time of sampling. All of the stratification data collected during the 2014 monitoring period is 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 temperature stratification patterns naturally occurring in lakes affect the distribution of dissolved and suspended compounds.

Temperatures of the tributary surface waters (Stations WA-3S, -4S, and -5S) of the F.E. Walter Reservoir watershed generally followed a similar pattern throughout the monitoring period. Monthly sampling showed temperatures peaked during late July and gradually decreased through September (Fig. 3-1). Downstream release (station WA-1) surface water temperatures in August and September were typically warmer than tributary inflow temperatures. A maximum inflow temperature of 20.65 °C (WA-5S) in July and maximum outflow temperature of 21.34 °C (WA-1S) was seen in August. Temperatures in surface waters of the reservoir-body (station WA-2S, -6S, and -7S) were generally warmer than in tributaries and downstream of the dam as a result of warming from the sun. In-lake reservoir surface temperatures peaked in late July at approximately 24.99°C (Station WA-2S). In 2014, tributary and release water temperatures, at times, exceeded the Pennsylvania state water quality criteria for cold water fisheries.

The water column of F.E. Walter Reservoir was lightly temperature stratified during May, June, and July of the 2014 sampling season (Fig. 3-2). Due to operations in 2014, specifically the raising of the base pool level and recreational release operations, the temperature stratification within the reservoir was likely affected by bottom flood gate releases on various occasions during the season. The reservoir operations tower was constructed with bottom flood control gates only and does not have the flexibility to withdrawal water from other locations in the water column. As a result, lower and typically cooler bottom waters are withdrawn first, likely causing a disruption in stratification and accelerated depletion of cooler bottom waters. Overall, 2014 reservoir temperatures were slightly warmer those seen during operations in 2013. The entire reservoir body warmed from May through July and maintained a relatively stable temperature range from July through September even with shallower pool elevations as a result of volume depletion for recreational releases.

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 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 oxygen can facilitate the release of nutrients from bottom sediments.

In 2014, DO in the tributary surface waters (stations WA-3S, -4S, and -5S) of F.E. Walter Reservoir remained relatively constant from May through September sampling with recorded values ranging from 7.81 mg/L to 10.19 mg/L. These values can be attributed to typically well oxygenated stream and river systems and seasonal changes in water temperature. Station WA-1 located downstream of F.E. Walter Reservoir also maintained a similar seasonal pattern. This can be attributed, in part, to the aeration of reservoir bottom waters as it passes through the conduit system of the dam and is released downstream.

The water column of F.E. Walter Reservoir was weakly stratified with respect to DO during July through September (Fig. 3-4). In all months sampled the DO concentrations remained above state epilimnion criteria (5 mg/l). In July, the reservoir begins to show the presence of a metalimnetic dissolved oxygen minimum. As seen in some oxygen versus depth profiles of lakes or reservoirs, concentrations of dissolved oxygen may be depleted in the metalimnion of the lake profile. This depletion is termed a negative heterograde curve or metalimnetic oxygen minimum. Metalimnetic minimums of dissolved oxygen in deep mesotrophic reservoirs are often seen and have been shown to exist in the Corps Philadelphia District's Beltzville Reservoir. This water column profile formation may be a natural occurrence and/or man induced. In either case, the potential exists for negative impacts on water quality, recreational use, and aquatic species such as fish. The occurrence and severity of this DO formation will be monitored during future sampling efforts.

The health of aquatic ecosystems can be impaired by low DO concentrations in the water column. The lowest DO concentration (3.43 mg/L) was recorded at the bottom of the reservoir during the 23 July sampling event (Fig. 3-4). Hypoxia, or conditions of DO concentrations less than 2 mg/L, is generally accepted as the threshold at which the most severe effects on biota occur. F.E. Walter Reservoir did not experience hypoxic conditions during the 2014 sampling season. Low oxygen reservoir waters are re-aerated as they pass through the conduit system of the reservoir during release. As a result, water releases from the deeper portions of the reservoir containing lower DO concentration did not directly impact the Lehigh River downstream. Dissolved oxygen concentrations downstream ranged from 8.33 mg/L to 10.19 mg/L throughout the sampling season.

3.1.3 pH

PH is the measure of the hydrogen –ion concentration in the water. A pH below 7 is considered acidic and a pH above 7 is basic. The pH scale is 0-14 with the lower numbers being more acidic and the higher numbers being more 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 in tributary surface (WA-3S, -4S, and -5S) waters of F.E. Walter Reservoir generally followed a similar pattern during 2014 and remained relatively constant or within a narrow range of values (6.27-7.51) throughout the sampling season. The lowest pH level of 6.27 recorded during the sampling season occurred at station WA-5S during the May sampling and the highest pH reading of 7.51 was recorded at Station WA-5S in September. Measures of pH at the downstream station WA-1S are directly influenced by bottom water column releases from the reservoir. Readings of pH at this station ranged from a high of 6.89 in September to a low of 6.58 in May (Fig. 3-5).

In 2014, measures of pH within the lake stayed within a tight range of values (6.05-7.47) from the surface to the bottom (Fig. 3-6). Slightly higher pH values were measured near the surface and bottom waters of the lake. Many factors can influence the pH of the reservoir water such as surrounding rock, acid rain, algal productivity, deep water biological productivity and others. Measures of pH throughout the water column in all months sampled remained in compliance with PADEP water quality standards. The water quality standard for pH is a range of acceptable measures between 6 and 9.

3.2 WATER COLUMN CHEMISTRY MONITORING

Table 3-1 provides a summary of water column chemistry sampling for all stations and dates sampled at F.E. Walter Reservoir in 2014. The following sections describe the temporal, spatial, and depth related patterns for these water quality measures.

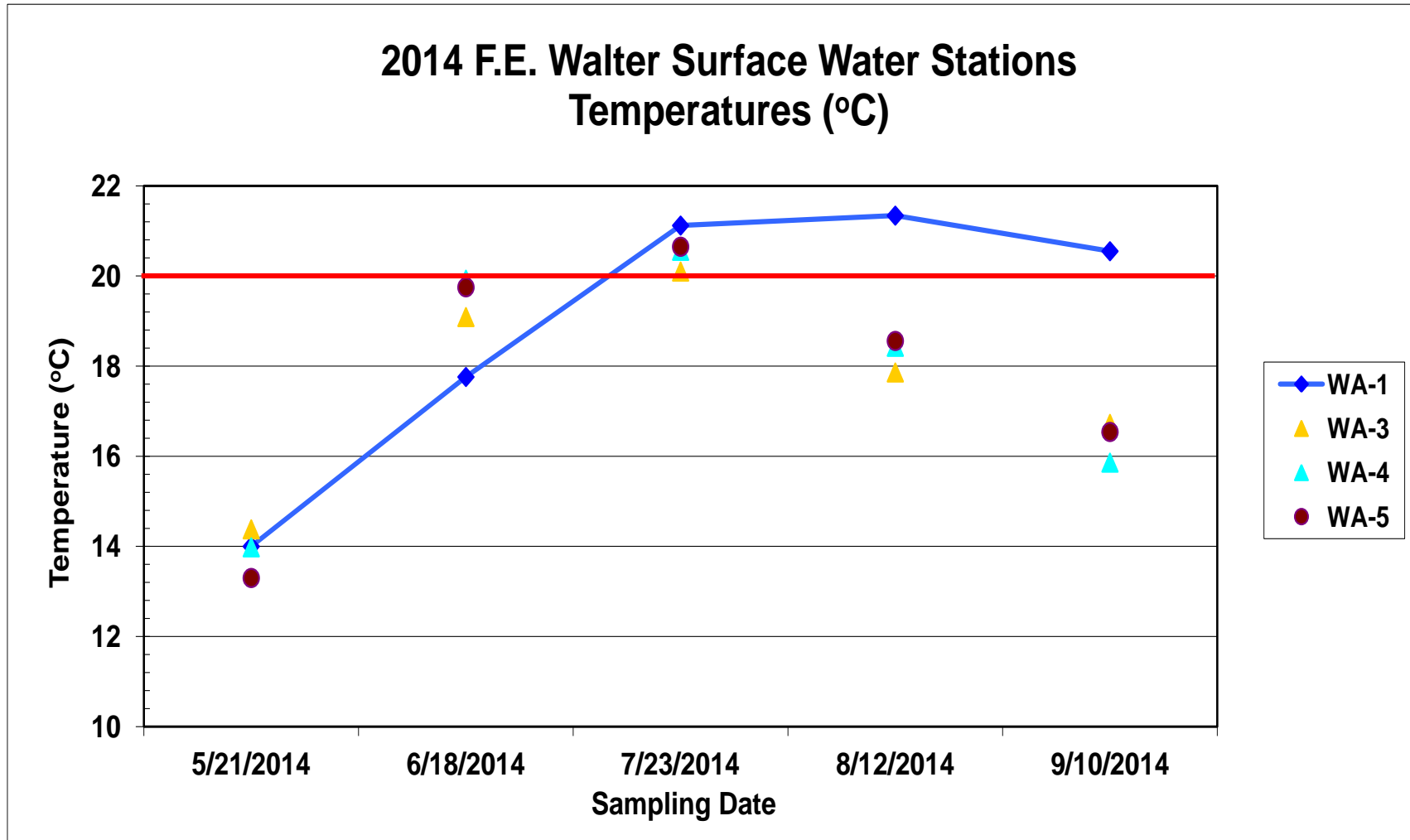


Figure 3-1. Temperature measured in tributary and release (WA-1) surface waters of F.E. Walter Reservoir during 2014. See Appendix A for a summary of the plotted values.

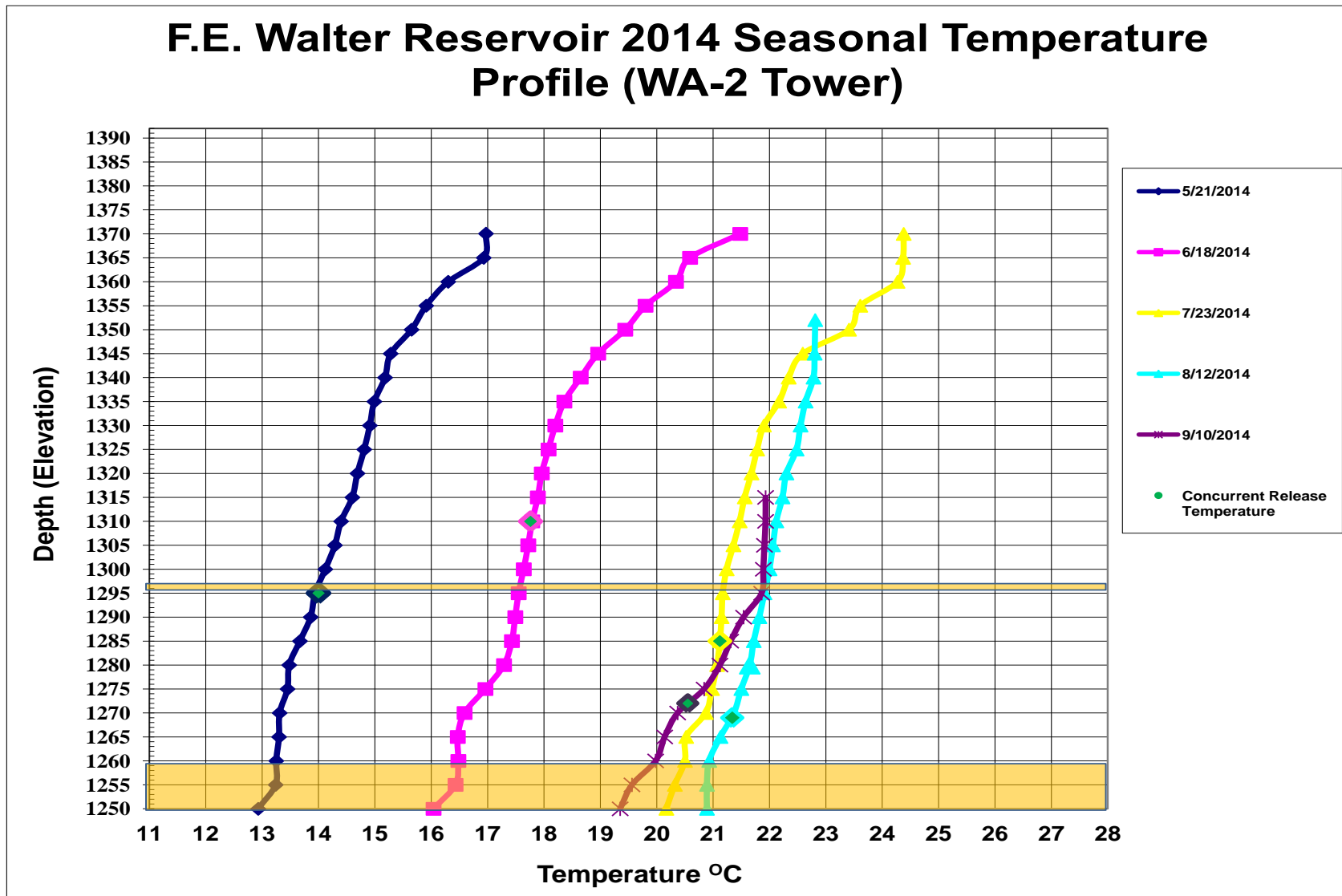


Figure 3-2. Stratification of temperature measured in the water column of F. E. Walter Reservoir at station WA-2 during 2014. See Appendix A for a summary of the plotted values.

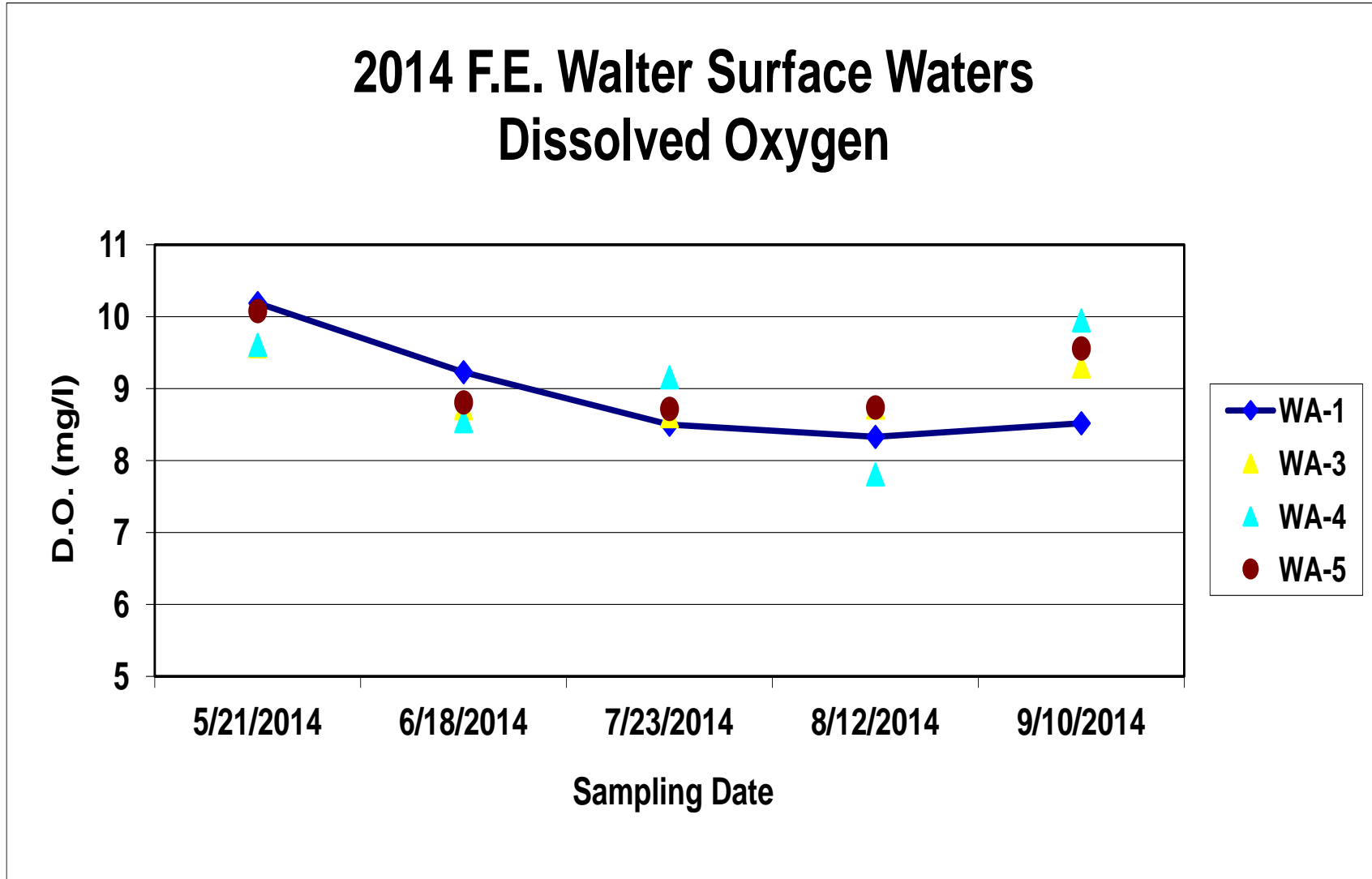


Figure 3-3. Dissolved oxygen measured in tributary and release (WA-1) surface waters of F. E. Walter Reservoir during 2014. See Appendix A for a summary of the plotted value.

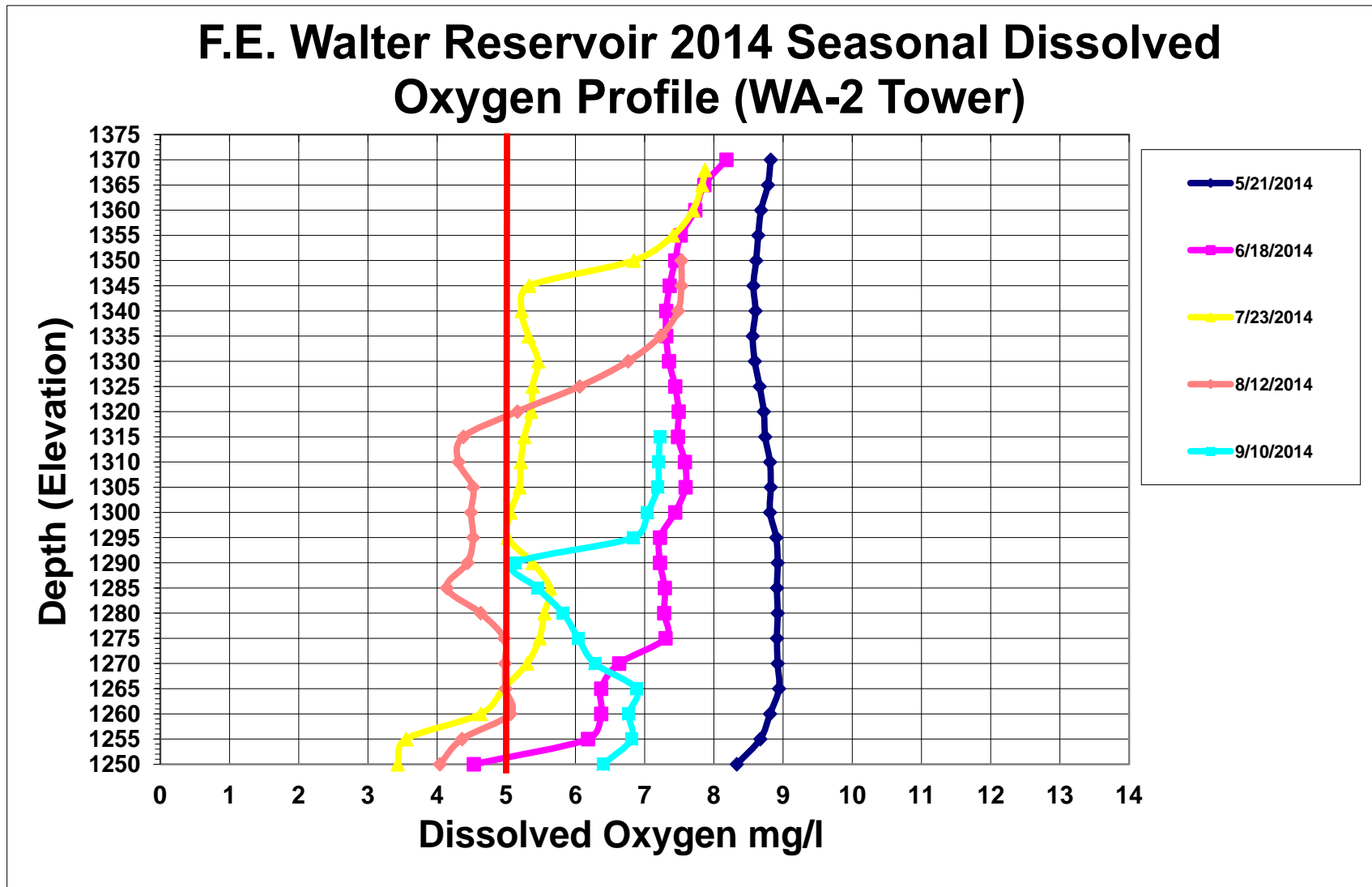


Figure 3-4. Dissolved oxygen measured in the water column of F.E. Walter Reservoir at station WA-2 during 2014. The PADEP WQ standard for DO is a epilimnion minimum concentration of 5 mg/L. See Appendix A for a summary of the plotted values.

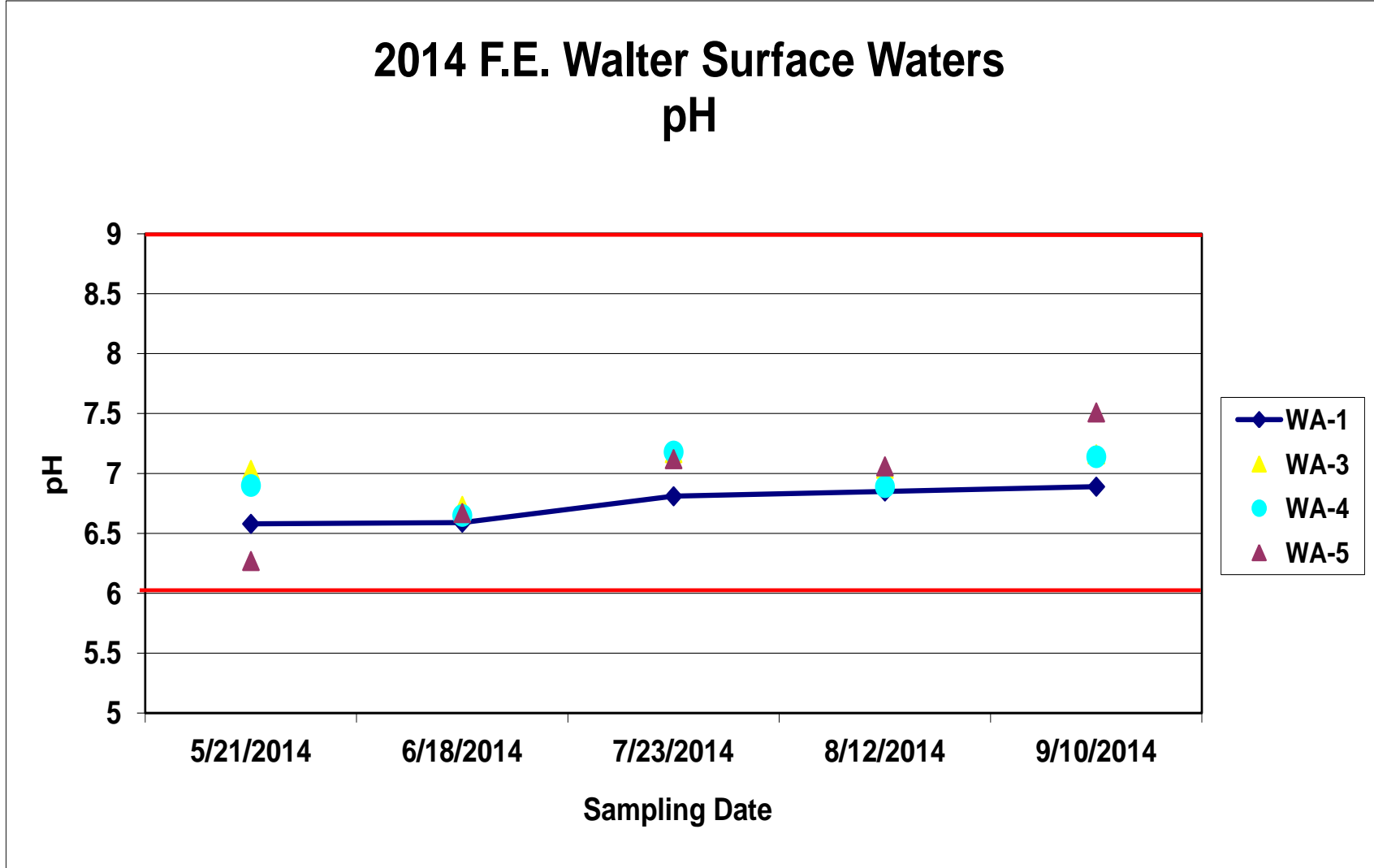


Figure 3-5. Measures of pH in tributary and release (WA-1) surface waters of F.E. Walter Reservoir during 2014. The PADEP WQ standard for pH is an acceptable range from 6 to 9. See Appendix A for a summary of the plotted values.

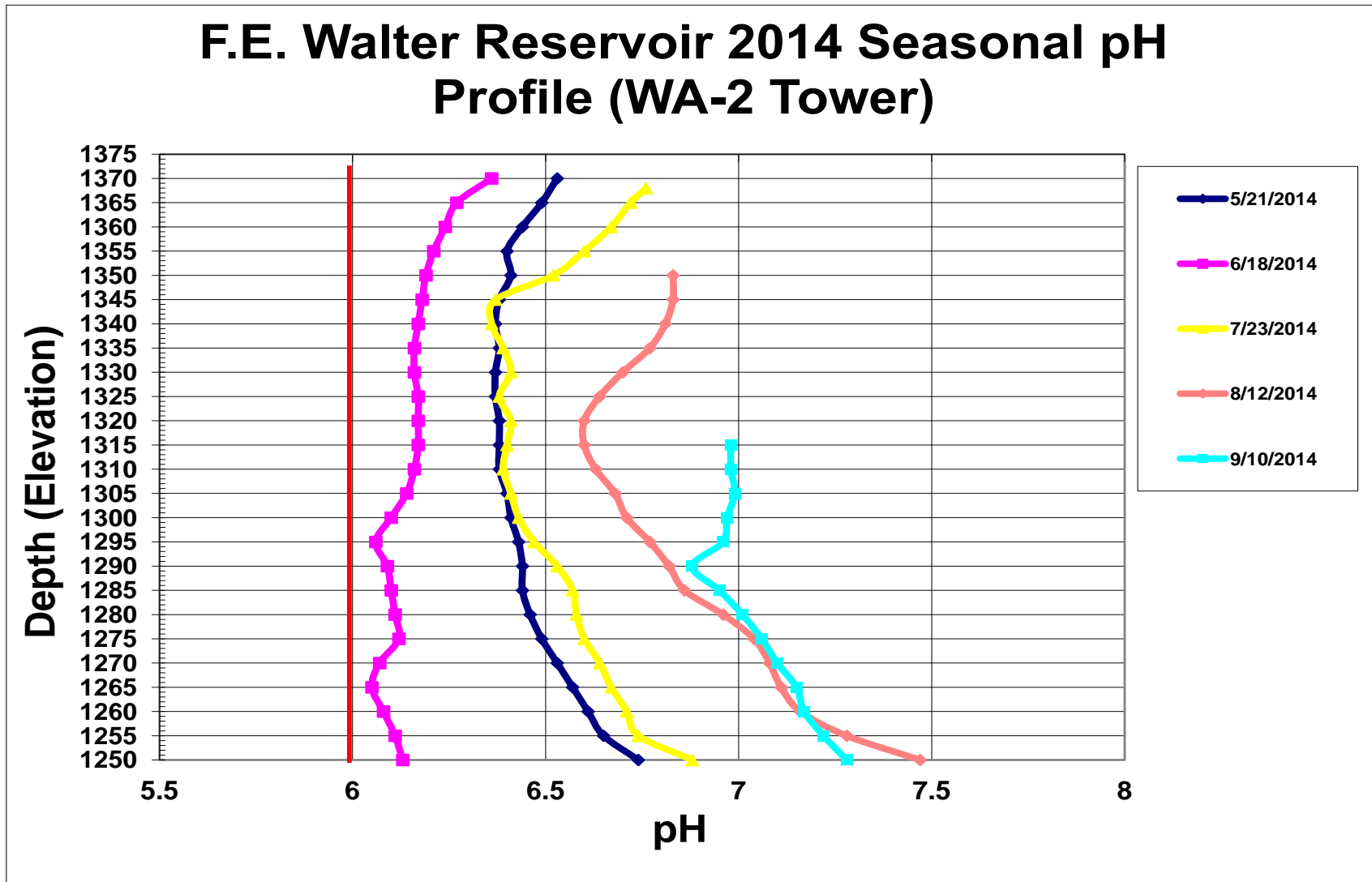


Figure 3-6. Stratification of pH measured in the water column of F.E. Walter Reservoir at station WA-2 during 2014. The PADEP water quality standard pH is an acceptable range from 6 to 9. See Appendix A for a summary of the plotted value.

Table 3-1. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014													
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
WA-01S	05/21/2014	4	<2	<0.05	<0.05	<0.05	<0.05	<0.01	64	<0.25	7.8	<0.01	<3
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.08	0.04	63	<0.25	6	0.04	3
	07/23/2014	7	<2	<0.05	<0.05	<0.05	0.11	<0.01	87	0.28	7.4	0.03	<3
	08/12/2014	7	<2	<0.05	<0.05	<0.05	0.12	<0.01	59	<0.25	4.8	0.02	16
	09/10/2014	8	<2	<0.05	<0.05	<0.05	0.11	0.04	58	0.27	4	0.04	8
	Mean	6.2	2	0.05	0.05	0.05	0.094	0.022	66.2	0.26	6	0.028	6.6
	Stdev	1.643	0	0	0	0	0.029	0.016	11.904	0.014	1.631	0.013	5.683
	Max	8	2	0.05	0.05	0.05	0.12	0.04	87	0.28	7.8	0.04	16
	Min	4	2	0.05	0.05	0.05	0.05	0.01	58	0.25	4	0.01	3
	No. of Dects	5	0	0	0	0	4	2	5	2	5	4	3
WA-02S	05/21/2014	3	<2	<0.05	<0.05	<0.05	<0.05	0.02	57	<0.25	5.5	0.02	<3
	06/18/2014	4	<2	<0.05	<0.05	<0.05	<0.05	<0.01	62	<0.25	4.8	<0.01	<3
	07/23/2014	6	<2	<0.05	<0.05	<0.05	0.08	<0.01	65	<0.25	5.5	<0.01	<3
	08/12/2014	5	<2	<0.05	<0.05	<0.05	0.08	<0.01	55	0.31	5.4	<0.01	<3
	09/10/2014	6	<2	<0.05	<0.05	<0.05	0.1	<0.01	57	0.28	4.7	<0.01	<3
	Mean	4.8	2	0.05	0.05	0.05	0.072	0.012	59.2	0.268	5.18	0.012	3
	Stdev	1.304	0	0	0	0	0.022	0.004	4.147	0.027	0.396	0.004	0
	Max	6	2	0.05	0.05	0.05	0.1	0.02	65	0.31	5.5	0.02	3
	Min	3	2	0.05	0.05	0.05	0.05	0.01	55	0.25	4.7	0.01	3
	No. of Dects	5	0	0	0	0	3	1	5	2	5	1	0

Table 3-1 continued. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014

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
WA-02M	05/21/2014	3	<2	<0.05	<0.05	<0.05	<0.05	<0.01	65	<0.25	8	<0.01	<3
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.07	<0.01	67	<0.25	6	0.01	3
	07/23/2014	7	<2	<0.05	<0.05	<0.05	0.1	<0.01	58	<0.25	6.7	<0.01	<3
	08/12/2014	5	<2	<0.05	<0.05	<0.05	0.12	0.09	63	<0.25	5.4	0.1	<3
	09/10/2014	5	<2	<0.05	<0.05	<0.05	0.09	<0.01	53	0.27	4.7	<0.01	3
	Mean	5	2	0.05	0.05	0.05	0.086	0.026	61.2	0.254	6.16	0.028	3
	Stdev	1.414	0	0	0	0	0.027	0.036	5.675	0.009	1.266	0.04	0
	Max	7	2	0.05	0.05	0.05	0.12	0.09	67	0.27	8	0.1	3
	Min	3	2	0.05	0.05	0.05	0.05	0.01	53	0.25	4.7	0.01	3
	No. of Dects	5	0	0	0	0	4	1	5	1	5	2	2
WA-02B	05/21/2014	4	<2	<0.05	<0.05	<0.05	<0.05	<0.01	64	0.58	8.9	0.05	24
	06/18/2014	5	3	<0.05	<0.05	<0.05	0.06	<0.01	58	<0.25	6.3	<0.01	<3
	07/23/2014	8	<2	<0.05	0.07	<0.05	0.1	<0.01	79	0.36	7.5	<0.01	9
	08/12/2014	7	<2	<0.05	0.07	<0.05	0.1	<0.01	59	<0.25	5	<0.01	17
	09/10/2014	8	<2	<0.05	<0.05	<0.05	0.1	<0.01	55	0.37	4	0.06	16
	Mean	6.4	2.2	0.05	0.058	0.05	0.082	0.01	63	0.362	6.34	0.028	13.8
	Stdev	1.817	0.447	0	0.011	0	0.025	0	9.513	0.135	1.948	0.025	8.044
	Max	8	3	0.05	0.07	0.05	0.1	0.01	79	0.58	8.9	0.06	24
	Min	4	2	0.05	0.05	0.05	0.05	0.01	55	0.25	4	0.01	3
	No. of Dects	5	1	0	2	0	4	0	5	3	5	2	4

Table 3-1 continued. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014													
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
WA-03S	05/21/2014	3	<2	<0.05	<0.05	<0.05	0.06	0.03	86	<0.25	10.1	0.03	<3
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.12	0.07	73	<0.25	8.1	0.07	<3
	07/23/2014	7	<2	<0.05	<0.05	<0.05	0.13	<0.01	92	0.37	7.2	0.02	<3
	08/12/2014	8	<2	<0.05	<0.05	<0.05	0.74	<0.01	83	<0.25	4.1	0.08	4
	09/10/2014	8	<2	<0.05	<0.05	<0.05	0.21	<0.01	61	<0.25	4	0.06	<3
	Mean	6.2	2	0.05	0.05	0.05	0.252	0.026	79	0.274	6.7	0.052	3.2
	Stdev	2.168	0	0	0	0	0.278	0.026	12.186	0.054	2.637	0.026	0.447
	Max	8	2	0.05	0.05	0.05	0.74	0.07	92	0.37	10.1	0.08	4
	Min	3	2	0.05	0.05	0.05	0.06	0.01	61	0.25	4	0.02	3
	No. of Dects	5	0	0	0	0	5	2	5	1	5	5	1
WA-04S	05/21/2014	5	<2	<0.05	<0.05	<0.05	<0.05	<0.01	62	<0.25	8	<0.01	<3
	06/18/2014	7	<2	<0.05	<0.05	<0.05	0.1	<0.01	66	<0.25	5.4	<0.01	18
	07/23/2014	11	<2	<0.05	<0.05	<0.05	0.12	<0.01	85	0.3	3.4	0.01	3
	08/12/2014	14	2	<0.05	<0.05	<0.05	0.21	0.02	71	<0.25	2.8	0.04	77
	09/10/2014	12	<2	<0.05	<0.05	<0.05	<0.05	<0.01	57	<0.25	2.6	<0.01	<3
	Mean	9.8	2	0.05	0.05	0.05	0.106	0.012	68.2	0.26	4.44	0.016	20.8
	Stdev	3.701	0	0	0	0	0.066	0.004	10.71	0.022	2.278	0.013	32.081
	Max	14	2	0.05	0.05	0.05	0.21	0.02	85	0.3	8	0.04	77
	Min	5	2	0.05	0.05	0.05	0.05	0.01	57	0.25	2.6	0.01	3
	No. of Dects	5	1	0	0	0	3	1	5	1	5	2	3

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
WA-05S	05/21/2014	1	<2	<0.05	<0.05	<0.05	<0.05	<0.01	25	<0.25	5.1	<0.01	<3
	06/18/2014	2	<2	<0.05	<0.05	<0.05	<0.05	<0.01	48	0.3	5	0.03	8
	07/23/2014	4	<2	<0.05	<0.05	<0.05	0.11	<0.01	73	<0.25	2.6	<0.01	<3
	08/12/2014	4	<2	<0.05	<0.05	<0.05	0.13	<0.01	74	<0.25	2.2	<0.01	<3
	09/10/2014	4	<2	<0.05	<0.05	<0.05	0.09	0.02	78	<0.25	2.2	0.02	<3
	Mean	3	2	0.05	0.05	0.05	0.086	0.012	59.6	0.26	3.42	0.016	4
	Stdev	1.414	0	0	0	0	0.036	0.004	22.678	0.022	1.497	0.009	2.236
	Max	4	2	0.05	0.05	0.05	0.13	0.02	78	0.3	5.1	0.03	8
	Min	1	2	0.05	0.05	0.05	0.05	0.01	25	0.25	2.2	0.01	3
	No. of Dects	5	0	0	0	0	3	1	5	1	5	2	1
WA-06S	05/21/2014	4	<2	<0.05	<0.05	<0.05	0.05	<0.01	66	<0.25	5.4	<0.01	<3
	06/18/2014	4	<2	<0.05	<0.05	<0.05	<0.05	<0.01	38	<0.25	4.8	0.01	<3
	07/23/2014	5	<2	<0.05	<0.05	<0.05	0.08	0.02	55	<0.25	5.2	0.02	<3
	08/12/2014	5	<2	<0.05	<0.05	<0.05	0.08	0.05	62	0.35	5.2	0.06	3
	09/10/2014	5	<2	<0.05	<0.05	<0.05	0.1	<0.01	51	<0.25	4.8	<0.01	<3
	Mean	4.6	2	0.05	0.05	0.05	0.072	0.02	54.4	0.27	5.08	0.022	3
	Stdev	0.548	0	0	0	0	0.022	0.017	10.877	0.045	0.268	0.022	0
	Max	5	2	0.05	0.05	0.05	0.1	0.05	66	0.35	5.4	0.06	3
	Min	4	2	0.05	0.05	0.05	0.05	0.01	38	0.25	4.8	0.01	3
	No. of Dects	5	0	0	0	0	4	2	5	1	5	3	1

Table 3-1 continued. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014

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
WA-06M	05/21/2014	3	<2	<0.05	<0.05	<0.05	<0.05	<0.01	45	<0.25	6.4	0.02	4
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.06	<0.01	31	<0.25	5.1	<0.01	<3
	07/23/2014	7	<2	<0.05	<0.05	<0.05	0.11	<0.01	70	<0.25	6.7	0.02	<3
	08/12/2014	6	<2	<0.05	<0.05	<0.05	0.09	0.07	59	<0.25	5.3	0.07	3
	09/10/2014	6	<2	<0.05	<0.05	<0.05	0.1	<0.01	50	<0.25	4.6	<0.01	3
	Mean	5.4	2	0.05	0.05	0.05	0.082	0.022	51	0.25	5.62	0.026	3.2
	Stdev	1.517	0	0	0	0	0.026	0.027	14.68	0	0.893	0.025	0.447
	Max	7	2	0.05	0.05	0.05	0.11	0.07	70	0.25	6.7	0.07	4
	Min	3	2	0.05	0.05	0.05	0.05	0.01	31	0.25	4.6	0.01	3
	No. of Dects	5	0	0	0	0	4	1	5	0	5	3	3
WA-06B	05/21/2014	2	<2	<0.05	<0.05	<0.05	<0.05	<0.01	40	0.32	5.8	0.13	252
	06/18/2014	6	<2	<0.05	<0.05	<0.05	0.06	0.04	47	<0.25	6.6	0.04	3
	07/23/2014	7	<2	<0.05	<0.05	<0.05	0.1	<0.01	72	<0.25	7.3	<0.01	7
	08/12/2014	5	<2	<0.05	<0.05	<0.05	0.1	<0.01	57	0.25	5.3	<0.01	<3
	09/10/2014	7	<2	<0.05	<0.05	<0.05	0.11	0.01	44	<0.25	4.1	0.01	<3
	Mean	5.4	2	0.05	0.05	0.05	0.084	0.016	52	0.264	5.82	0.04	53.6
	Stdev	2.074	0	0	0	0	0.027	0.013	12.826	0.031	1.228	0.052	110.922
	Max	7	2	0.05	0.05	0.05	0.11	0.04	72	0.32	7.3	0.13	252
	Min	2	2	0.05	0.05	0.05	0.05	0.01	40	0.25	4.1	0.01	3
	No. of Dects	5	0	0	0	0	4	2	5	2	5	3	3

Table 3-1 continued. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014

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
WA-07S	05/21/2014	4	<2	<0.05	<0.05	<0.05	<0.05	<0.01	51	<0.25	5.4	<0.01	<3
	06/18/2014	5	<2	<0.05	<0.05	<0.05	<0.05	<0.01	45	<0.25	5.3	<0.01	<3
	07/23/2014	5	<2	<0.05	<0.05	<0.05	0.08	<0.01	57	<0.25	5.7	<0.01	5
	08/12/2014	6	<2	<0.05	<0.05	<0.05	0.1	<0.01	59	<0.25	5.3	0.02	4
	09/10/2014	6	<2	<0.05	<0.05	<0.05	0.1	<0.01	50	<0.25	4.3	<0.01	<3
	Mean	5.2	2	0.05	0.05	0.05	0.076	0.01	52.4	0.25	5.2	0.012	3.6
	Stdev	0.837	0	0	0	0	0.025	0	5.639	0	0.529	0.004	0.894
	Max	6	2	0.05	0.05	0.05	0.1	0.01	59	0.25	5.7	0.02	5
	Min	4	2	0.05	0.05	0.05	0.05	0.01	45	0.25	4.3	0.01	3
	No. of Dects	5	0	0	0	0	3	0	5	0	5	1	2
WA-07M	05/21/2014	4	<2	<0.05	<0.05	<0.05	<0.05	0.01	49	0.38	8	0.04	<3
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.08	0.03	53	<0.25	5.9	0.04	<3
	07/23/2014	6	<2	<0.05	<0.05	<0.05	0.1	0.03	57	<0.25	7.6	0.03	<3
	08/12/2014	5	<2	<0.05	<0.05	<0.05	0.08	<0.01	62	<0.25	5.5	<0.01	<3
	09/10/2014	6	<2	<0.05	<0.05	<0.05	0.1	<0.01	45	0.27	4.3	0.01	3
	Mean	5.2	2	0.05	0.05	0.05	0.082	0.018	53.2	0.28	6.26	0.026	3
	Stdev	0.837	0	0	0	0	0.02	0.011	6.648	0.057	1.531	0.015	0
	Max	6	2	0.05	0.05	0.05	0.1	0.03	62	0.38	8	0.04	3
	Min	4	2	0.05	0.05	0.05	0.05	0.01	45	0.25	4.3	0.01	3
	No. of Dects	5	0	0	0	0	4	3	5	2	5	4	1

Table 3-1 continued. Summary of surface, middle, and bottom water quality monitoring data for F.E. Walter Reservoir in 2014

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
WA-07B	05/21/2014	4	<2	<0.05	<0.05	<0.05	<0.05	0.02	37	0.67	9.5	0.08	149
	06/18/2014	5	<2	<0.05	<0.05	<0.05	0.06	<0.01	32	<0.25	7.7	<0.01	6
	07/23/2014	6	<2	<0.05	<0.05	<0.05	0.1	0.02	51	0.35	7.7	0.02	6
	08/12/2014	7	<2	<0.05	<0.05	<0.05	0.1	<0.01	63	<0.25	4.5	<0.01	8
	09/10/2014	8	<2	<0.05	<0.05	<0.05	0.09	<0.01	50	0.25	3.6	<0.01	18
	Mean	6	2	0.05	0.05	0.05	0.08	0.014	46.6	0.354	6.6	0.026	37.4
	Stdev	1.581	0	0	0	0	0.023	0.005	12.3	0.182	2.462	0.03	62.584
	Max	8	2	0.05	0.05	0.05	0.1	0.02	63	0.67	9.5	0.08	149
	Min	4	2	0.05	0.05	0.05	0.05	0.01	32	0.25	3.6	0.01	6
	No. of Dects	5	0	0	0	0	4	2	5	3	5	2	5

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 is an essential plant nutrient, it contributes to the trophic status of a water body. 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.

Ammonia in the water column of F.E. Walter Reservoir was consistently low throughout the monitoring period with only two samples of sixty five measuring greater than the laboratory reporting limit (<0.05 mg/L). Two measures of 0.07 mg/L of ammonia were collected at station WA-2B on 23 July and 12 August (Table 3-1). F.E. Walter Reservoir was in compliance with the PADEP water quality standard for ammonia during 2014. The water quality standard of ammonia is dependent on temperature and pH (Table 3-2). Throughout the monitoring period, all measures of ammonia were less than their respective criteria values.

PH	0 °C	5 °C	10 °C	15 °C	20 °C	25 °C	30 °C
6.50	25.5	25.5	25.5	17.4	12.0	8.4	5.9
6.75	23.6	23.6	23.6	16.0	11.1	7.7	5.5
7.00	20.6	20.6	20.6	14.0	9.7	6.8	4.8
7.25	16.7	16.7	16.7	11.4	7.8	5.5	3.9
7.50	12.4	12.4	12.4	8.5	5.9	4.1	2.9
7.75	8.5	8.5	8.5	5.8	4.0	2.8	2.0
8.00	5.5	5.5	5.5	5.8	4.0	2.8	2.0
8.25	3.4	3.4	3.4	2.3	1.6	1.2	0.9
8.50	2.0	2.0	2.0	1.4	1.0	0.7	0.6
8.75	1.2	1.2	1.2	0.9	0.6	0.5	0.4
9.00	0.8	0.8	0.8	0.5	0.4	0.3	0.3

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. Concentrations of nitrite at F.E. Walter Reservoir were consistently low during 2014. Concentrations of nitrite measured at all stations and depths were less than the reporting limit of 0.05 mg/L (Table 3-1).

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 also consistently low at F.E. Walter Reservoir during 2014. For all stations and depths, sample results ranged from less than

the reporting limit of 0.05 mg/L to a high of 0.74 mg/L in the surface waters at station WA-3S on 12 August.

In 2014, F.E. Walter Reservoir was in compliance with the PADEP water quality standard for nitrogen. The water quality standard for nitrogen is a summed concentration of nitrite and nitrate of less than 10-mg/L. Throughout the monitoring period, the summed concentrations for each station were well below this standard. The maximum summed concentration for any one sampling station did not exceed 0.79 mg/L.

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 an inorganic form occurs. TKN in the water column of F.E. Walter Reservoir was low during 2014 (Table 3-1). Concentrations measured at all reservoir stations ranged from less than the reporting limit of 0.25 mg/L to a high of .67 mg/L at station WA-7B on 21 May. Higher concentrations were observed in the bottom waters at all lake sampling stations.

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. Concentrations of total phosphorus were occasionally elevated at many of the reservoir sampling stations throughout the sampling season (Table 3-1). For all stations and depths, concentrations ranged from less than the reporting limit of 0.01 mg/L to a high of 0.08 mg/L. Surface waters of the reservoir tributaries and the Lehigh River outflow routinely had the higher concentrations. The maximum single sample concentration of 0.08 mg/L was measured on 12 August at station WA-03S and in the bottom waters at station WA-07B on 21 May. The highest seasonal mean concentrations of total phosphorus were seen at the deeper waters of the reservoir tower station WA-02B and WA-02M and at Station WA-01S downstream of the reservoir. Higher concentrations in lake bottom waters are attributed to phosphorus sediment release under low oxygen conditions. F.E. Walter Reservoir experienced these conditions in 2014.

3.2.5 Dissolved Phosphorus

Dissolved or soluble phosphorus (DISS P) in the water column of F.E. Walter Reservoir remained consistently low during 2014. Concentrations at all stations and depths during the sampling season were below the reporting limit of 0.05 mg/L (Table 3-1). In freshwater environments, dissolved phosphorus is usually a limiting nutrient and is utilized by freshwater plants and algae during photosynthesis.

3.2.6 Dissolved Phosphate

Dissolved Phosphate or 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 2014, concentrations of dissolved phosphate were near or below the reporting limit of 0.01 mg/L at all stations and depths (Table 3-1). The single highest measure of 0.09 mg/L was recorded in the middle of the water column at station WA-2M on 12 August.

3.2.7 Total Dissolved Solids

Total Dissolved Solids (TDS) is a measure of the amount of filterable dissolved material in the water. Dissolved salts such as sulfate, magnesium, chloride, and sodium contribute to elevated levels. TDS in the lake and tributary stations of F.E. Walter Reservoir remained relatively constant and low during 2014. Concentrations at all stations and depths over the monitoring period ranged from 25 to 92 mg/L (Table 3-1). The highest mean seasonal concentration of 79 mg/L was seen at the upstream surface tributary station WA-03S. F.E. Walter Reservoir and its tributaries were in compliance with the PADEP water quality standard for total dissolved solids during 2014. The water quality standard is a maximum concentration of 500-mg/L.

3.2.8 Total Suspended Solids

Total Suspended Solids (TSS) is a measure of the amount of non-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). TSS measures in the water column of F.E. Walter Reservoir were low in 2014 with most sample results less than the reporting limit of 3.0 mg/L up to 252 mg/L (Table 3-1). Elevated results were most seen in the lake bottom water samples. This is likely a result of sampling error and resulting interference of suspended sediment in the sampling apparatus during lake bottom water sample collection. On occasion, bottom sediments are re-suspended during the process of collecting a sample from deeper waters. These elevated results do not accurately reflect conditions at those stations and depths.

3.2.9 Biochemical Oxygen Demand

Five-day biochemical oxygen demand (BOD) 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.

Measurements of 5-day Biochemical oxygen demand (BOD) for all but one sample (3.0 mg/L) at F.E. Walter Reservoir and its tributary stations in 2014 were below the reporting limit of 2.0 mg/L. It is therefore inferred that F.E. Walter 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_3 except where natural conditions are less.

Alkalinity measurements in the waters of F.E. Walter Reservoir were routinely low during 2014. Concentrations measured at all stations and depths ranged from 1.0 mg/L to 14.0 mg/L CaCO_3 throughout the monitoring period (Table 3-1). The greatest mean seasonal concentration of 9.8 mg/L CaCO_3 was measured in the surface waters at Station WA-4S. The natural alkalinity of water is largely dependent on the underlying geology and soils within the surrounding watershed. The low alkalinity measured at F.E. Walter Reservoir probably results from the regional geology, which is primarily sandstone and shale (Van Diver 1990).

3.2.11 Total Organic Carbon

Total Organic Carbon (TOC) is a measure of the dissolved and particulate organic carbon in water. The bulk of organic carbon in water is composed of humic substances and partly degraded animal and plant materials. High levels of organic carbon coincide with a lowering of dissolved oxygen concentrations. Carbon is a nutrient required for biological processes.

Total Organic Carbon (TOC) was measured in the water column and tributaries of F.E. Walter Reservoir (Table 3-1). Concentrations of TOC at all stations and depths ranged from 2.2

mg/L to 10.1 mg/L. The highest single measured concentration of 10.1 mg/L was in the surface waters at tributary station WA-03S on 21 May.

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. For the most part, chlorophyll *a* was low in the surface waters of F.E. Walter Reservoir during 2014 (Appendix A). Concentrations at all tributary and lake stations at depths from 0-15 feet ranged from 0.6 ug/L to 7.2 ug/L for the monitoring season. The highest single lake surface water (0-15 feet) concentration of 6.5 ug/L was measured at station WA-06 on 23 July.

3.3 TROPHIC STATE DETERMINATION

Carlson’s (1977) trophic state index (TSI) is a method of expressing the extent of eutrophication of a lake, quantitatively. The trophic state analysis calculates separate indices for eutrophication based on measures of total phosphorus, chlorophyll *a*, and secchi disc depth. 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 F.E. Walter Reservoir was based on a single sample each month during the sampling season. It is important to note that variability in measurements not captured between sampling events and the resulting classification can occur. Figure 3-7 graphically shows this potential variability between samples.

TSIs calculated for measures of total phosphorus classified F.E. Walter Reservoir as oligotrophic in June (37.35), July (37.35), August (37.35) and September (37.35), and mesotrophic in May (47.35). TSIs calculated for measures of secchi disk depth classified F.E. Walter Reservoir as mesotrophic in June (49.66), July (49.66) and September (47.09), oligotrophic in May (35.97), and eutrophic in August (51.14). TSIs calculated for measures of chlorophyll *a* classified F.E. Walter Reservoir as mesotrophic in May (43.62), June (43.25), July (46.83) and August (44.37), and oligotrophic in September (39.59).

Carlson (1977) warned against averaging TSI values estimated for different parameters, and instead suggested giving priority to chlorophyll *a* during the summer and to phosphorus in the spring, fall, and winter. With this in mind, and based on the pattern of TSI values for secchi disk depth, chlorophyll *a* and total phosphorus, F.E. Walter Reservoir was oligotrophic/mesotrophic during the 2014 sampling season.

The EPA (1983) also provides criteria for classifying the trophic conditions of lakes of the North Temperate Zone based on concentrations of total phosphorus, chlorophyll *a*, and secchi disk depth (Table 3-3). Taking into account the general agreement between the EPA classifications with that of the Carlson TSIs, the trophic condition of F.E. Walter Reservoir was oligotrophic/mesotrophic throughout much of the 2014 sampling season.

Water Quality Variable	Oligo-trophic	Meso-trophic	Eutrophic	21 May	18 June	23 July	12 Aug.	10 Sep.
Total Phosphorus (ppb)	<10	10-20	>20	20	<10	<10	<10	<10
Chlorophyll a (ppb)	<4	4-10	>10	3.77	3.63	5.23	4.07	2.5
Secchi Depth (m)	>4	2-4	<2	5.3	2.05	2.05	1.85	2.45

3.4 RESERVOIR BACTERIA MONITORING

Three forms of coliform bacteria contamination were monitored in the tributary and lake surface waters at F.E. Walter Reservoir during 2014 including total and fecal coliform (Table 3-4). Total coliform includes *Escherichia coliform* (*E. coli*) and related bacteria that are associated with fecal discharges. *Escherichia coliform* is used as an indicator of the presence of other potentially dangerous pathogens. 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 measures for all lake and tributary stations at F.E. Walter Reservoir during 2014, ranged from 260-clns/100-ml to greater than the detection limit of 2400 clns/100-ml. Fecal coliform counts ranged from less than the detection limit of 2-clns/100-ml to 450 clns/100-ml for the monitoring period. *Escherichia coliform* counts ranged from less than the detection limit of 1-clns/100-ml to 440-clns/100-ml for the monitoring period. Overall, bacteria levels were low at F.E. Walter Reservoir with respect to PADEP water quality standards. Elevated bacteria levels were seen in tributary surface water stations WA-3S and WA-4S and are directly affected by upstream watershed activity. For waters with contact recreation, the water quality standard for bacterial contamination is a single fecal sample standard of 1000 colonies/100-ml. No single fecal bacteria sample result exceeded the PADEP water contact recreation standard. However, two e-coli sample results did exceed the 235 organisms/ 100 ml (single water sample) Environmental Protection Agency recreational water quality standard. Water contact recreation is not permitted at F.E. Walter Reservoir.

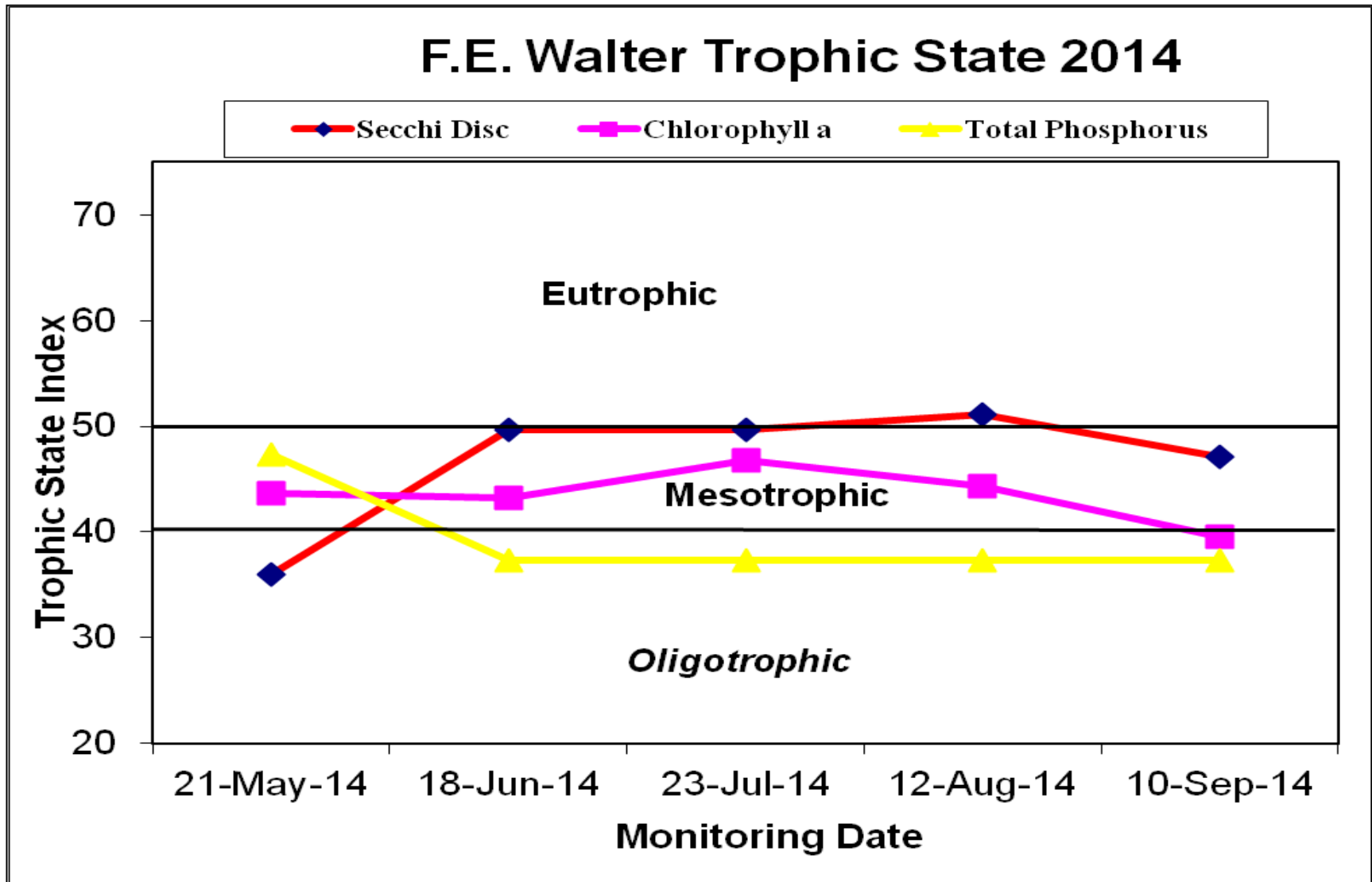


Figure 3-7. Carlson Trophic state indices calculated from secchi disk depth, concentrations of chlorophyll a and Total Phosphorus measured in surface waters of F.E. Walter Reservoir at Station WA-2 during 2014.

Table 3-4. Surface water bacteria counts (colonies/100 ml) at Walter Reservoir during 2014. Shaded values exceed State or Federal bacteria criteria.

STATION	DATE		Total Coliform		Fecal Coliform		Escherichia coli
WA-1S	21-May		2400		76		68
	18-Jun	>	2400		13		13
	23-Jul	>	2400	<	2		1
	12-Aug.		1600	<	2		1
	10-Sep.		1000		8		6
WA-2S	21-May		270		15		13
	18-Jun	>	2400	<	2	<	1
	23-Jul	>	2400		3		4
	12-Aug.		2400		2	<	1
	10-Sep.		260		6	<	1
WA-3S	21-May	>	2400		42		40
	18-Jun		2400		13		6
	23-Jul	>	2400		28		22
	12-Aug.	>	2400		310		330
	10-Sep.	>	2400		30		20
WA-4S	21-May		1700		15		16
	18-Jun		2400		130		130
	23-Jul	>	2400		78		73
	12-Aug.	>	2400		450		440
	10-Sep.	>	2400		21		19
WA-5S	21-May		1000		8		8
	18-Jun	>	2400		31		20
	23-Jul	>	2400		11		3
	12-Aug.	>	2400		30		31
	10-Sep.		2400		10		5
WA-6S	21-May		410		31		24
	18-Jun		2400	<	2		2
	23-Jul	>	2400	<	2	<	1
	12-Aug.		980	<	2	<	1
	10-Sep.		1100	<	2	<	1
WA-7S	21-May		490		16		14
	18-Jun	>	2400	<	2		1
	23-Jul	>	2400	<	2		1
	12-Aug.		1100	<	2	<	1
	10-Sep.		920	<	2	<	1

4.0 REFERENCES

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APPENDIX A

STRATIFICATION DATA TABLES

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
WA-1 Outfall	5/21/2014	9:17:09	1.099	14	99	10.19	6.58	-4	187	21	6.1	0.312
	6/18/2014	9:15:03	1	17.76	97	9.23	6.59	-4.1	162	19.4	3.5	0.191
	7/23/2014	9:07:00	1	21.12	95.6	8.5	6.81	-16.8	148	18.7	5.2	0.135
	8/12/2014	8:35:59	1	21.34	94.1	8.33	6.85	-19	182	22.3	2.4	0.116
	9/10/2014	9:37:29	1	20.55	94.8	8.52	6.89	-21.3	148.5	22.3	1.7	0.114
WA-2 Lake Tower Lake Tower Secchi 5.3 m	5/21/2014	7:35:13	0.5	16.97	91.3	8.82	6.53	-0.8	192	19.1	3.4	0.307
		7:34:29	5	16.93	90.7	8.78	6.49	1.4	194	19.2	3.7	0.305
		7:33:42	10	16.3	88.6	8.68	6.44	4.3	197	19.4	4.2	0.308
		7:32:53	15	15.91	87.5	8.64	6.4	6.5	199	19.5	4.3	0.309
		7:32:18	20	15.65	86.6	8.61	6.41	5.9	198	19.8	5.8	0.31
		7:31:11	25	15.28	85.6	8.57	6.38	7.4	200	20.1	5.9	0.311
		7:30:06	30	15.18	85.7	8.6	6.37	7.9	200	20.3	5.8	0.312
		7:29:11	35	14.99	85	8.56	6.38	7.6	200	20.3	5.1	0.313
		7:28:01	40	14.91	85.1	8.59	6.37	8	200	20.4	5.8	0.313
		7:26:40	45	14.81	85.6	8.66	6.37	8	199	20.3	6.5	0.311
		7:25:27	50	14.69	85.9	8.72	6.38	7.2	199	20.4	6.1	0.311
		7:24:10	55	14.6	86	8.74	6.38	7.5	199	20.5	6.3	0.311
		7:23:21	60	14.4	86.3	8.81	6.38	7.1	198	20.5	6.2	0.311
		7:22:32	65	14.29	86.2	8.82	6.4	6.1	198	20.4	6.5	0.311
		7:21:40	70	14.12	85.8	8.81	6.41	5.4	197	20.4	5.8	0.312
		7:20:50	75	13.94	86.3	8.9	6.43	4.4	196	20.4	6.4	0.312
		7:19:54	80	13.86	86.3	8.92	6.44	3.8	196	20.4	6.4	0.312
		7:19:06	85	13.67	85.9	8.91	6.44	3.6	196	20.4	5.6	0.312
		7:18:31	90	13.48	85.6	8.92	6.46	2.5	195	20.5	5.6	0.313
		7:17:44	95	13.45	85.5	8.91	6.49	1.1	194	20.6	5.9	0.313
7:16:51	100	13.31	85.3	8.92	6.53	-1	192	21	5.5	0.315		
7:15:58	105	13.3	85.5	8.94	6.57	-3.6	190	20.8	6.6	0.316		
7:14:53	110	13.25	84.1	8.81	6.61	-5.9	189	21.1	6.4	0.316		
7:13:56	115	13.24	82.8	8.67	6.65	-7.9	187	21.4	6.2	0.316		
7:12:50	120	12.93	79	8.33	6.74	-12.8	184	23.1	6.2	0.319		

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
WA-2 Lake Tower Secchi 2.05 m	6/18/2014	7:42:37	0.5	21.48	92.6	8.18	6.36	9.5	204	17.5	3.7	0.183
		7:41:52	5	20.59	87.5	7.86	6.27	14.2	208	17.6	3.5	0.185
		7:41:14	10	20.34	85.6	7.73	6.24	15.8	208	17.7	3.7	0.186
		7:40:17	15	19.8	82.4	7.52	6.21	17.7	209	17.8	3.4	0.187
		7:39:40	20	19.44	81	7.44	6.19	19	210	17.9	4.3	0.189
		7:39:04	25	18.96	79.3	7.36	6.18	19.5	210	18.1	4.3	0.192
		7:38:31	30	18.65	78.3	7.31	6.17	19.9	211	18.1	4.3	0.194
		7:37:59	35	18.36	77.8	7.31	6.16	20.2	211	18.1	3.2	0.195
		7:37:15	40	18.2	78	7.35	6.16	20.3	210	18.2	3.4	0.196
		7:36:42	45	18.08	78.7	7.44	6.17	20	210	18.2	4.4	0.196
		7:36:12	50	17.96	79.1	7.49	6.17	20	210	18.3	5	0.197
		7:35:49	55	17.89	78.9	7.48	6.17	19.6	209	18.2	3.8	0.197
		7:35:04	60	17.79	79.7	7.58	6.16	20.1	209	18.2	5	0.198
		7:34:21	65	17.72	79.8	7.59	6.14	21.2	209	18.3	4.4	0.198
		7:33:27	70	17.64	78.1	7.44	6.1	23.7	209	18.3	4.5	0.197
		7:32:39	75	17.55	75.6	7.22	6.06	26.2	211	18.5	3.7	0.194
		7:32:14	80	17.49	75.5	7.22	6.09	24.4	210	18.4	3.8	0.194
		7:31:25	85	17.43	76.2	7.29	6.1	23.6	208	18.4	4.5	0.197
		7:30:26	90	17.29	75.8	7.28	6.11	23.1	207	18.7	4.4	0.196
		7:29:35	95	16.96	75.5	7.3	6.12	22.5	207	19.1	4.6	0.198
7:26:31	100	16.59	68.1	6.63	6.07	25.1	205	20.2	3.8	0.198		
7:24:46	105	16.47	65.2	6.37	6.05	26.1	203	21	3.8	0.199		
7:23:36	110	16.48	65.2	6.37	6.08	24.7	199	20.7	3.6	0.199		
7:22:32	115	16.43	63.3	6.18	6.11	23	193	23.3	4	0.199		
7:20:39	120	16.04	45.9	4.53	6.13	21.9	176	36.1	4.5	0.203		
7:21:01	0.5	24.38	94.2	7.87	6.76	-13.5	187	17	5.1	0.137		
7:20:24	5	24.37	93.7	7.83	6.72	-11.6	187	17	5.1	0.14		
7:19:36	10	24.27	92	7.7	6.67	-8.4	187	17.1	5.5	0.142		
7:18:53	15	23.61	87.4	7.41	6.6	-4.6	187	17.2	5.4	0.145		
7:17:54	20	23.41	80.4	6.84	6.52	0.1	188	17.2	4.4	0.147		
7:16:14	25	22.59	61.7	5.33	6.37	9	190	17.1	4.2	0.152		
7:15:27	30	22.34	60.1	5.22	6.36	9.6	190	17.1	4	0.153		
7:14:28	35	22.17	61	5.32	6.39	7.9	188	17.2	4.4	0.154		
7:13:38	40	21.9	62.3	5.46	6.41	6.6	187	17.2	3.6	0.155		
7:12:39	45	21.78	61.3	5.38	6.38	8.1	187	17.2	4.4	0.156		
7:11:55	50	21.68	60.9	5.36	6.41	6.4	184	17.1	3.9	0.156		
7:10:58	55	21.56	59.7	5.26	6.4	7	183	17.2	4	0.156		
7:10:17	60	21.47	59.1	5.21	6.39	7.3	183	17.1	3.9	0.156		
7:09:37	65	21.36	58.6	5.19	6.41	6.3	180	17.2	3.7	0.156		
7:08:31	70	21.24	57.1	5.06	6.43	5	177	17.4	3.9	0.156		
7:07:18	75	21.17	56.5	5.02	6.47	3.1	175	17.7	4	0.156		
7:06:17	80	21.15	60.6	5.38	6.53	-0.5	171	17.7	4.3	0.156		
7:05:21	85	21.12	63.4	5.63	6.57	-2.9	168	17.9	4.1	0.156		
7:04:19	90	21.07	62.4	5.55	6.58	-3.6	166	18.3	4.3	0.157		
7:03:05	95	20.98	61.5	5.48	6.6	-4.3	163	18.6	3.8	0.157		
7:02:02	100	20.87	59.3	5.3	6.64	-7.1	157	18.5	4.5	0.157		
7:00:41	105	20.52	55.2	4.96	6.67	-8.6	152	21	4.7	0.158		
6:59:38	110	20.5	51.5	4.63	6.71	-10.8	147	21.8	4.5	0.158		
6:58:07	115	20.32	39.3	3.55	6.74	-13	136	35	5	0.159		
6:56:33	117	20.17	37.9	3.43	6.88	-20.6	143	30	5	0.16		

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
WA-3 Tobyhanna Creek Upstream	5/21/2014	9:38:44	1	14.38	93.9	9.59	7.03	-29.4	175	19.9	7.2	0.367
	6/18/2014	9:34:46	1	19.09	94.3	8.73	6.73	-12.1	153	18.4	5.7	0.204
	7/23/2014	9:36:01	1	20.1	95	8.62	7.17	-37.7	127	16.5	5.6	0.139
	8/12/2014	8:56:24	1	17.86	92	8.74	7.04	-29.8	185	19.8	2.7	0.15
	9/10/2014	10:14:09	1	16.72	95.8	9.31	7.16	-37	162.1	19.4	1.6	0.129
WA-4 Lehigh River Upstream	5/21/2014	9:48:12	1	13.98	93.3	9.61	6.9	-22.3	163	20	4.2	0.364
	6/18/2014	9:45:05	1	19.92	93.9	8.55	6.65	-7.7	140	19.2	3.4	0.187
	7/23/2014	9:47:26	1	20.56	101.9	9.16	7.18	-38	138	16.4	1.9	0.139
	8/12/2014	9:07:16	1	18.43	83.2	7.81	6.89	-21.2	106	21.2	2.4	0.161
	9/10/2014	10:25:58	1	15.86	100.6	9.95	7.14	-35.8	165.1	18.6	1.5	0.121
WA-5 Bear Creek Upstream	5/21/2014	10:10:23	1	13.3	96.4	10.08	6.27	13.6	184	19.2	2.9	0.36
	6/18/2014	10:04:17	1	19.75	96.4	8.81	6.67	-8.4	150	18.3	2.8	0.194
	7/23/2014	10:12:04	1	20.65	97.2	8.72	7.12	-34.4	153	16.1	1.5	0.157
	8/12/2014	9:26:09	1	18.56	93.4	8.74	7.06	-31.1	161	17.9	0.6	0.148
	9/10/2014	10:48:41	1	16.54	98	9.56	7.51	-56.5	170.1	18.4	0.6	0.153
WA-6 Bear Creek Lake Arm	5/21/2014	8:24:03	0.5	16.89	91.8	8.88	6.36	8.6	206	19.1	4.7	0.305
		8:23:18	5	16.87	91.1	8.82	6.32	11	209	19.1	3.6	0.304
		8:22:31	10	16.42	89.2	8.72	6.27	14.1	212	19.3	4.3	0.306
		8:21:51	15	15.89	87.6	8.66	6.24	15.6	213	19.4	4.3	0.308
		8:20:54	20	15.5	86.3	8.6	6.2	17.6	214	19.7	5	0.309
		8:19:52	25	15.17	85.7	8.61	6.18	18.9	215	20	4.6	0.311
		8:19:01	30	15.05	85.9	8.64	6.17	19.5	214	20	4.1	0.31
		8:17:42	35	14.91	86.1	8.69	6.15	20.3	215	20	4	0.31
		8:16:41	40	14.82	86.2	8.71	6.14	20.8	215	20.2	5.7	0.311
		8:15:42	45	14.72	86.3	8.75	6.11	22.5	216	20.1	4.9	0.31
		8:14:53	50	14.61	86.4	8.78	6.12	22.2	215	20	4.1	0.309
		8:14:05	55	14.55	86.2	8.77	6.12	22.3	215	20.1	5.6	0.31
		8:13:25	60	14.45	86.2	8.78	6.11	22.4	215	20.2	5.5	0.311
		8:12:29	65	14.36	86.7	8.86	6.07	24.5	216	20.2	6.1	0.311
		8:11:36	70	14.05	86.9	8.93	6.06	25.5	216	19.8	4.1	0.31
8:10:13	75	13.91	86.9	8.96	6.06	25.4	216	19.9	3.7	0.311		
8:09:09	80	13.79	86.6	8.96	6.08	23.9	215	19.8	3.9	0.312		
8:07:44	85	13.65	86.6	8.98	6.14	20.5	212	19.9	3.6	0.313		
8:06:21	90	13.61	86.5	8.98	6.24	15.2	209	19.7	3.2	0.315		
WA-6 Bear Creek Lake Arm	6/18/2014	8:13:53	0.5	22.55	95.3	8.24	6.5	1.5	187	17.5	3.1	0.179
		8:13:08	5	21.22	90.7	8.05	6.4	7	192	17.6	4.8	0.182
		8:12:24	10	20.65	87.2	7.82	6.35	9.6	192	17.6	4.5	0.182
		8:11:47	15	19.91	83.8	7.63	6.3	12.5	194	17.7	3.7	0.186
		8:10:56	20	19.28	80.4	7.42	6.26	14.9	195	18	4.2	0.188
		8:10:28	25	18.98	79.1	7.34	6.27	14.3	193	18	3.6	0.19
		8:09:37	30	18.73	78.4	7.31	6.25	15.3	192	18	3.4	0.19
		8:08:43	35	18.46	77.4	7.26	6.21	17.6	193	17.8	3.8	0.19
		8:07:44	40	18.27	77.1	7.26	6.17	19.7	192	17.8	3.3	0.189
		8:07:05	45	18.11	77.5	7.31	6.17	19.8	191	18.1	2.6	0.189
		8:06:28	50	18.01	76.8	7.27	6.18	19.4	190	18.1	2.9	0.191
		8:05:53	55	17.89	76.5	7.26	6.17	19.8	189	18.2	2.9	0.19
		8:05:09	60	17.82	76	7.22	6.19	18.7	186	18.3	3.4	0.19
		8:04:06	65	17.71	75.8	7.21	6.2	18.1	183	18.5	3.1	0.19
		8:03:04	70	17.48	75.6	7.23	6.22	16.8	178	18.7	2.5	0.192
8:02:15	75	17.34	73.2	7.02	6.23	16.2	175	20.1	3.4	0.191		
8:00:53	80	17.21	74.8	7.19	6.32	11.3	163	19.6	3.8	0.194		
7:59:50	85	17.1	73.3	7.07	6.34	10	149	18.8	4.9	0.196		
7:58:10	88	16.97	10.6	1.02	6.36	8.6	148	91.1	7.3	0.197		

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond	
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm	
WA-6 Bear Creek Lake Arm	7/23/2014	7:44:40	0.5	24.81	93.7	7.76	6.64	-6.6	180	17	5.1	0.136	
		7:43:49	5	24.72	93	7.72	6.59	-3.5	180	17.1	5.4	0.139	
		7:42:59	10	23.95	90.3	7.61	6.52	0.5	181	17.2	6.5	0.143	
		7:41:49	15	23.44	73.2	6.23	6.33	11.4	184	17.2	5	0.146	
		7:41:03	20	22.97	63.5	5.45	6.25	15.7	186	17.4	5.3	0.15	
		7:40:13	25	22.79	62	5.34	6.25	15.6	184	17.2	4.2	0.152	
		7:39:14	30	22.42	62	5.38	6.26	15	182	17.2	4.5	0.154	
		7:38:13	35	22.15	63	5.49	6.28	14.3	179	17.3	4.8	0.155	
		7:37:01	40	22.02	63.2	5.52	6.27	14.8	176	17.2	4.7	0.155	
		7:36:01	45	21.85	61.5	5.39	6.25	16	174	17.2	4.4	0.155	
		7:35:12	50	21.69	61.1	5.37	6.23	16.8	172	17.3	4.2	0.155	
		7:34:07	55	21.62	56.9	5.01	6.19	19.3	169	17.4	3.5	0.155	
		7:33:14	60	21.53	55.3	4.88	6.19	19.1	164	17.5	3.4	0.155	
		7:32:14	65	21.41	55	4.87	6.22	17.6	157	17.7	4	0.155	
		7:30:41	70	21.24	57.2	5.07	6.28	14	144	18.3	3.8	0.156	
		7:29:48	75	21.09	55.9	4.97	6.31	12.2	134	19.4	3.4	0.156	
		7:29:09	80	21.04	58.1	5.17	6.37	8.5	123	19.4	3.8	0.157	
7:27:37	87	20.9	52.7	4.71	6.46	3.6	67	44.5	4.4	0.157			
WA-6 Bear Creek Lake Arm	8/12/2014												
		7:31:45	0.5	23.15	89	7.61	6.67	-8.8	191	18.3	3.7	0.113	
		7:31:11	5	23.19	88.6	7.57	6.66	-7.6	190	18.4	4.1	0.114	
		7:30:32	10	23.18	87.7	7.49	6.62	-5.4	189	18.4	4.8	0.115	
		7:29:52	15	23.16	84.4	7.21	6.55	-1.6	188	18.4	3.8	0.117	
		7:29:05	20	22.55	67.5	5.84	6.43	5.5	190	18.3	3.2	0.121	
		7:28:16	25	22.43	65.5	5.68	6.39	7.9	190	18.3	3.2	0.122	
		7:27:23	30	22.35	60.4	5.25	6.36	9.7	189	18.4	2.7	0.123	
		7:27:12	35	22.26	60	5.22	6.38	8.5	187	18.5	2.2	0.123	
		7:26:05	40	22.18	61.2	5.33	6.39	7.6	183	18.7	4	0.123	
		7:25:18	45	22.14	58.3	5.09	6.38	8	181	18.5	2.3	0.124	
		7:24:46	50	22.06	60.4	5.28	6.41	6.3	178	18.9	3.3	0.124	
		7:24:02	55	22	59.4	5.19	6.41	6.2	174	19.1	3.1	0.125	
		7:23:31	60	21.92	58.4	5.12	6.43	5.2	170	19.3	2.6	0.126	
7:22:23	65	21.81	55.7	4.89	6.45	4.4	153	38.2	3.8	0.127			

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond	
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm	
WA-6 Bear Creek Lake Arm	9/10/2014	8:18:39	0.5	22.02	83.3	7.28	6.82	-17.1	156.9	19	3.8	0.106	
		8:17:32	5	22.02	83.2	7.27	6.8	-16.4	154.7	19.1	3.9	0.106	
		8:16:28	10	22.02	82.6	7.21	6.76	-13.8	153.6	19	2.8	0.106	
		8:15:41	15	21.99	77.5	6.78	6.72	-11.5	152.5	19.1	3.2	0.106	
		8:14:57	20	21.7	68.5	6.03	6.66	-8.2	152.4	18.9	0.7	0.11	
		8:14:22	25	21.62	65	5.73	6.64	-7.1	151.1	19.7	2.5	0.108	
		8:13:01	30	21.48	71.1	6.28	6.67	-8.5	138.1	25.7	2.6	0.108	
		8:11:25	32	21.46	63.6	5.62	6.71	-11	126.8	43.6	4.5	0.108	
WA-7 Lehigh Lake Arm	5/21/2014	7:59:02	0.5	16.98	91.6	8.85	6.47	2.4	196	19	4.4	0.305	
		7:58:08	5	16.94	91.3	8.83	6.41	5.7	200	19.1	3.8	0.305	
		7:57:18	10	16.27	89.3	8.76	6.35	9.2	203	19.2	4.4	0.308	
		7:56:20	15	15.81	88.3	8.75	6.31	11.5	205	19.6	5.1	0.308	
		7:55:44	20	15.48	87.7	8.75	6.31	11.6	205	19.8	5.8	0.309	
		7:55:00	25	15.21	86.7	8.7	6.3	12	205	20.1	6	0.31	
		7:54:06	30	15.12	86.1	8.65	6.29	12.5	205	20.2	6	0.311	
		7:53:12	35	15.03	85.7	8.62	6.29	12.5	205	20.3	6.2	0.312	
		7:52:15	40	14.94	86	8.67	6.28	13	205	20.2	5.9	0.312	
		7:51:25	45	14.77	86	8.71	6.29	12.6	204	20.4	6	0.312	
		7:50:20	50	14.69	86.6	8.78	6.3	11.9	203	20.4	6.5	0.311	
		7:49:18	55	14.56	86.4	8.79	6.3	11.9	203	20.3	6.5	0.311	
		7:48:16	60	14.37	87	8.89	6.3	12.1	203	20.2	6.7	0.311	
		7:47:04	65	14.07	86.6	8.9	6.3	12	203	20.1	6.9	0.312	
		7:45:45	70	13.82	86.6	8.96	6.29	12	203	20.2	6.3	0.314	
		7:44:58	75	13.71	87.8	9.1	6.34	9.6	201	20	6	0.314	
		7:44:02	80	13.59	88.1	9.16	6.35	8.8	200	20.3	6.7	0.314	
		7:43:17	85	13.26	87.7	9.18	6.39	6.8	198	20.3	6.5	0.317	
		7:42:34	88	13.18	87.5	9.17	6.43	4.2	195	20.5	7	0.319	

2014 F.E. Walter Water Quality Profiles

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
WA-7 Lehigh Lake Arm	6/18/2014	8:36:16	0.5	22.71	95.2	8.21	6.52	-0.1	179	17.6	4	0.179
		8:35:33	5	22.11	92.7	8.08	6.44	4.5	182	17.7	4	0.179
		8:34:49	10	20.77	88.1	7.89	6.39	7.4	183	17.8	4.7	0.182
		8:34:17	15	19.85	84.8	7.73	6.36	9.2	184	18	4.6	0.185
		8:33:36	20	19.41	82	7.54	6.34	10.4	184	17.9	4.2	0.186
		8:33:04	25	19.03	80.7	7.48	6.33	10.5	183	18.2	4.5	0.188
		8:32:29	30	18.78	79.9	7.44	6.34	9.9	182	18.2	4.6	0.189
		8:31:38	35	18.59	79.7	7.45	6.33	10.7	182	18.2	4.4	0.191
		8:31:01	40	18.4	81	7.61	6.34	9.8	180	18.4	5.5	0.192
		8:30:09	45	18.21	80.6	7.59	6.34	10.1	178	18.4	5.2	0.192
		8:29:25	50	18.05	79.8	7.54	6.34	10.3	176	18.5	4.9	0.193
		8:28:22	55	17.95	79.1	7.49	6.31	11.6	175	18.2	4.2	0.193
		8:27:48	60	17.89	78.8	7.47	6.33	10.6	172	18.2	4.3	0.193
		8:26:54	65	17.8	80.1	7.61	6.34	9.9	168	18.5	4.9	0.194
		8:25:58	70	17.74	80.9	7.7	6.35	9.4	163	18.6	5.4	0.193
		8:24:55	75	17.64	80.1	7.63	6.35	9.6	157	18.6	6	0.194
		8:23:45	80	17.3	76.5	7.34	6.35	9.5	145	20.2	5.3	0.194
8:22:38	85	17.23	73.1	7.03	6.38	7.5	127	28	5.5	0.195		
WA-7 Lehigh Lake Arm	7/23/2014	8:11:50	0.5	24.99	94	7.77	6.63	-5.9	188	17.1	4.4	0.137
		8:10:51	5	24.22	91.8	7.7	6.56	-2.2	189	17	5.4	0.142
		8:09:59	10	23.89	88.7	7.48	6.51	1.2	189	17.1	5.7	0.144
		8:08:51	15	23.58	79.4	6.73	6.4	7.5	190	17	4.5	0.146
		8:07:15	20	23.23	68.2	5.83	6.29	13.5	191	17.1	6.1	0.149
		8:05:51	25	22.82	65.6	5.64	6.28	14	189	17.4	5.4	0.152
		8:04:44	30	22.43	64.1	5.56	6.28	14.2	188	17.2	5.1	0.154
		8:03:47	35	22.04	66.6	5.82	6.28	13.8	187	17.4	4.5	0.155
		8:02:36	40	21.84	66.5	5.83	6.28	14	185	17.5	5.1	0.155
		8:02:03	45	21.73	67.7	5.95	6.29	13.2	183	17.7	4.5	0.155
		8:00:45	50	21.65	64	5.63	6.26	14.9	182	17.3	4.5	0.156
		8:00:09	55	21.57	63.9	5.63	6.28	13.7	179	17.4	4.3	0.156
		7:59:09	60	21.52	64.7	5.71	6.29	13.4	176	17.4	5.3	0.156
		7:58:14	65	21.42	65.6	5.8	6.3	13	173	17.6	5.2	0.156
		7:56:33	70	21.36	65.9	5.84	6.31	12.3	166	17.8	5.1	0.156
		7:55:14	75	21.29	66.4	5.88	6.31	12	160	18	4.9	0.156
		7:54:10	80	21.19	65.5	5.82	6.32	11.9	153	18.3	5.1	0.157
7:52:24	85	20.96	59.5	5.31	6.31	12.1	130	37.5	6	0.159		

APPENDIX B

LABORATORY CUSTODY SHEETS



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015773

Date Collected: 05/21/14 09:20
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	68	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	76	/100mL	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	2400	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	21:07	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:15	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:50	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:08	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	7.8	mg/L	1	1	SM5310 C	05/27	16:29	ALD
RESIDUES								
Solids, Total Dissolved	64	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	11:30	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015773

Date Collected: 05/21/14 09:20
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

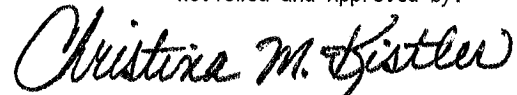
COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

Distribution of Reports:

Reviewed and Approved by:



Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015774
 Date Collected: 05/21/14 07:10
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-2 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	13	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	15	/100mL	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	270	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	21:22	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:16	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:53	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:09	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	5.5	mg/L	1	1	SM5310 C	05/27	16:42	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	3	mg/L	1	1	SM 2320 B	05/27	11:30	HRG

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015774

Date Collected: 05/21/14 07:10
 Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015775
 Date Collected: 05/21/14 07:10
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-2 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	22:06	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:17	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:54	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:09	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	8.0	mg/L	1	1	SM5310 C	05/27	16:56	ALD
RESIDUES								
Solids, Total Dissolved	65	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	3	mg/L	1	1	SM 2320 B	05/27	11:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015776

Date Collected: 05/21/14 07:10
 Collected By: Client

Sample Desc: WA-2 Deep

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.05	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	22:20	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:18	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:55	JCL
Nitrogen, Total Kjeldahl	0.58	mg/L	.25	1	EPA 351.2	05/29	16:10	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	8.9	mg/L	1	1	SM5310 C	05/27	17:10	ALD
RESIDUES								
Solids, Total Dissolved	64	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	24	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	11:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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 Reported To: USACE, Philadelphia District
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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015777

Date Collected: 05/21/14 09:40
 Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	40	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	42	/100ml	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.03	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.03	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	22:35	JCL
Nitrogen, Nitrate	0.06	mg/L	.05	1	EPA 353.2	05/22	18:21	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:56	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:11	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	10.1	mg/L	1	1	SM5310 C	05/27	17:24	ALD
RESIDUES								
Solids, Total Dissolved	86	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	3	mg/L	1	1	SM 2320 B	05/27	11:45	HRG

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015777

Date Collected: 05/21/14 09:40
 Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

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Date of Report: 06/05/14
 Lab ID: 2295-14-0015778

Date Collected: 05/21/14 10:00
 Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	16	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	15	/100mL	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	1700	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	22:49	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:22	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:57	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:14	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	8.0	mg/L	1	1	SM5310 C	05/27	17:37	ALD
RESIDUES								
Solids, Total Dissolved	62	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	05/27	11:45	HRG

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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015778

Date Collected: 05/21/14 10:00
 Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015779
 Date Collected: 05/21/14 10:10
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-5 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	8	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	8	/100ml	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	1000	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	23:04	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:23	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:58	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:15	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	5.1	mg/L	1	1	SM5310 C	05/27	17:51	ALD
RESIDUES								
Solids, Total Dissolved	25	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	1	mg/L	1	1	SM 2320 B	05/27	12:00	HRG

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 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015779

Date Collected: 05/21/14 10:10
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

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Date of Report: 06/05/14
 Lab ID: 2295-14-0015780
 Date Collected: 05/21/14 08:15
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-6 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	24	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	31	/100mL	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	410	mpn/100ml	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	23:19	JCL
Nitrogen, Nitrate	0.05	mg/L	.05	1	EPA 353.2	05/22	18:24	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	16:59	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:16	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	5.4	mg/L	1	1	SM5310 C	05/27	20:51	ALD
RESIDUES								
Solids, Total Dissolved	66	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	12:00	HRG

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 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015780

Date Collected: 05/21/14 08:15
 Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.
- 03 One TOC CCV was 111% recovery.

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015781
 Date Collected: 05/21/14 08:15
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-6 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:00	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	23:33	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:27	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	17:02	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/29	16:19	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	6.4	mg/L	1	1	SM5310 C	05/27	21:16	ALD
RESIDUES								
Solids, Total Dissolved	45	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	4	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	3	mg/L	1	1	SM 2320 B	05/27	12:15	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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Date of Report: 06/05/14
 Lab ID: 2295-14-0015781

Date Collected: 05/21/14 08:15
 Collected By: Client

Sample Desc: WA-6 Mid-Depth

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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02 One TOC CCV was 111% recovery.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015782
 Date Collected: 05/21/14 08:15
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-6 Deep

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:15	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.13	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/04	23:48	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:28	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	17:03	JCL
Nitrogen, Total Kjeldahl	0.32	mg/L	.25	1	EPA 351.2	05/29	16:20	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	5.8	mg/L	1	1	SM5310 C	05/27	21:56	ALD
RESIDUES								
Solids, Total Dissolved	40	mg/L	5	1	SM 2540C	05/22	12:20	TMH
Solids, Total Suspended	252	mg/L	3	1	SM 2540D	05/22	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	2	mg/L	1	1	SM 2320 B	05/27	12:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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Date of Report: 06/05/14
 Lab ID: 2295-14-0015782

Date Collected: 05/21/14 08:15
 Collected By: Client

Sample Desc: WA-6 Deep

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
--------	------	--------------	------------------	-----------	--------------	--------------	---------

02 One TOC CCV was 111% recovery.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015783

Date Collected: 05/21/14 07:45
 Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	14	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
Fecal Coliform	16	/100mL	2	1	SM 9222D	05/21	18:00	PLW
Total Coliform	490	mpn/100mL	1	1	SM 9223B	05/22	12:30	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	05/22	12:15	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/05	00:02	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:29	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	17:04	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	05/30	14:36	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	5.4	mg/L	1	1	SM5310 C	05/27	22:44	ALD
RESIDUES								
Solids, Total Dissolved	51	mg/L	5	1	SM 2540C	05/22	12:50	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:50	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	12:45	HRG

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 Account Executive

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Attention: Gregory Wacik
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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015783

Date Collected: 05/21/14 07:45
 Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 05/21/14 17:00

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

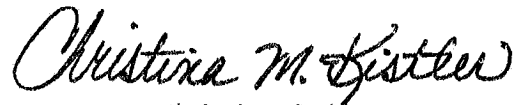
- 01 The TKN matrix spike was high indicating possible sample matrix interference.

- 02 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 03 The total coliform sample was placed in the incubator at 05/21/14 at 18:00.

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Attention: Gregory Wacik
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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015784

Date Collected: 05/21/14 07:45
 Collected By: Client

Sample Desc: WA-7 Mid-Depth

Date Received: 05/21/14 17:00

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.01	mg/L	.01	1	SM 4500P-E	05/22	12:15	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.04	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/05	00:17	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:30	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	17:07	JCL
Nitrogen, Total Kjeldahl	0.38	mg/L	.25	1	EPA 351.2	05/30	14:39	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	8.0	mg/L	1	1	SM5310 C	05/27	22:57	ALD
RESIDUES								
Solids, Total Dissolved	49	mg/L	5	1	SM 2540C	05/22	12:50	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	05/22	12:50	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	12:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/05/14
 Lab ID: 2295-14-0015785
 Date Collected: 05/21/14 07:45
 Collected By: Client
 Date Received: 05/21/14 17:00

Sample Desc: WA-7 Deep

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	05/22	12:15	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/02	14:45	HRG
Phosphorus as P, Total	0.08	mg/L	.01	1	SM 4500P-E	05/28	14:15	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/05	00:32	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	05/22	18:32	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	05/22	17:08	JCL
Nitrogen, Total Kjeldahl	0.67	mg/L	.25	1	EPA 351.2	05/30	14:40	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	05/22	12:10	EMW
Total Organic Carbon	9.5	mg/L	1	1	SM5310 C	05/27	23:11	ALD
RESIDUES								
Solids, Total Dissolved	37	mg/L	5	1	SM 2540C	05/22	12:50	TMH
Solids, Total Suspended	149	mg/L	3	1	SM 2540D	05/22	12:50	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	05/27	13:00	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Chain of Custody

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB
No: 236462

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Remarks:
Total Sampling Time (hours):
Bottle Prep by:
Laboratory Receipt Temp: 4 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: PCS

15773

Sample No: 1 Desc: WA-1 Surface
FC, EC, TC, H6 H6
NO2-N, NO3-N, d-p04-P, o-p04, BOD gn
NH3-N, tkm, ALk, tds, tss, p04-P, toc,

15774

Sample No: 2 Desc: WA-2 Surface
FC, EC, TC, H6 H6
NO2-N, NO3-N, d-p04-P, o-p04, BOD gn
NH3-N, tkm, ALk, tds, tss, p04-P, toc,

broken bottle
5/21/14
**Sample was saved and poured into sterile back bottle. ECC 5/22/14*

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3; Date: 5/21/14 Time: 0710
- B - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
- E - 1 X 2xamberova g w/ H3PO4/zero headspace;
- F - 1 X 8oz ALk P w/ Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]
Date: 5/21/14 Time: 330

Received by: [Signature]

Received for laboratory by: [Signature]
Date: 5/21/14 Time: 1700

Sample entered by: ECC

Chain of Custody

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB
No: 236462

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561
Ext: _____

Samplers: WACIK

Remarks: _____
Total Sampling Time (hours): _____
Bottle Prep by: _____
Laboratory Receipt Temp: 4 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: WAC

15778

Sample No: 6 Desc: WA-4 Surface

FC, EC, TC, ^{HL}
NO2-N, NO3-N, d-pO4-P, o-pO4, BOD ^{HL}
NH3-N, tkm, ALK, tds, tss, po4-p, toc, ^{HL}

Matrix: 0 Date: 5/21/14
Time: 10:00

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
 - B - 1 X 1 Bod P w/ Cool to 6 C;
 - C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
 - D - 1 X 500ml NH3 P w/ H2SO4 (PH<2);
 - E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
 - F - 1 X 8oz Alk P w/
- Cool to 6 C/Zero Headspace:

15779

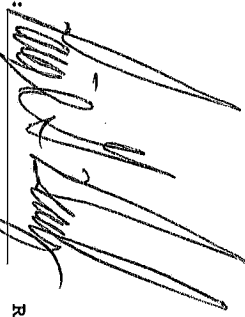
Sample No: 7 Desc: WA-5 Surface

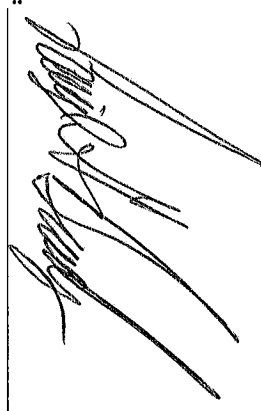
FC, EC, TC, ^{HL}
NO2-N, NO3-N, d-pO4-P, o-pO4, BOD ^{HL}
NH3-N, tkm, ALK, tds, tss, po4-p, toc, ^{HL}

Matrix: 0 Date: 5/21/14
Time: 10:10

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
 - B - 1 X 1 Bod P w/ Cool to 6 C;
 - C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
 - D - 1 X 500ml NH3 P w/ H2SO4 (PH<2);
 - E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
 - F - 1 X 8oz Alk P w/
- Cool to 6 C/Zero Headspace:

Relinquished by: 

Received by: 

Received for laboratory by: 

Date: 5/21/14 Time: 3:30

Date: 5/21/14 Time: 17:00

Sample entered by: EC

Chain of Custody

Account: 2295 Work Order: 004035 Project Leader: CMB No: 236462
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Remarks:
Total Sampling Time (hours):
Bottle Prep by:
Laboratory Receipt Temp: 4 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: AW

15780

Sample No: 8 Desc: WA-6 Surface
FC, EC, TC, He
NO2-N, NO3-N, d-p04-p, o-p04, BOD He
NH3-N, tkm, Alk, tds, tss, p04-p, toc, He

Matrix: 0 Date: 5/21/14
Time: 08/15
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

15781

Sample No: 9 Desc: WA-6 Mid-Depth
NO2-N, NO3-N, d-p04-p, o-p04, BOD He
NH3-N, tkm, Alk, tds, tss, p04-p, toc, He

Matrix: 0 Date: 5/21/14
Time: 08/15
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]
Date: 5/21/14 Time: 330
1540

Received by: [Signature]

Received for Laboratory by: [Signature]
Date: 5/21/14 Time: 1700

Sample entered by: ELL

Chain of Custody

Account: 2295 Work Order: 004035 Project Leader: CMB No: 236462
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext: _____

Samplers: WDACIK

Remarks: _____
Total Sampling Time (hours): _____ Bottle Prep by: _____
Laboratory Receipt Temp: 4 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: [Signature]

15784

Sample No: 12 Desc: WA-7 Mid-Depth
NO2-N, NO3-N, d-p04-p, o-p04, BOD gk
NH3-N, tkm, ALK, tds, tss, po4-p, toc, gk

Matrix: 0 Date: 5/21/14
Time: 0745
A - 1 X 1 Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz ALK p w/
Cool to 6 C/Zero Headspace;

15785

Sample No: 13 Desc: WA-7 Deep
NO2-N, NO3-N, d-p04-p, o-p04, BOD gk
NH3-N, tkm, ALK, tds, tss, po4-p, toc, gk

Matrix: 0 Date: 5/21/14
Time: 0745
A - 1 X 1 Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz ALK p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]
Date: 5/21/14 Time: 330
1540

Received by: [Signature]

Received for Laboratory by: [Signature]
Date: 5/21/14 Time: 1700
Sample entered by: EE



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019444

Date Collected: 06/18/14 09:20
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	13	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	13	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.04	mg/L	.01	1	SM 4500P-E	06/19	09:40	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	0.04	mg/L	.01	1	SM 4500P-E	06/19	13:50	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	14:24	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	06/19	18:36	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	16:53	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:33	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	6.0	mg/L	1	1	SM5310 C	06/19	20:12	ALD
RESIDUES								
Solids, Total Dissolved	63	mg/L	5	1	SM 2540C	06/20	12:45	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	06/20	12:45	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:00	HRG

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Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019444
 Date Collected: 06/18/14 09:20
 Collected By: Client
 Date Received: 06/18/14 17:10

Sample Desc: WA-1 Surface

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019445

Date Collected: 06/18/14 07:15
 Collected By: Client

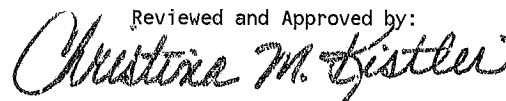
Sample Desc: WA-2 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	<2	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	09:40	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/19	13:50	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	14:38	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	06/19	18:37	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	16:54	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:34	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	4.8	mg/L	1	1	SM5310 C	06/19	21:26	ALD
RESIDUES								
Solids, Total Dissolved	62	mg/L	5	1	SM 2540C	06/20	12:45	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	12:45	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	06/23	10:00	HRG

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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 06/30/14
Lab ID: 2295-14-0019445

Date Collected: 06/18/14 07:15
Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019446

Date Collected: 06/18/14 07:15
 Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	09:45	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	0.01	mg/L	.01	1	SM 4500P-E	06/19	13:55	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	14:53	JCL
Nitrogen, Nitrate	0.07	mg/L	.05	1	EPA 353.2	06/19	18:38	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	16:55	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:35	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	6.0	mg/L	1	1	SM5310 C	06/19	21:58	ALD
RESIDUES								
Solids, Total Dissolved	67	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:15	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina M. Kistler
 Christina Kistler
 Account Executive

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Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 06/30/14
Lab ID: 2295-14-0019447

Date Collected: 06/18/14 07:15
Collected By: Client

Sample Desc: WA-2 Deep

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	09:45	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/19	13:55	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	15:07	JCL
Nitrogen, Nitrate	0.06	mg/L	.05	1	EPA 353.2	06/19	18:39	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	16:56	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:38	JCL
OTHER								
Biochemical Oxygen Demand	3	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	6.3	mg/L	1	1	SM5310 C	06/19	22:45	ALD
RESIDUES								
Solids, Total Dissolved	58	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:15	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina Kistler
Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019447

Date Collected: 06/18/14 07:15
 Collected By: Client

Sample Desc: WA-2 Deep

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
02	The SM 5210B sample did not have a DO depletion of at least 2 mg/L.							

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019448
 Date Collected: 06/18/14 09:35
 Collected By: Client
 Date Received: 06/18/14 17:10

Sample Desc: WA-3 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	6	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	13	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.07	mg/L	.01	1	SM 4500P-E	06/19	09:45	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	0.07	mg/L	.01	1	SM 4500P-E	06/19	13:55	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	15:22	JCL
Nitrogen, Nitrate	0.12	mg/L	.05	1	EPA 353.2	06/19	18:42	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	16:57	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:39	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	8.1	mg/L	1	1	SM5310 C	06/19	23:02	ALD
RESIDUES								
Solids, Total Dissolved	73	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:15	HRG

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Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019448

Date Collected: 06/18/14 09:35
 Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
--------	------	-----------	---------------	-----------	-----------	-----------	---------

COMMENTS

- 01 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.
- 02 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

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Christina Kistler
 Account Executive

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Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 06/30/14
Lab ID: 2295-14-0019449

Date Collected: 06/18/14 09:50
Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	130	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	130	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	09:45	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/19	13:55	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	15:37	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	06/19	18:43	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:00	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:40	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	5.4	mg/L	1	1	SM5310 C	06/19	23:18	ALD
RESIDUES								
Solids, Total Dissolved	66	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	18	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	06/23	10:30	HRG

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019449

Date Collected: 06/18/14 09:50
 Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 06/30/14
Lab ID: 2295-14-0019450

Date Collected: 06/18/14 10:00
Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	20	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	31	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	09:45	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	0.03	mg/L	.01	1	SM 4500P-E	06/19	13:55	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	15:51	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	06/19	18:44	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:01	JCL
Nitrogen, Total Kjeldahl	0.30	mg/L	.25	1	EPA 351.2	06/19	14:41	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	5.0	mg/L	1	1	SM5310 C	06/19	23:34	ALD
RESIDUES								
Solids, Total Dissolved	48	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	8	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	2	mg/L	1	1	SM 2320 B	06/23	10:30	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
Account Executive

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ACIL Seal of Excellence



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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019450

Date Collected: 06/18/14 10:00
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 06/30/14
Lab ID: 2295-14-0019451

Date Collected: 06/18/14 08:00
Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	2	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	<2	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	10:20	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	0.01	mg/L	.01	1	SM 4500P-E	06/19	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	16:06	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	06/19	18:45	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:02	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:44	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	4.8	mg/L	1	1	SM5310 C	06/19	23:50	ALD
RESIDUES								
Solids, Total Dissolved	38	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	06/23	10:30	HRG

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Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019451

Date Collected: 06/18/14 08:00
 Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019452

Date Collected: 06/18/14 08:00
 Collected By: Client

Sample Desc: WA-6 Mid-Depth

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	10:20	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/19	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	16:20	JCL
Nitrogen, Nitrate	0.06	mg/L	.05	1	EPA 353.2	06/19	18:48	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:05	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:45	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	5.1	mg/L	1	1	SM5310 c	06/20	00:05	ALD
RESIDUES								
Solids, Total Dissolved	31	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019453

Date Collected: 06/18/14 08:00
 Collected By: Client

Sample Desc: WA-6 Deep

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.04	mg/L	.01	1	SM 4500P-E	06/19	10:20	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:40	HRG
Phosphorus as P, Total	0.04	mg/L	.01	1	SM 4500P-E	06/19	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	16:35	JCL
Nitrogen, Nitrate	0.06	mg/L	.05	1	EPA 353.2	06/19	18:49	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:06	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:46	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	6.6	mg/L	1	1	SM5310 C	06/20	00:22	ALD
RESIDUES								
Solids, Total Dissolved	47	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	06/23	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019454
 Date Collected: 06/18/14 08:20
 Collected By: Client
 Date Received: 06/18/14 17:10

Sample Desc: WA-7 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	1	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
Fecal Coliform	<2	/100mL	2	1	SM 9222D	06/18	17:50	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	06/19	12:00	DAD
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	10:20	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:40	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/19	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	16:50	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	06/19	18:50	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:07	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:47	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	5.3	mg/L	1	1	SM5310 C	06/20	00:28	ALD
RESIDUES								
Solids, Total Dissolved	45	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:45	HRG

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 Account Executive

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 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019454

Date Collected: 06/18/14 08:20
 Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 06/18/14 17:10

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

02 The total coliform sample was placed in the incubator on 06/18/14 at 17:45.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019455
 Date Collected: 06/18/14 08:20
 Collected By: Client

Sample Desc: WA-7 Mid-Depth

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.03	mg/L	.01	1	SM 4500P-E	06/19	10:25	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/19	13:40	HRG
Phosphorus as P, Total	0.04	mg/L	.01	1	SM 4500P-E	06/19	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	17:48	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	06/19	18:50	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:08	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:48	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	5.9	mg/L	1	1	SM5310 C	06/20	01:53	ALD
RESIDUES								
Solids, Total Dissolved	53	mg/L	5	1	SM 2540C	06/20	13:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	06/20	13:50	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

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Christina Kistler
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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 06/30/14
 Lab ID: 2295-14-0019456

Date Collected: 06/18/14 08:20
 Collected By: Client

Sample Desc: WA-7 Deep

Date Received: 06/18/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	06/19	10:25	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	06/20	10:52	ALD
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	06/20	10:30	ALD
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	06/19	18:03	JCL
Nitrogen, Nitrate	0.06	mg/L	.05	1	EPA 353.2	06/19	18:53	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	06/19	17:11	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	06/19	14:49	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	06/19	11:45	EMW
Total Organic Carbon	7.7	mg/L	1	1	SM5310 C	06/20	02:25	ALD
RESIDUES								
Solids, Total Dissolved	32	mg/L	5	1	SM 2540C	06/20	13:50	TMH
Solids, Total Suspended	6	mg/L	3	1	SM 2540D	06/20	13:50	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	06/23	11:00	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina Kistler
 Account Executive

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Jbs
05/12/14 1:05:49 PM

M. J. REIDER ASSOCIATES, INC.

CORC.PRT
1/6

Chain of Custody

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB

No: 237775

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561
Ext:

Samplers: WACIK

Total Sampling Time (hours):
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? N
Approved By: Jbs

Bottle Prep by:

19444

Sample No: 1 Desc: WA-1 Surface
~~B/A~~
FC, EC, TC,
NO2-N, NO3-N, d-p04-p, ^{Hg} ^{BOD} ^{BW}
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0920
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

19445

Sample No: 2 Desc: WA-2 Surface
~~PK~~
FC, EC, TC,
NO2-N, NO3-N, d-p04-p, o^{Hg}p04, BOD ^{BW}
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0715
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

Relinquished by: Gregory Wacik Received by: [Signature]

Received for Laboratory by: [Signature]

Date: 6-18-14 Time: 6/18/14
3:30

Date: 6-18-14 Time: 1550 1710

Sample entered by: [Signature]

Chain of Custody

Account: 2295
Customer: Gregory Wacik
Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: GMB

No: 237775

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Remarks:
Total Sampling Time (hours):
Bottle Prep by:
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? N
Approved By: JBS

19446

Sample No: 3 Desc: WA-2 Mid-Depth
NO2-N, NO3-N, d-p04-p, o-p04, BOD
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0715
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 P w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

19447

Sample No: 4 Desc: WA-2 Deep
NO2-N, NO3-N, d-p04-p, o-p04, BOD
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0715
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 P w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

19448

Sample No: 5 Desc: WA-3 Surface
FC, EC, TC,
NO2-N, NO3-N, d-p04-p, o-p04, BOD
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0935
A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]

Received by: [Signature]

Received for laboratory by: [Signature]

Date: 6-18-14 Time: 3:30

Date: 6-18-14 Time: 1710

Sample entered by: [Signature]

Chain of Custody

Account: 2295 Work Order: 004035 Project Leader: CMB No: 237775
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561 Ext:

Samplers: WACIK

Remarks: _____
Total Sampling Time (hours): _____ Bottle Prep by: _____
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? N
Approved By: WAS

19449

Sample No: 6 Desc: WA-4 Surface
~~DHD~~
FC, EC, TC, ~~He~~
NO2-N, NO3-N, d-pod-p, ~~He~~ pod4, BOD ~~SW~~
NH3-N, tkm, Alk, tds, tss, pod-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0950
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/ Cool to 6 C/Zero Headspace;

19450

Sample No: 7 Desc: WA-5 Surface
~~DHD~~
FC, EC, TC, ~~He~~
NO2-N, NO3-N, d-pod-p, o-pod4, BOD ~~SW~~
NH3-N, tkm, Alk, tds, tss, pod-p, toc,

Matrix: 0 Date: 6/18/14
Time: 1000
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/ Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]

Received by: [Signature]

Received for Laboratory by: [Signature]

Date: 6-18-14 Time: 6/18/14 330

Date: 6-18-14 Time: 1710

Sample entered by: [Signature]

Chain of Custody

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB

No: 237775

Account: 2295
Customer: Gregory Wacik

Remarks:

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? N

Approved By: JMS

=====

19451

Sample No: 8 Desc: WA-6 Surface
DAD FC, EC, TC;
NO2-N, NO3-N, d-p04-p, o-p04, BOD
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0800
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

19452

Sample No: 9 Desc: WA-6 Mid-Depth
NO2-N, NO3-N, d-p04-p, o-p04, BOD
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0800
A - 1 X 1 Bod P w/ Cool to 6 C;
B - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]

Received by: [Signature]

Received for Laboratory by: [Signature]

Date: 6/18/14 Time: 3:30

Date: 6/18/14 Time: 1710

Sample entered by: [Signature]

Chain of Custody

Account: 2295 Work Order: 004035 Project Leader: CMB No: 237775
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Remarks:
Total Sampling Time (hours):
Bottle Prep by:
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? Y
Approved By: JRS

19453

Sample No: 10 Desc: WA-6 Deep
NO2-N, NO3-N, d-p04-p, ^{Hg}o-p04, BOD ^{GM}
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0800
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

19454

Sample No: 11 Desc: WA-7 Surface
^{PR0}FC, EC, TC, ^{Hg}
NO2-N, NO3-N, d-p04-p, ^{Hg}o-p04, BOD ^{GM}
NH3-N, tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0 Date: 6/18/14
Time: 0820
A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 6-18-14
Time: 6/18/14
3:30

Received by: [Signature]

Received for Laboratory by: [Signature]
Date: 6-18-14
Time: 7710

Sample entered by: [Signature]

Chain of Custody

Account: 2295
Customer: Gregory Wackl

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB

No: 237775

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561
Ext:

Samplers: WACIK

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? Q N

Approved By: JRS

=====

19455

Sample No: 12 Desc: WA-7 Mid-Depth

NO2-N, NO3-N, d-p04-p, o-p04, BOD H6

NH3-N, tkm, Alk, tds, tss, p04-p, toc, SW

Matrix: 0 Date: 6/18/14
Time: 08:20

A - 1 X 1 Bod p w/ Cool to 6 C;

B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;

C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);

D - 1 X 2xambervoa g w/ H3PO4/zero headspace;

E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

Matrix: 0 Date: 6/18/14
Time: 08:20

A - 1 X 1 Bod p w/ Cool to 6 C;

B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;

C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);

D - 1 X 2xambervoa g w/ H3PO4/zero headspace;

E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

19456

Sample No: 13 Desc: WA-7 Deep

NO2-N, NO3-N, d-p04-p, o-p04, BOD H6

NH3-N, tkm, Alk, tds, tss, p04-p, toc, SW

Matrix: 0 Date: 6/18/14
Time: 08:20

A - 1 X 1 Bod p w/ Cool to 6 C;

B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;

C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);

D - 1 X 2xambervoa g w/ H3PO4/zero headspace;

E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 6-18-14
Time: 6/18/14
3:30

Received by: [Signature]

Received for Laboratory by: [Signature]
Date: 6-18-14
Time: 1710

Sample entered by: [Signature]



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023406
 Date Collected: 07/23/14 09:00
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-1 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	1	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	<2	/100mL	2	1	SM 9222D	07/23	19:20	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:15	HRG
Phosphorus as P, Total	0.03	mg/L	.01	1	SM 4500P-E	07/25	14:25	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	11:42	JCL
Nitrogen, Nitrate	0.11	mg/L	.05	1	EPA 353.2	07/24	16:59	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	14:55	JCL
Nitrogen, Total Kjeldahl	0.28	mg/L	.25	1	EPA 351.2	07/26	15:00	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.4	mg/L	1	1	SM5310 c	07/24	15:53	ALD
RESIDUES								
Solids, Total Dissolved	87	mg/L	5	1	SM 2540c	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	07/24	10:00	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023406

Date Collected: 07/23/14 09:00
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

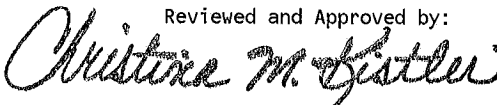
Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

Distribution of Reports:

Reviewed and Approved by:


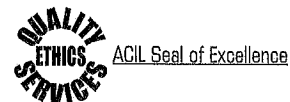
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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023407

Date Collected: 07/23/14 07:00
 Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

	Result	Unit	Rep Limit	Dilut Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	4	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	3	/100mL	2	1	SM 9222D	07/23	19:20	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:15	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:25	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	11:57	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	07/24	17:00	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	14:55	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/26	15:01	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	5.5	mg/L	1	1	SM5310 C	07/24	16:30	ALD
RESIDUES								
Solids, Total Dissolved	65	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	07/24	10:15	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 07/31/14
Lab ID: 2295-14-0023407

Date Collected: 07/23/14 07:00
Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

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Reviewed and Approved by:

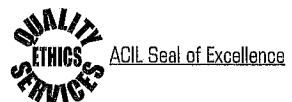
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Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023408
 Date Collected: 07/23/14 07:00
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-2 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:15	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:25	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	12:11	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	07/24	17:01	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	14:58	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/26	15:02	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	6.7	mg/L	1	1	SM5310 C	07/24	17:19	ALD
RESIDUES								
Solids, Total Dissolved	58	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	07/24	10:15	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Reviewed and Approved by:

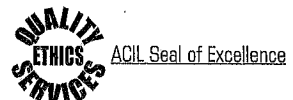
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 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 07/31/14
Lab ID: 2295-14-0023408

Date Collected: 07/23/14 07:00
Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 07/23/14 18:45

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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02 The duplicate analysis of this sample for total dissolved solids was outside the recommended limit of 5% of their average weight.

Distribution of Reports:

Reviewed and Approved by:

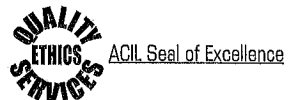
Christina Kistler
Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023409
 Date Collected: 07/23/14 07:00
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-2 Deep

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:15	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:25	HRG
NITROGENS								
Nitrogen, Ammonia	0.07	mg/L	.05	1	D6919-03	07/24	12:26	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	07/24	17:02	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	14:59	JCL
Nitrogen, Total Kjeldahl	0.36	mg/L	.25	1	EPA 351.2	07/26	15:04	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.5	mg/L	1	1	SM5310 C	07/24	17:37	ALD
RESIDUES								
Solids, Total Dissolved	79	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	9	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/L	1	1	SM 2320 B	07/24	10:15	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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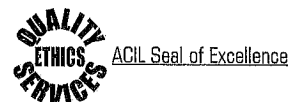
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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023410
 Date Collected: 07/23/14 09:20
 Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	22	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	28	/100ml	2	1	SM 9222D	07/23	19:20	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	0.02	mg/l	.01	1	SM 4500P-E	07/25	14:25	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	07/24	12:41	JCL
Nitrogen, Nitrate	0.13	mg/l	.05	1	EPA 353.2	07/24	17:04	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	07/24	15:02	JCL
Nitrogen, Total Kjeldahl	0.37	mg/l	.25	1	EPA 351.2	07/26	15:05	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.2	mg/l	1	1	SM5310 C	07/24	17:55	ALD
RESIDUES								
Solids, Total Dissolved	92	mg/l	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/l	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/l	1	1	SM 2320 B	07/24	10:15	HRG

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100 Penn Square East
Philadelphia PA 19107

Date of Report: 07/31/14
Lab ID: 2295-14-0023410

Date Collected: 07/23/14 09:20
Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

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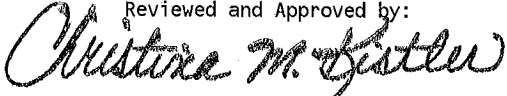
Date of Report: 07/31/14
 Lab ID: 2295-14-0023411
 Date Collected: 07/23/14 09:55
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-4 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	73	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	78	/100mL	2	1	SM 9222D	07/23	19:20	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	0.01	mg/L	.01	1	SM 4500P-E	07/25	14:28	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	12:55	JCL
Nitrogen, Nitrate	0.12	mg/L	.05	1	EPA 353.2	07/24	17:05	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:03	JCL
Nitrogen, Total Kjeldahl	0.3	mg/L	.25	1	EPA 351.2	07/29	11:51	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	3.4	mg/L	1	1	SM5310 C	07/24	18:11	ALD
RESIDUES								
Solids, Total Dissolved	85	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	11	mg/L	1	1	SM 2320 B	07/24	10:30	HRG

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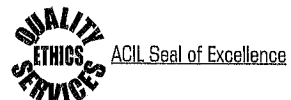
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Date of Report: 07/31/14
 Lab ID: 2295-14-0023411

Date Collected: 07/23/14 09:55
 Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 One of the matrix spike/matrix spike duplicate results was outside of the recommended range but the other passed the criteria for TKN.
- 02 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 03 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

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Date of Report: 07/31/14
 Lab ID: 2295-14-0023412
 Date Collected: 07/23/14 10:10
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	3	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	11	/100mL	2	1	SM 9222D	07/23	19:20	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:28	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	13:39	JCL
Nitrogen, Nitrate	0.11	mg/L	.05	1	EPA 353.2	07/24	17:08	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:04	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/29	11:56	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	2.6	mg/L	1	1	SM5310 C	07/24	18:27	ALD
RESIDUES								
Solids, Total Dissolved	73	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	07/24	10:30	HRG

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Date of Report: 07/31/14
Lab ID: 2295-14-0023412

Date Collected: 07/23/14 10:10
Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

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Date of Report: 07/31/14
 Lab ID: 2295-14-0023413

Date Collected: 07/23/14 07:35
 Collected By: Client

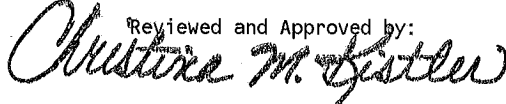
Sample Desc: WA-6 Surface

Date Received: 07/23/14 18:45

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	<2	/100mL	2	1	SM 9222D	07/23	19:35	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	07/24	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	07/25	14:28	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	13:54	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	07/24	17:09	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:05	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/29	11:57	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	5.2	mg/L	1	1	SM5310 C	07/24	18:44	ALD
RESIDUES								
Solids, Total Dissolved	55	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	07/24	10:30	HRG

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 100 Penn Square East
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Date of Report: 07/31/14
 Lab ID: 2295-14-0023413
 Date Collected: 07/23/14 07:35
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-6 Surface

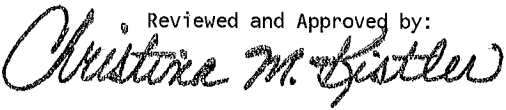
PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

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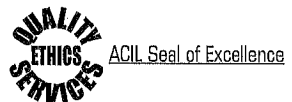
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Date of Report: 07/31/14
 Lab ID: 2295-14-0023414
 Date Collected: 07/23/14 07:35
 Collected By: Client

Sample Desc: WA-6 Mid-Depth

Date Received: 07/23/14 18:45

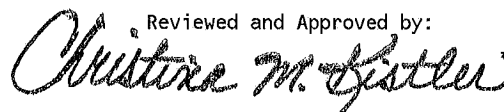
PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	07/24	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	0.02	mg/l	.01	1	SM 4500P-E	07/25	14:28	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	07/24	14:08	JCL
Nitrogen, Nitrate	0.11	mg/l	.05	1	EPA 353.2	07/24	17:10	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	07/24	15:06	JCL
Nitrogen, Total Kjeldahl	<.25	mg/l	.25	1	EPA 351.2	07/29	11:58	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	6.7	mg/l	1	1	SM5310 C	07/24	20:16	ALD
RESIDUES								
Solids, Total Dissolved	70	mg/l	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	<3	mg/l	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/l	1	1	SM 2320 B	07/24	10:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Date of Report: 07/31/14
 Lab ID: 2295-14-0023415
 Date Collected: 07/23/14 07:35
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-6 Deep

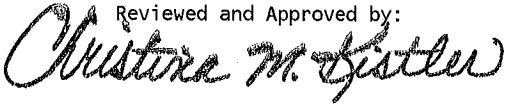
PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:28	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	14:23	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	07/24	17:11	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:07	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/29	11:59	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.3	mg/L	1	1	SM5310 C	07/24	20:34	ALD
RESIDUES								
Solids, Total Dissolved	72	mg/L	5	1	SM 2540C	07/28	13:00	TMH
Solids, Total Suspended	7	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	07/24	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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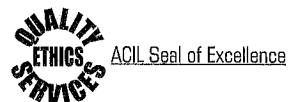
Reviewed and Approved by:

 Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023416
 Date Collected: 07/23/14 07:55
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-7 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	1	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
Fecal Coliform	<2	/100ml	2	1	SM 9222D	07/23	19:35	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	07/24	13:10	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	07/24	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	07/25	14:32	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	14:37	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	07/24	17:12	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:08	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/29	12:00	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	5.7	mg/L	1	1	SM5310 C	07/24	20:51	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	07/28	13:35	TMH
Solids, Total Suspended	5	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	07/24	10:45	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023416
 Date Collected: 07/23/14 07:55
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-7 Surface

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 07/23/14 at 19:10.

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler
 Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023417
 Date Collected: 07/23/14 07:55
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-7 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.03	mg/L	.01	1	SM 4500P-E	07/24	09:55	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:20	HRG
Phosphorus as P, Total	0.03	mg/L	.01	1	SM 4500P-E	07/25	14:32	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	14:52	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	07/24	17:13	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:09	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	07/29	11:01	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.6	mg/L	1	1	SM5310 C	07/24	21:08	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	07/28	13:35	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	07/28	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	07/24	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 07/31/14
 Lab ID: 2295-14-0023418
 Date Collected: 07/23/14 07:55
 Collected By: Client
 Date Received: 07/23/14 18:45

Sample Desc: WA-7 Deep

PWSID: 3130843

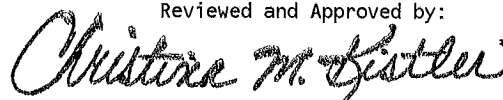
	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	07/24	09:55	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	07/24	15:25	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	07/25	14:27	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	07/24	15:07	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	07/24	17:14	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	07/24	15:10	JCL
Nitrogen, Total Kjeldahl	0.35	mg/L	.25	1	EPA 351.2	07/29	12:02	ALD
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	07/24	13:15	EMW
Total Organic Carbon	7.7	mg/L	1	1	SM5310 C	07/24	21:26	ALD
RESIDUES								
Solids, Total Dissolved	51	mg/L	5	1	SM 2540C	07/28	13:35	TMH
Solids, Total Suspended	6	mg/L	3	1	SM 2540D	07/28	13:35	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	07/24	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Reviewed and Approved by:



Christina Kistler
 Account Executive

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M. J. REIDER ASSOCIATES, INC.

jbs
06/05/14 1:30:21 PM

Chain of Custody

No: 239131

Project Leader: CMB

Work Order: 004035

Work Order Description: Walter Reservoir

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561 Ext:

Samplers: WACIK

Total Sampling Time (hours): _____ Bottle Prep by: _____

Laboratory Receipt Temp: C Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: RAC

Remarks: _____

23406

Sample No: 1 Desc: WA-1 Surface
FC, EC, TC, ^{H6}
NO2-N, NO3-N, d-po4-P, o-po4, BOD, ^{BN}
NH3-N, tkn, Alk, tds, tss, po4-P, toc,

Matrix: 0 Date: 7/23/14
Time: 0700

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X L Bod p w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
- D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

23407

Sample No: 2 Desc: WA-2 Surface
FC, EC, TC, ^{H6}
NO2-N, NO3-N, d-po4-P, o-po4, BOD, ^{BN}
NH3-N, tkn, Alk, tds, tss, po4-P, toc,

Matrix: 0 Date: 7/23/14
Time: 0700

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X L Bod p w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
- D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: Rafael Quijada
Date: 7/23/14 Time: 3:30
1725

Received for laboratory by: [Signature] Rafael Quijada
Date: 7/23 Time: 1845

Sample entered by: [Signature]

M. J. REIDER ASSOCIATES, INC.

jbs
06/05/14 1:30:21 PM

Chain of Custody

No: 239131

Account: 2295 Work Order: 004035 Project Leader: CMB

Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District Environmental Resources Branch
100 Penn Square East Philadelphia PA 19107

Phone: 215-656-6561 Ext: WACIK

Sample No: 23908 Desc: WA-2 Mid-Depth

Matrix: O Date: 7/23/14
Time: 0700

A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Sample No: 23409 Desc: WA-2 Deep

Matrix: O Date: 7/23/14
Time: 0700

A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Sample No: 23410 Desc: WA-3 Surface

Matrix: O Date: 7/23/14
Time: 0920

A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Relinquished by: Rafael Quijada Received for laboratory by: Rafael Quijada

Date: 7/23/14 Time: 3:30 Date: 7/23/14 Time: 1845

Sample entered by: Rafael Quijada

M. J. REIDER ASSOCIATES, INC.

jbs
06/05/14 1:30:23 PM

Chain of Custody

No: 239131

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB

No: 239131

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561 Ext: WACIK

Samplers: WACIK

Total Sampling Time (hours): _____ Bottle Prep by: _____

Laboratory Receipt Temp: 6 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: RAE

Sample No: 6 Desc: WA-4 Surface
WACIK
FC, EC, TC,
NO2-N, NO3-N, d-po4-p, o-po4, BOD WACIK
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Sample No: 7 Desc: WA-5 Surface
WACIK
FC, EC, TC,
NO2-N, NO3-N, d-po4-p, o-po4, BOD WACIK
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: O Date: 7/23/14
Time: 0958
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Matrix: O Date: 7/23/14
Time: 1010
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: Rafael Quijada

Date: 7/23/14 Time: 3:30
1725

Received for Laboratory by: [Signature]

Date: 7/25/14 Time: 1845

Sample entered by: [Signature]

M. J. REIDER ASSOCIATES, INC.

Jbs
06/05/14 1:30:23 PM

Chain of Custody

No: 239131

Account: 2295 Work Order: 004035 Project Leader: CMB
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561 Ext: WACIK

Sample No: 8 Desc: WA-6 Surface
FC, EC, TC, ^{TC}
NO2-N, NO3-N, d-po4-P, o-po4, BOD₅
NH3-N, tkm, Alk, tds, tss, po4-P, toc,

Sample No: 9 Desc: WA-6 Mid-Depth
NO2-N, NO3-N, d-po4-P, o-po4, BOD₅
NH3-N, tkm, Alk, tds, tss, po4-P, toc,

Matrix: 0 Date: 7/23/14
Time: 0735
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Matrix: 0 Date: 7/23/14
Time: 0735
A - 1 X 1 Bod p w/ Cool to 6 C;
B - 1 X 16oz NO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: Rafael Quijada
Date: 7/23/14 Time: 3:30

Received for laboratory by: Rafael Quijada
Date: 7/23/17 Time: 1845

Sample entered by: _____

M. J. REIDER ASSOCIATES, INC.

jbs
06/05/14 1:30:23 PM

Chain of Custody

No: 239131

Project Leader: CMB
Work Order: 004035
Work Order Description: Walter Reservoir

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561
Ext: WACIK

Remarks:

Total Sampling Time (hours): _____ Bottle Prep by: _____

Laboratory Receipt Temp: 6 Deg C If Temp Unacceptable, On Ice? Y N
Approved By: RAC

Date: 7/23/14
Time: 0735

Matrix: 0

- A - 1 X 1 Bod p w/ Cool to 6 C;
- B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
- C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- E - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Date: 7/23/14
Time: 0755

Matrix: 0

- A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
- B - 1 X 1 Bod p w/ Cool to 6 C;
- C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
- D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

23415

Sample No: 10 Desc: WA-6 Deep
NO2-N, NO3-N, d-po4-p, o-po4, BOD, TKN
NH3-N, tkn, Alk, tds, tss, po4-p, toc,

23416

Sample No: 11 Desc: WA-7 Surface
FC, EC, TC, TKN
NO2-N, NO3-N, d-po4-p, o-po4, BOD, TKN
NH3-N, tkn, Alk, tds, tss, po4-p, toc,

Rafael Quijada

Rafael Quijada

Received for laboratory by: _____

Received by: _____

Rafael Quijada

Date: 7/23/14

Date: 7/23/14

Time: 1845

Time: 3:30

1725

Sample entered by: R

Chain of Custody

No: 239131

Project Leader: CMB

Work Order: 004035

Account: 2295

Work Order Description: Walter Reservoir

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext: WACIK

Remarks:

Total Sampling Time (hours): _____ Bottle Prep by: _____

Laboratory Receipt Temp: 6 Deg C. If Temp Unacceptable, On Ice? (Y) N
Approved By: [Signature]

=====

Sample No: 12 Desc: WA-7 Mid-Depth
 NO2-N, NO3-N, d-po4-p, o-po4, BOD ^{H6} _{BN}
 NH3-N, tkm, Alk, tds, tss, po4-p, toc,
 Matrix: 0 Date: 7/23/14
 Time: 0755

=====

Sample No: 13 Desc: WA-7 Deep
 NO2-N, NO3-N, d-po4-p, o-po4, BOD ^{H6} _{BN}
 NH3-N, tkm, Alk, tds, tss, po4-p, toc,
 Matrix: 0 Date: 7/23/14
 Time: 0755

Relinquished by: [Signature] Received by: Rafael Quijada
 Received for laboratory by: Rafael Quijada

Date: 7/23/14 Time: 3:30
1725

Date: 7/23/14 Time: 1845

Sample entered by: [Signature]



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030914

Date Collected: 08/12/14 08:30
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	1	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	<2	/100ml	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	1600	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:35	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	08/13	13:53	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	14:03	JCL
Nitrogen, Nitrate	0.12	mg/L	.05	1	EPA 353.2	08/13	17:57	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	15:58	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:09	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	4.8	mg/L	1	1	SM5310 C	08/13	18:13	ALD
RESIDUES								
Solids, Total Dissolved	59	mg/L	5	1	SM 2540C	08/16	12:20	TMH
Solids, Total Suspended	16	mg/L	3	1	SM 2540D	08/16	12:20	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	08/18	10:30	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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ACIL Seal of Excellence



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030914

Date Collected: 08/12/14 08:30
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

- 02 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler
 Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030915

Date Collected: 08/12/14 07:00
 Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	2	/100mL	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	2400	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	01:58	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	08/13	17:58	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	15:59	JCL
Nitrogen, Total Kjeldahl	0.31	mg/L	.25	1	EPA 351.2	08/14	17:10	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.4	mg/L	1	1	SM5310 C	08/13	18:31	ALD
RESIDUES								
Solids, Total Dissolved	55	mg/L	5	1	SM 2540C	08/16	12:20	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	08/18	10:45	HRG

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Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030915

Date Collected: 08/12/14 07:00
 Collected By: Client

Sample Desc: WA-2 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

- 02 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030916

Date Collected: 08/12/14 07:00
 Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.09	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:35	HRG
Phosphorus as P, Total	0.10	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	02:13	JCL
Nitrogen, Nitrate	0.12	mg/L	.05	1	EPA 353.2	08/13	17:59	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:00	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:11	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.4	mg/L	1	1	SM5310 c	08/13	18:48	ALD
RESIDUES								
Solids, Total Dissolved	63	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	08/18	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina M. Kistler
 Christina Kistler
 Account Executive

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 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030916

Date Collected: 08/12/14 07:00
 Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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02	The TKN matrix spike was low indicating possible sample matrix interference.						
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Attention: Gregory Wacik
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Date of Report: 08/21/14
 Lab ID: 2295-14-0030917

Date Collected: 08/12/14 07:00
 Collected By: Client

Sample Desc: WA-2 Deep

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:35	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	0.07	mg/L	.05	1	D6919-03	08/13	02:28	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	08/13	18:00	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:01	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:14	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.0	mg/L	1	1	SM5310 C	08/13	19:07	ALD
RESIDUES								
Solids, Total Dissolved	59	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	17	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	08/18	10:45	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Attention: Gregory Wacik
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Date of Report: 08/21/14
 Lab ID: 2295-14-0030918
 Date Collected: 08/12/14 08:50
 Collected By: Client
 Date Received: 08/12/14 16:20

Sample Desc: WA-3 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	330	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	310	/100mL	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:40	HRG
Phosphorus as P, Total	0.08	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	02:43	JCL
Nitrogen, Nitrate	0.74	mg/L	.05	1	EPA 353.2	08/13	18:01	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:02	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:15	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	4.1	mg/L	1	1	SM5310 C	08/13	19:39	ALD
RESIDUES								
Solids, Total Dissolved	83	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	4	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/L	1	1	SM 2320 B	08/18	10:45	HRG

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 Account Executive

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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 08/21/14
Lab ID: 2295-14-0030918

Date Collected: 08/12/14 08:50
Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
--------	------	-----------	---------------	-----------	-----------	-----------	---------

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

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Account Executive

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Attention: Gregory Wacik
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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030919
 Date Collected: 08/12/14 09:15
 Collected By: Client
 Date Received: 08/12/14 16:20

Sample Desc: WA-4 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	440	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	450	/100ml	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:40	HRG
Phosphorus as P, Total	0.04	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	02:58	JCL
Nitrogen, Nitrate	0.21	mg/L	.05	1	EPA 353.2	08/13	18:04	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:04	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:16	JCL
OTHER								
Biochemical Oxygen Demand	2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	2.8	mg/L	1	1	SM5310 C	08/13	19:55	ALD
RESIDUES								
Solids, Total Dissolved	71	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	77	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	14	mg/L	1	1	SM 2320 B	08/18	10:45	HRG

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 Account Executive

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030919
 Date Collected: 08/12/14 09:15
 Collected By: Client
 Date Received: 08/12/14 16:20

Sample Desc: WA-4 Surface

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.
- 03 The SM 5210B sample did not have a DO depletion of at least 2 mg/L.

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Date of Report: 08/21/14
 Lab ID: 2295-14-0030920

Date Collected: 08/12/14 09:25
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	31	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	30	/100ml	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:05	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:40	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	03:13	JCL
Nitrogen, Nitrate	0.13	mg/L	.05	1	EPA 353.2	08/13	18:07	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:05	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:17	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	2.2	mg/L	1	1	SM5310 C	08/13	20:11	ALD
RESIDUES								
Solids, Total Dissolved	74	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	08/18	11:00	HRG

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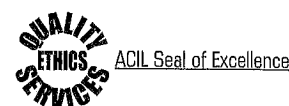
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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030920

Date Collected: 08/12/14 09:25
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

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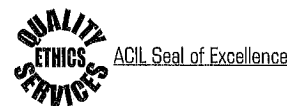
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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030921

Date Collected: 08/12/14 07:30
 Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	<2	/100mL	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	980	mpn/100mL	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.05	mg/L	.01	1	SM 4500P-E	08/13	09:08	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:40	HRG
Phosphorus as P, Total	0.06	mg/L	.01	1	SM 4500P-E	08/13	13:58	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	03:28	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	08/13	18:08	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:06	JCL
Nitrogen, Total Kjeldahl	0.35	mg/L	.25	1	EPA 351.2	08/14	17:18	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.2	mg/L	1	1	SM5310 C	08/13	21:14	ALD
RESIDUES								
Solids, Total Dissolved	62	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	08/18	11:00	HRG

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler
 Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS
M.J. Reider Associates, Inc.



Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 08/21/14
Lab ID: 2295-14-0030921
Date Collected: 08/12/14 07:30
Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

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Reviewed and Approved by:

Christina Kistler
Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030922

Date Collected: 08/12/14 07:30
 Collected By: Client

Sample Desc: WA-6 Mid-Depth

Date Received: 08/12/14 16:20

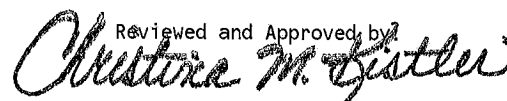
PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.07	mg/L	.01	1	SM 4500P-E	08/13	09:08	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:40	HRG
Phosphorus as P, Total	0.07	mg/L	.01	1	SM 4500P-E	08/13	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	03:43	JCL
Nitrogen, Nitrate	0.09	mg/L	.05	1	EPA 353.2	08/13	18:09	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:09	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:21	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.3	mg/L	1	1	SM5310 C	08/13	21:48	ALD
RESIDUES								
Solids, Total Dissolved	59	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	08/18	11:00	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by


Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030923

Date Collected: 08/12/14 07:30
 Collected By: Client

Sample Desc: WA-6 Deep

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:08	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:43	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/13	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	03:58	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	08/13	18:10	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:10	JCL
Nitrogen, Total Kjeldahl	0.25	mg/L	.25	1	EPA 351.2	08/14	17:22	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.3	mg/L	1	1	SM5310 C	08/13	22:05	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	08/18	11:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina M. Kistler
 Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030924

Date Collected: 08/12/14 07:50
 Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 08/12/14 16:20

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
Fecal Coliform	<2	/100ml	2	1	SM 9222D	08/12	17:15	PLW
Total Coliform	1100	mpn/100ml	1	1	SM 9223B	08/13	11:15	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:08	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:43	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	08/13	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	04:13	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	08/13	18:11	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:11	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:23	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.3	mg/L	1	1	SM5310 C	08/13	22:22	ALD
RESIDUES								
Solids, Total Dissolved	59	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	4	mg/L	3	1	SM 2540D	08/16	12:40	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	08/18	11:30	HRG

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Christina Kistler
 Account Executive

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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 08/21/14
Lab ID: 2295-14-0030924
Date Collected: 08/12/14 07:50
Collected By: Client
Date Received: 08/12/14 16:20

Sample Desc: WA-7 Surface

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 08/12/14 at 17:15.

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Account Executive

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 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030925
 Date Collected: 08/12/14 07:50
 Collected By: Client
 Date Received: 08/12/14 16:20

Sample Desc: WA-7 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:08	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/13	13:43	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/13	14:00	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	04:28	JCL
Nitrogen, Nitrate	0.08	mg/L	.05	1	EPA 353.2	08/13	18:12	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:12	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:24	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	EMW
Total Organic Carbon	5.5	mg/L	1	1	SM5310 C	08/13	22:40	ALD
RESIDUES								
Solids, Total Dissolved	62	mg/L	5	1	SM 2540C	08/16	12:55	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	08/16	13:10	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	08/18	11:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 08/21/14
 Lab ID: 2295-14-0030926
 Date Collected: 08/12/14 07:50
 Collected By: Client
 Date Received: 08/12/14 16:20

Sample Desc: WA-7 Deep

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	08/13	09:10	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	08/14	15:00	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	08/19	13:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	08/13	04:43	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	08/13	18:15	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	08/13	16:15	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	08/14	17:27	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	08/13	14:15	ENW
Total Organic Carbon	4.5	mg/L	1	1	SM5310 C	08/13	22:57	ALD
RESIDUES								
Solids, Total Dissolved	63	mg/L	5	1	SM 2540C	08/16	13:20	TMH
Solids, Total Suspended	8	mg/L	3	1	SM 2540D	08/16	13:10	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	08/18	11:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 08/21/14
Lab ID: 2295-14-0030926

Date Collected: 08/12/14 07:50
Collected By: Client

Sample Desc: WA-7 Deep

Date Received: 08/12/14 16:20

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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02 One of the matrix spike/matrix spike duplicate results was outside of the recommended range but the other passed the criteria for TKN.

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Reviewed and Approved by:

Christina Kistler
Account Executive

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raq
07/16/14 4:26:53 PM

M. J. REIDER ASSOCIATES, INC.

Chain of Custody

Project Leader: CMB

No: 241685

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: UDR ctk

Remarks: _____
Total Sampling Time (hours): _____
Bottle Prep by: _____
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? N
Approved By: SMS

30914 Sample No: 1 Desc: WA-1 Surface

FC, EC, TC, plm
NO2-N, NNO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0830
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/zero Headspace;

30915 Sample No: 2 Desc: WA-2 Surface

FC, EC, TC, plm
NO2-N, NNO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0900
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X 1 Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 8/12/14 Time: 3:30

Received by: [Signature]

Received for laboratory by: _____
Date: 8-12-14

Time: 1620
Sample entered by: [Signature]

Tag
07/16/14 4:26:53 PM

M. J. REIDER ASSOCIATES, INC.

Chain of Custody

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

No: 241685

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561 Ext:

Samplers: WDAGIK

Project Leader: CMB
Remarks: _____
Total Sampling Time (hours): _____
Bottle Prep By: _____
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice: 0 N
Approved By: SMS

30916

Sample No: 3 Desc: WA-2 Mid-Depth

NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, ALK, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0700
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X L 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (PH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

30917

Sample No: 4 Desc: WA-2 Deep

NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, ALK, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0700
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (PH<2);
D - 1 X 2xamberova g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

30918

Sample No: 5 Desc: WA-3 Surface

FC, EC, TC, PH
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, ALK, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0750
A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (PH<2);
E - 1 X 2xamberova g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 8/12/14 Time: 3:00

Received by: [Signature]

Received for laboratory by: [Signature]
Date: 8-12-14 Time: 1620

Sample entered by: [Signature]

raq
07/16/14 4:26:53 PM

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COFC, PRT
Page: 3

Chain of Custody

Project Leader: CMB
Work Order: 004035
Work Order Description: Walter Reservoir

No: 241685

Account: 2295
Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561
Ext:

Samplers: WDAGIK

Remarks:

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? Y N

Approved By: SWG

30919 Sample No: 6 Desc: WA-4 Surface

FC, EC, TC, plm
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, W tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0915

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X 1 Bod P w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
- E - 1 X 2xamberova g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk P w/ Cool to 6 C/zero Headspace;

30920

Sample No: 7 Desc: WA-5 Surface

FC, EC, TC, plm
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, W tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0925

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X 1 Bod P w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
- E - 1 X 2xamberova g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk P w/ Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 8/12/14 Time: 3:53

Received by: [Signature]

Received for laboratory by: [Signature]

Date: 8-12-14 Time: 1020

Sample entered by: SM

Chain of Custody

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB
Walter Reservoir

No: 241685

Account: 2295
Customer: Gregory Wack

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Phone: 215-656-6561
Ext:

Samplers:

Wack

Remarks:

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: *8*

Deg C. If Temp Unacceptable, On Ice? Y N

Approved By: *JRS*

30921 Sample No: 8 Desc: WA-6 Surface

FC, EC, TC, *pl*
NO2-N, NO3-N, d-p04-p, o-p04, BOD,
NH3-N, *MA* tkm, Alk, tds, tss, p04-p, toc,

30922 Sample No: 9 Desc: WA-6 Mid-Depth

NO2-N, NO3-N, d-p04-p, o-p04, BOD,
NH3-N, *MA* tkm, Alk, tds, tss, p04-p, toc,

Matrix: 0

Date: *8/12/14*
Time: *0730*

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X 1 Bod P w/ Cool to 6 C;
- C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
- E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk P w/

Matrix: 0

Date: *8/12/14*
Time: *0730*

- A - 1 X 1 Bod P w/ Cool to 6 C;
- B - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
- C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
- D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
- E - 1 X 8oz Alk P w/

Cool to 6 C/Zero Headspace;

Relinquished by: *[Signature]*
Date: *8/12/14* Time: *3:30*

Received by:

[Signature]

Received for laboratory by:

[Signature]

Date: *8-12-14*

Time: *1620*

Sample entered by: *[Signature]*

Tag
07/16/14 4:26:53 PM

M. J. REIDER ASSOCIATES, INC.

COFC.PRT
Page: 5

Chain of Custody

Project Leader: CMB
Work Order: 004035
Work Order Description: Walter Reservoir

No: 241685

Account: 2295
Customer: Gregory Wack

Remarks:

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: USACE

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? Y N

Approved By: SMS

30923 Sample No: 10 Desc: WA-6 Deep

NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0

Date: 8/12/14
Time: 0726

- A - 1 X 1 Bod p w/ Cool to 6 C;
- B - 1 X 1 6oz NO2NO3 p w/ Cool to 6 C;
- C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- D - 1 X 2xamberova g w/ H3PO4/zero headspace;
- E - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

30924 Sample No: 11 Desc: WA-7 Surface

FC, EC, TC, PM
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0

Date: 8/12/14
Time: 0758

- A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
- B - 1 X 1 Bod p w/ Cool to 6 C;
- C - 1 X 1 6oz NO2NO3 p w/ Cool to 6 C;
- D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
- E - 1 X 2xamberova g w/ H3PO4/zero headspace;
- F - 1 X 8oz Alk p w/ Cool to 6 C/Zero Headspace;

Relinquished by: [Signature]
Date: 8/12/14 Time: 3:00

Received by: [Signature]

Received for Laboratory by: [Signature]

Date: 8-12-14

Time: 1620

Sample entered by: OSM

Chain of Custody

Account: 2295
Customer: Gregory Wackl

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB
No: 241685

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: UDAGIK

Remarks:
Total Sampling Time (hours):
Laboratory Receipt Temp: 8 Deg C. If Temp Unacceptable, On Ice? Y N
Approved By: [Signature] Bottle Prep by:

30925 Sample No: 12 Desc: WA-7 Mid-Depth

NO2-N, ^NNO3-N, d-p04-p, o-p04, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0750
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

30926 Sample No: 13 Desc: WA-7 Deep

NO2-N, ^NNO3-N, d-p04-p, o-p04, BOD,
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 8/12/14
Time: 0750
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/zero Headspace;

Relinquished by: [Signature]
Date: 8/12/14 Time: 3:00

Received by: [Signature]

Received for Laboratory by: [Signature]
Date: 8/12/14 Time: 1620

Sample entered by: [Signature]



CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034278

Date Collected: 09/10/14 09:40
Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	6	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	8	/100ml	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	1000	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.04	mg/l	.01	1	SM 4500P-E	09/11	09:47	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	09/11	12:45	HRG
Phosphorus as P, Total	0.04	mg/l	.01	1	SM 4500P-E	09/11	12:25	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	09/11	03:25	JCL
Nitrogen, Nitrate	0.11	mg/l	.05	1	EPA 353.2	09/11	16:19	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	09/11	14:54	JCL
Nitrogen, Total Kjeldahl	0.27	mg/l	.25	1	EPA 351.2	09/11	18:23	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.0	mg/l	1	1	SM5310 C	09/12	17:09	ALD
RESIDUES								
Solids, Total Dissolved	58	mg/l	5	1	SM 2540C	09/12	12:30	TMH
Solids, Total Suspended	8	mg/l	3	1	SM 2540D	09/12	12:30	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/l	1	1	SM 2320 B	09/15	09:45	HRG

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Reviewed and Approved by:

Christina Kistler
Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034278

Date Collected: 09/10/14 09:40
 Collected By: Client

Sample Desc: WA-1 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

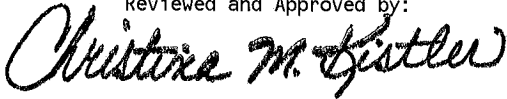
Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

Distribution of Reports:

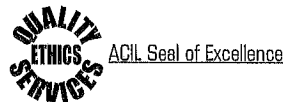
Reviewed and Approved by:

 Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034279
 Date Collected: 09/10/14 07:40
 Collected By: Client
 Date Received: 09/10/14 17:15


Sample Desc: WA-2 Surface

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100mL	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	6	/100mL	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	260	mpn/100mL	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:47	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	03:40	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	09/11	16:20	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	14:55	JCL
Nitrogen, Total Kjeldahl	0.28	mg/L	.25	1	EPA 351.2	09/11	18:24	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.7	mg/L	1	1	SM5310 C	09/12	17:25	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	09/12	12:30	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	12:30	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/L	1	1	SM 2320 B	09/15	10:00	HRG

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Reviewed and Approved by:



Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034279
 Date Collected: 09/10/14 07:40
 Collected By: Client
 Date Received: 09/10/14 17:15

Sample Desc: WA-2 Surface

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

Distribution of Reports:

Reviewed and Approved by:

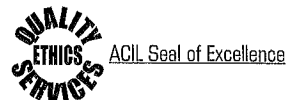
Christina M. Kistler
 Christina Kistler
 Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034280

Date Collected: 09/10/14 07:40
 Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	03:55	JCL
Nitrogen, Nitrate	0.09	mg/L	.05	1	EPA 353.2	09/11	16:21	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	14:56	JCL
Nitrogen, Total Kjeldahl	0.27	mg/L	.25	1	EPA 351.2	09/16	16:38	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.7	mg/L	1	1	SM5310 C	09/12	17:43	ALD
RESIDUES								
Solids, Total Dissolved	53	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	09/15	10:00	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorus was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034280

Date Collected: 09/10/14 07:40
Collected By: Client

Sample Desc: WA-2 Mid-Depth

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
02	The duplicate analysis of this sample for total dissolved solids was outside the recommended limit of 5% of their average weight.							

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Reviewed and Approved by:

Christina Kistler
Account Executive

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Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034281

Date Collected: 09/10/14 07:40
 Collected By: Client

Sample Desc: WA-2 Deep

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	0.06	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	04:10	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	09/11	16:22	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	14:57	JCL
Nitrogen, Total Kjeldahl	0.37	mg/L	.25	1	EPA 351.2	09/16	16:41	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.0	mg/L	1	1	SM5310 C	09/12	17:59	ALD
RESIDUES								
Solids, Total Dissolved	55	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	16	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/L	1	1	SM 2320 B	09/15	10:00	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034282

Date Collected: 09/10/14 10:10
 Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	20	mpn/100mL	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	30	/100mL	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	>2400	mpn/100mL	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:50	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	0.06	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	04:25	JCL
Nitrogen, Nitrate	0.21	mg/L	.05	1	EPA 353.2	09/11	16:23	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	14:58	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	09/16	16:42	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.0	mg/L	1	1	SM5310 C	09/12	18:31	ALD
RESIDUES								
Solids, Total Dissolved	61	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/L	1	1	SM 2320 B	09/15	10:15	HRG

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Christina Kistler
 Account Executive

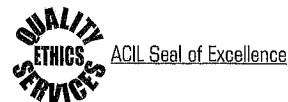
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Attention: Gregory Wacik
Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034282

Date Collected: 09/10/14 10:10
Collected By: Client

Sample Desc: WA-3 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

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Christina M. Kistler
Christina Kistler
Account Executive

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Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034283

Date Collected: 09/10/14 10:30
Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	19	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	21	/100ml	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	>2400	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	04:40	JCL
Nitrogen, Nitrate	<.05	mg/L	.05	1	EPA 353.2	09/11	16:26	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	15:01	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	09/16	16:43	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	2.6	mg/L	1	1	SM5310 C	09/12	18:15	ALD
RESIDUES								
Solids, Total Dissolved	57	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	12	mg/L	1	1	SM 2320 B	09/15	10:15	HRG

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 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034283

Date Collected: 09/10/14 10:30
 Collected By: Client

Sample Desc: WA-4 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
-----	-----	-----	-----	-----	-----	-----	-----

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

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 Christina Kistler
 Account Executive

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Date of Report: 09/18/14
 Lab ID: 2295-14-0034284

Date Collected: 09/10/14 10:50
 Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	5	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	10	/100ml	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	2400	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.02	mg/L	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	0.02	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	04:55	JCL
Nitrogen, Nitrate	0.09	mg/L	.05	1	EPA 353.2	09/11	16:28	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	15:02	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	09/16	16:44	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	2.2	mg/L	1	1	SM5310 C	09/12	18:47	ALD
RESIDUES								
Solids, Total Dissolved	78	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	4	mg/L	1	1	SM 2320 B	09/15	10:15	HRG

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100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034284

Date Collected: 09/10/14 10:50
Collected By: Client

Sample Desc: WA-5 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

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Christina M. Kistler

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Date of Report: 09/18/14
 Lab ID: 2295-14-0034285

Date Collected: 09/10/14 08:10
 Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTERIOLOGY								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	<2	/100ml	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	1100	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/L	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:50	HRG
Phosphorus as P, Total	<.01	mg/L	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	05:10	JCL
Nitrogen, Nitrate	0.10	mg/L	.05	1	EPA 353.2	09/11	16:29	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	15:02	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	09/16	16:45	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.8	mg/L	1	1	SM5310 C	09/12	19:04	ALD
RESIDUES								
Solids, Total Dissolved	51	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	5	mg/L	1	1	SM 2320 B	09/15	10:15	HRG

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Reported To: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034285

Date Collected: 09/10/14 08:10
Collected By: Client

Sample Desc: WA-6 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

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100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034286

Date Collected: 09/10/14 08:10
Collected By: Client

Sample Desc: WA-6 Mid-Depth

Date Received: 09/10/14 17:10

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	09/11	12:53	HRG
Phosphorus as P, Total	<.01	mg/l	.01	1	SM 4500P-E	09/11	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	09/11	05:25	JCL
Nitrogen, Nitrate	0.10	mg/l	.05	1	EPA 353.2	09/11	16:30	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	09/11	15:05	JCL
Nitrogen, Total Kjeldahl	<.25	mg/l	.25	1	EPA 351.2	09/16	16:46	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.6	mg/l	1	1	SM5310 C	09/12	19:21	ALD
RESIDUES								
Solids, Total Dissolved	50	mg/l	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	3	mg/l	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/l	1	1	SM 2320 B	09/15	10:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Date of Report: 09/18/14
Lab ID: 2295-14-0034287

Date Collected: 09/10/14 08:10
Collected By: Client

Sample Desc: WA-6 Deep

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	0.01	mg/L	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/L	.05	1	SM 4500P-E	09/11	12:55	HRG
Phosphorus as P, Total	0.01	mg/L	.01	1	SM 4500P-E	09/11	12:35	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/L	.05	1	D6919-03	09/11	05:40	JCL
Nitrogen, Nitrate	0.11	mg/L	.05	1	EPA 353.2	09/11	16:31	JCL
Nitrogen, Nitrite	<.05	mg/L	.05	1	EPA 353.2	09/11	15:06	JCL
Nitrogen, Total Kjeldahl	<.25	mg/L	.25	1	EPA 351.2	09/16	16:46	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/L	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.1	mg/L	1	1	SM5310 C	09/15	11:40	ALD
RESIDUES								
Solids, Total Dissolved	44	mg/L	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/L	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	7	mg/L	1	1	SM 2320 B	09/15	10:30	HRG

COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

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Date of Report: 09/18/14
 Lab ID: 2295-14-0034288

Date Collected: 09/10/14 08:40
 Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
BACTI								
MICROBIOLOGY								
Escherichia coli	<1	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
Fecal Coliform	<2	/100ml	2	1	SM 9222D	09/10	17:55	PLW
Total Coliform	920	mpn/100ml	1	1	SM 9223B	09/11	11:50	PLW
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	09/11	09:53	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	09/11	12:55	HRG
Phosphorus as P, Total	<.01	mg/l	.01	1	SM 4500P-E	09/11	12:35	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	09/11	12:36	JCL
Nitrogen, Nitrate	0.10	mg/l	.05	1	EPA 353.2	09/11	16:32	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	09/11	15:07	JCL
Nitrogen, Total Kjeldahl	<.25	mg/l	.25	1	EPA 351.2	09/16	16:49	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.3	mg/l	1	1	SM5310 C	09/15	12:30	ALD
RESIDUES								
Solids, Total Dissolved	50	mg/l	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	<3	mg/l	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/l	1	1	SM 2320 B	09/15	10:30	HRG

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100 Penn Square East
Philadelphia PA 19107

Date of Report: 09/18/14
Lab ID: 2295-14-0034288

Date Collected: 09/10/14 08:40
Collected By: Client

Sample Desc: WA-7 Surface

Date Received: 09/10/14 17:15

PWSID: 3130843

Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
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COMMENTS

- 01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.
- 02 The total coliform sample was placed in the incubator on 09/10/14 at 17:40.

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Account Executive

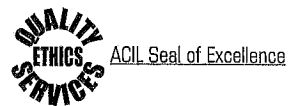
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ENVIRONMENTAL TESTING LABORATORY 107 ANGELICA STREET, READING, PA 19611

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034289
 Date Collected: 09/10/14 08:40
 Collected By: Client
 Date Received: 09/10/14 17:15

Sample Desc: WA-7 Mid-Depth

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	09/11	09:55	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	09/11	12:55	HRG
Phosphorus as P, Total	0.01	mg/l	.01	1	SM 4500P-E	09/11	12:35	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	09/11	12:51	JCL
Nitrogen, Nitrate	0.10	mg/l	.05	1	EPA 353.2	09/11	16:33	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	09/11	15:08	JCL
Nitrogen, Total Kjeldahl	0.27	mg/l	.25	1	EPA 351.2	09/16	16:50	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	4.3	mg/l	1	1	SM5310 C	09/15	13:21	ALD
RESIDUES								
Solids, Total Dissolved	45	mg/l	5	1	SM 2540C	09/12	13:00	TMH
Solids, Total Suspended	3	mg/l	3	1	SM 2540D	09/12	13:00	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	6	mg/l	1	1	SM 2320 B	09/15	10:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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CERTIFICATE OF ANALYSIS

M.J. Reider Associates, Inc.



Attention: Gregory Wacik
 Reported To: USACE, Philadelphia District
 Environmental Resources Branch
 100 Penn Square East
 Philadelphia PA 19107

Date of Report: 09/18/14
 Lab ID: 2295-14-0034290

Date Collected: 09/10/14 08:40
 Collected By: Client

Sample Desc: WA-7 Deep

Date Received: 09/10/14 17:15

PWSID: 3130843

	Result	Unit	Rep Limit	Dilutn Factor	Procedure	Test Date	Test Time	Analyst
CHEMISTRY								
COLORMETRIC								
Phosphate as P, Ortho	<.01	mg/l	.01	1	SM 4500P-E	09/11	09:57	HRG
Phosphorus as P, Dissolved	<.05	mg/l	.05	1	SM 4500P-E	09/12	12:50	HRG
Phosphorus as P, Total	<.01	mg/l	.01	1	SM 4500P-E	09/12	12:30	HRG
NITROGENS								
Nitrogen, Ammonia	<.05	mg/l	.05	1	D6919-03	09/11	13:05	JCL
Nitrogen, Nitrate	0.09	mg/l	.05	1	EPA 353.2	09/11	16:36	JCL
Nitrogen, Nitrite	<.05	mg/l	.05	1	EPA 353.2	09/11	15:11	JCL
Nitrogen, Total Kjeldahl	0.25	mg/l	.25	1	EPA 351.2	09/16	16:51	JCL
OTHER								
Biochemical Oxygen Demand	<2	mg/l	2	1	SM 5210B	09/11	11:30	ALD
Total Organic Carbon	3.6	mg/l	1	1	SM5310 C	09/15	13:37	ALD
RESIDUES								
Solids, Total Dissolved	50	mg/l	5	1	SM 2540C	09/12	13:25	TMH
Solids, Total Suspended	18	mg/l	3	1	SM 2540D	09/12	13:25	TMH
TITRATIONS								
Alkalinity, Total to pH 4.5	8	mg/l	1	1	SM 2320 B	09/15	10:30	HRG

COMMENTS

01 The Ortho-phosphate was filtered and the dissolved phosphorous was filtered and preserved w/ H2SO4 to pH <2 after the sample was received at the laboratory.

Distribution of Reports:

Reviewed and Approved by:

Christina Kistler
 Account Executive

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ACIL Seal of Excellence

Account: 2295

Work Order: 004035

Project Leader: CMB

No: 242819

Customer: Gregory Wacik

Chain of Custody

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:

Remarks:

ON ICE

Total Sampling Time (hours):

Bottle Prep by:

Laboratory Receipt Temp: 13 Deg C IF Temp Unacceptable, On Ice? (Y) N

Approved By: PAE

Samplers: WACIK

=====

Sample No: 1 Desc: WA-1 Surface
FC, EC, TC, ^{He} NO3-N, d-po4-p, ^{He} o-po4, BOD, ^{AD}
NH3-N, tkn, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 9/10/14
Time: 0940
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Sample No: 2 Desc: WA-2 Surface
FC, EC, TC, ^{He} NO3-N, d-po4-p, ^{He} o-po4, BOD, ^{AD}
NH3-N, tkn, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 9/10/14
Time: 0740
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: [Signature]
Date: 9/10/14 Time: 330
1545

Received for laboratory by: [Signature] Rafael Quijeda
Date: 9/10/14 Time: 1715
Sample entered by: [Signature]

M. J. REIDER ASSOCIATES, INC.

jbs
08/06/14 12:25:16 PM

Chain of Custody

Account: 2295 Work Order: 004035 Project Leader: CMB No: 242819
Customer: Gregory Wacik Work Order Description: Walter Reservoir

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:
Samplers: WACIK

Remarks: ON ICE

Total Sampling Time (hours): Bottle Prep by:
Laboratory Receipt Temp: 3 Deg C. If Temp Unacceptable, On Ice: 3 N
Approved By:

Sample No: 3 Desc: WA-2 Mid-Depth
NO2-N, NO3-N, d-po4-p, o-po4, BOD, TK
NH3-N, tkn, Alk, tds, tss, po4-p, toc, TK

Sample No: 4 Desc: WA-2 Deep
NO2-N, NO3-N, d-po4-p, o-po4, BOD, TK
NH3-N, tkn, Alk, tds, tss, po4-p, toc, TK

Sample No: 5 Desc: WA-3 Surface
FC, EC, TC, TK
NO2-N, NO3-N, d-po4-p, o-po4, BOD, TK
NH3-N, tkn, Alk, tds, tss, po4-p, toc, TK

Matrix: 0 Date: 9/10/14
Time: 0740
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Matrix: 0 Date: 9/10/14
Time: 0740
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Matrix: 0 Date: 9/10/14
Time: 1910
A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: [Signature]

Date: 9/10/14 Time: 330
Date: 9/10/14 Time: 1715

Sample entered by: BM

Chain of Custody

Account: 2295
Customer: Gregory Wacik

Work Order: 004035
Work Order Description: Walter Reservoir

Project Leader: CMB
No: 242819

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:

Sample No: 34283 Desc: WA-4 Surface
FC, EC, TC, 1/2 tk AD
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkn, Alk, tds, tss, po4-p, toc,
Matrix: 0
Date: 9/10/14
Time: 1030

Sample No: 34284 Desc: WA-5 Surface
FC, EC, TC, 1/2 tk AD
NO2-N, NO3-N, d-po4-p, o-po4, BOD,
NH3-N, tkn, Alk, tds, tss, po4-p, toc,
Matrix: 0
Date: 9/10/14
Time: 1050

Total Sampling Time (hours): Bottle Prep by:
Laboratory Receipt Temp: 63 deg IF Temp Unacceptable, On Ice? Y N
Approved By:

Remarks: CA ICE

Received for laboratory by:
Date: 9/10/14 Time: 1715
Received by:
Date: Time:

Relinquished by: Received by:
Date: 9/10/14 Time: 330
 1545

Sample entered by:

Account: 2295

Work Order: 004035

Project Leader: CMB

No: 242819

Customer: Gregory Wacik

Work Order Description: Walter Reservoir

Chain of Custody

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext: WACIK

Remarks: ON ICE

Total Sampling Time (hours): _____ Bottle Prep by: _____

Laboratory Receipt Temp: 13 Deg C. If Temp Unacceptable, On Ice? C N
Approved By: RAC

Samplers: _____

Sample No: 8 Desc: WA-6 Surface
FC, EC, TC, pl
NO2-N, NO3-N, d-p_{o4}-p, le p_{o4}, BOD, AD
NH3-N, t_{kn}, Alk, tds, tss, p_{o4}-p, toc,

Matrix: 0

Date: 9/10/14
Time: 0810
A - 1 X 250ml Micro P w/ Sterile/Na2S2O3;
B - 1 X L Bod P w/ Cool to 6 C;
C - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
D - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

Sample No: 9 Desc: WA-6 Mid-Depth
NO2-N, NO3-N, d-p_{o4}-p, le p_{o4}, BOD, AD
NH3-N, t_{kn}, Alk, tds, tss, p_{o4}-p, toc,

Matrix: 0

Date: 9/10/14
Time: 0810
A - 1 X L Bod P w/ Cool to 6 C;
B - 1 X 16oz NO2NO3 P w/ Cool to 6 C;
C - 1 X 500ml NH3 P w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk P w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: [Signature]

Received for laboratory by: Rafael Quiñaca

Date: 9/10/14 Time: 330
1545

Date: 9/10/14 Time: 1715

Sample entered by: 97m

M. J. REIDER ASSOCIATES, INC.

jbs
08/06/14 12:25:17 PM

No: 242819

Chain of Custody

Work Order: 004035
Work Order Description: Walter Reservoir

Account: 2295

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:

Remarks:

ON ICC

Total Sampling Time (hours): 12.00 9/10/14 Bottle Prep by:

Laboratory Receipt Temp: 13 Deg PAE If Temp Unacceptable, On Ice? Y N

Approved By: PAE

Samplers: WACIK

Sample No: 10 Desc: WA-6 Deep
NO2-N, NO3-N, d-po4-p, o-po4, BOD ff
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Sample No: 11 Desc: WA-7 Surface
FC, EC, TC, fld ff
NO2-N, NO3-N, d-po4-p, o-po4, BOD ff
NH3-N, tkm, Alk, tds, tss, po4-p, toc,

Matrix: 0 Date: 9/10/14
Time: 08:40
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Matrix: 0 Date: 9/10/14
Time: 08:40
A - 1 X 250mlMicro P w/ Sterile/Na2S2O3;
B - 1 X L Bod p w/ Cool to 6 C;
C - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
D - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
E - 1 X 2xambervoa g w/ H3PO4/zero headspace;
F - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: [Signature] Received by: [Signature]
Date: 9/10/14 Time: 330
1545

Received for laboratory by: Rafael Leiva
Date: 9/10/14 Time: 1715
Sample entered by: [Signature]

Chain of Custody

Work Order: 004035 Project Leader: CMB No: 242819

Work Order Description: Walter Reservoir

Customer: Gregory Wacik

Address: USACE, Philadelphia District
Environmental Resources Branch
100 Penn Square East
Philadelphia PA 19107
Phone: 215-656-6561 Ext:

Remarks: ON ICE

Total Sampling Time (hours): 9/10/14 Bottle Prep by:

Laboratory Receipt Temp: 63 Deg C IF Temp Unacceptable, On Ice? Y N
Approved By:

Samplers: WACIK

Sample No: 12 Desc: WA-7 Mid-Depth
NO2-N, NO3-N, d-p⁴-p, o-p⁴, BOD, ^{Hg}RP
NH3-N, t^{kn}, Alk, tds, tss, p⁴-p, toc,

Matrix: 0 Date: 9/10/14
Time: 0840
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Sample No: 13 Desc: WA-7 Desp
NO2-N, NO3-N, d-p⁴-p, o-p⁴, BOD, ^{Hg}RP
NH3-N, t^{kn}, Alk, tds, tss, p⁴-p, toc,

Matrix: 0 Date: 9/10/14
Time: 0840
A - 1 X L Bod p w/ Cool to 6 C;
B - 1 X 16ozNO2NO3 p w/ Cool to 6 C;
C - 1 X 500ml NH3 p w/ H2SO4 (pH<2);
D - 1 X 2xambervoa g w/ H3PO4/zero headspace;
E - 1 X 8oz Alk p w/
Cool to 6 C/Zero Headspace;

Relinquished by: Received by:

Received for laboratory by:

Date: 9/10/14 Time: 330
1545

Date: 9/10/14 Time: 1715

Rafael Quijano

Sample entered by: