FINAL REPORT

CITY OF PORTSMOUTH, NEW HAMPSHIRE

PUBLIC WORKS DEPARTMENT
680 PEVERLY HILL ROAD
PORTSMOUTH, NEW HAMPSHIRE

Background Water Quality Sampling in Support of the Future Pease NPDES Permit

March 11, 2019

UNDERWOOD engineers
Portsmouth, New Hampshire

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1. Introduction

1.1. Background

The City of Portsmouth, New Hampshire (City) is planning for future growth at their Pease Wastewater Treatment Facility. The Pease Development Authority (PDA) has identified a significant industrial user as well as other areas within the Tradeport as future sources of growth. This future growth will require the City to request an increase in flow to their NPDES Permit (NH0090000).

The Pease WWTF is designed to treat 1.2 million gallons per day (MGD) of wastewater. The current annual average daily flow is 0.71 MGD (Table NUT1-1, 2013 State of the Estuaries Report). The Pease WWTF shares a combined outfall with Newington's WWTF, which discharges to the Piscataqua River in Newington. The Newington WWTF is designed to treat 0.29 MGD and has a current annual average daily flow of 0.133 MGD.

To increase the Pease National Pollutant Discharge Elimination System (NPDES) permit capacity, the City must seek approval from the New Hampshire Department of Environmental Services (NHDES) in accordance with antidegradation requirements as stated in New Hampshire's Surface Water Quality Rules Env-Wq 1708. The objective of an antidegradation study is to evaluate the impact of an increased pollutant loading on a receiving waters capacity to continue to meet NHDES water quality and designated use criteria. Antidegradation requirements allow for the evaluation of existing WWTF effluent concentrations and existing background concentrations in receiving waters for a suite of water quality parameters.

As part of this antidegradation study, the City contracted with Underwood Engineers to conduct this water quality sampling program in support of making decisions on the future discharge capacity. The sampling program included collecting water quality samples from both the Pease and Newington WWTF effluent as well as sampling within the Piscataqua River. The results of this sampling effort are presented in this report and will be provided to NHDES to support an antidegradation water quality study.

All activities of the sampling program are detailed in a Quality Assurance Field Sampling Plan (QAFSP) which was approved in June of 2018 by the City, NHDES, and US EPA.

2. Sampling Program

2.1. Sampling Schedule

The sampling program consisted of four (4) rounds of concurrent sampling at three (3) unique locations. The dates of sampling were scheduled around specific flood tide conditions based on NHDES guidance, which required the maximum elevation difference from low to high tide to be less than 6.5 feet. Tide elevation predictions were determined through published tide charts for Atlantic Heights, Portsmouth, NH found on the NOAA tides and currents website (https://tidesandcurrents.noaa.gov/). The river sampling location is approximately 300 feet south of the combined WWTF outfall and Atlantic Heights is approximately 7,000 feet south of this sampling location. See Figure 1 for a map of sampling locations and WWTFs.

River samples were taken upstream of the combined outfall approximately 60 to 90 minutes after local slack-low tide, which is the beginning of the flood tide. During a flood tide, "upstream" is south of the outfall or towards the ocean. The objective of these river sampling criteria is to measure background water quality characteristics during a tidal stage when the dilution of sources of pollution, including contributions from the WWTFs, is at or near the lowest levels. The sampling dates, times, and tide elevation changes for each round are listed in Table 1 below.

The WWTF sampling schedule was based on the selected River sampling dates. The WWTF sampling consisted of grab samples and 24-hour composite sampling. The 24-hour composite sampling period was scheduled to finish prior to the start of River sampling and in accordance with the typical 24-hour sampling period at each WWTF. Therefore, Newington sampling was set from 7am to 7am and Pease sampling was set from 8am to 8am. The grab samples were taken either immediately before or after the 24-hour composite sampling program, as necessary. The original dates scheduled in the approved QAFSP were changed due to unforeseen project and planning conditions. The actual dates of sampling and sampling times are listed in Table 1.

Table 1: Project sampling schedule and tide information.

River Sampling				WWTF 24-hour Composite Sampling
Date	Low Tide	Actual Sampling Time	Tide Delta (ft)	Date
9/17/2018	12:18	13:23 to 14:10	6.05	9/16/18 to 9/17/18
10/18/2018	13:36	15:30 to 16:10	5.38	10/17/18 to 10/18/18
11/15/2018	10:51	12:30 to 13:21	5.30	11/14/18 to 11/15/18
12/12/2018	08:29	10:20 to 10:38	6.27	12/11/18 to 12/12/18

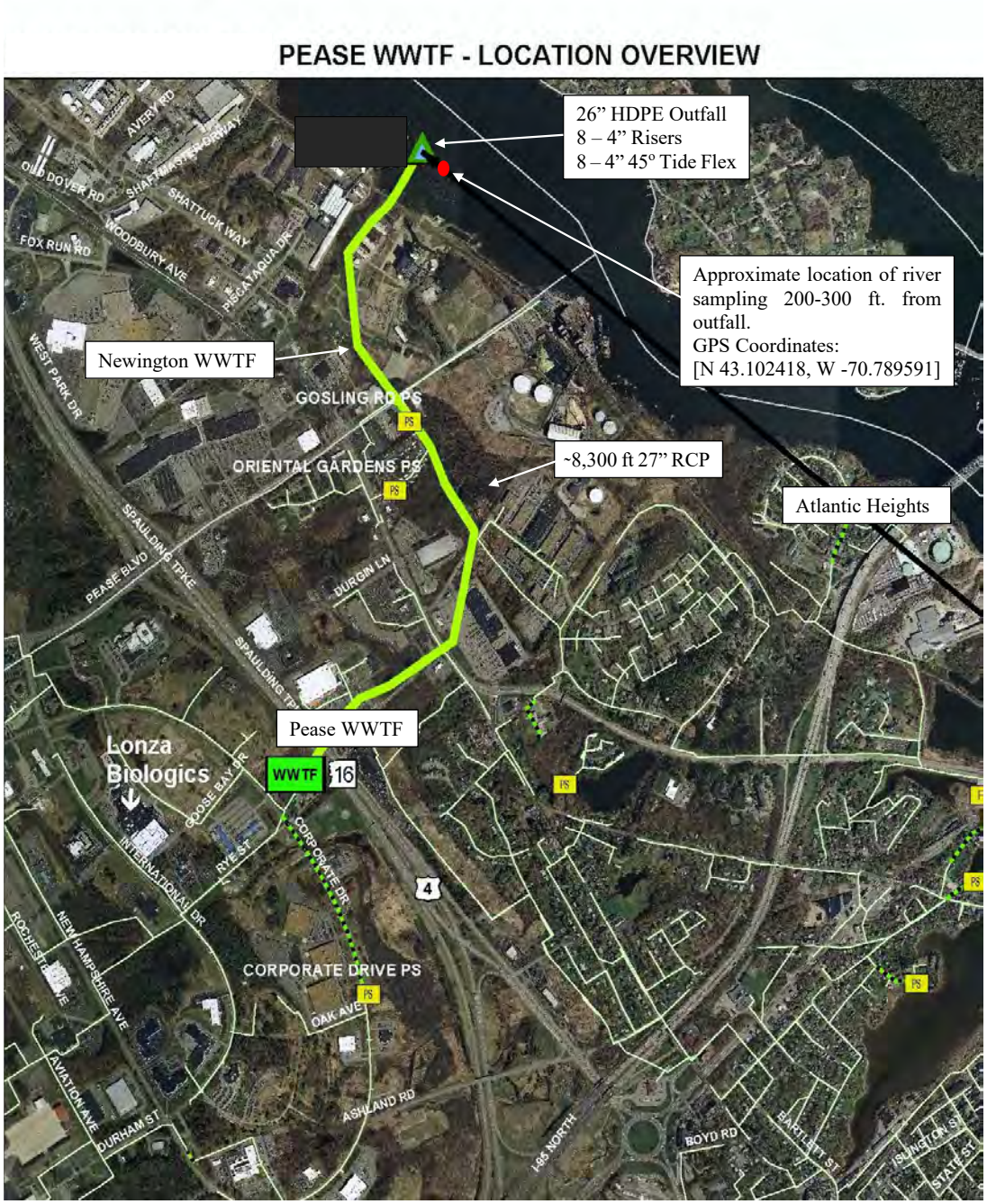

Figure 1: Overview map of WWTF locations, combined outfall, and Piscataqua River sampling location.

2.2. Sampling Methods and Laboratory Procedures

River sampling was conducted by the University of New Hampshire (UNH) Jackson Estuarine Laboratory (JEL). JEL was also responsible for filtering and processing of all River dissolved metals samples as well as packaging both River and WWTF samples for delivery to EFGS. JEL and Underwood Engineers (UE) staff coordinated sample hand-off as needed for each sampling round.

WWTF sampling was conducted by Osprey Owl and UE staff with the assistance of WWTF personnel as needed. To reduce potential contamination from sampling equipment, new sample tubing, pump tubing, and sample collection containers were used for each round. This included placing a new polyethylene liner in the 20L composite sample container for each round. The WWTF sampling team also took precautions to reduce potential ambient metals contamination by removing any personal items that may have resulted in metals contamination.

Sampling in the River and at both WWTF effluent locations consisted of a series of primary and quality control (QC) samples for each parameter to fully characterize the water chemistry and provide verification of sampling procedures. Round 1 had an increased number of QC samples for startup verification and Round 2 through Round 4 had the same sample schedule. See Appendix A for sample count tables of each round. See Section 2.3 of this report for a discussion on QC samples.

River samples were collected using grab sample techniques in accordance with the *Standard of Practice for Grab Sampling* (QAFSP, Appendix C). The field parameters (i.e. pH, temperature, conductivity, dissolved oxygen) were measured in-situ using a multi-parameter water quality meter, model YSI 6600 Sonde (QAFSP, Appendix D). WWTF effluent samples were collected using both grab sample techniques and 24-hour flow-weighted composite sampling. The composite samples are generated using an auto-sampler programmed to draw a pre-determined aliquot after a flow-based interval. The aliquot volume and flow interval are based on the projected WWTF 24-hour flow for each sampling period and calculated to generate sufficient volume to fill all sample bottles.

Sample analysis was conducted by two separate analytical laboratories. Enthalpy Analytical (formerly Enviro-Systems, Inc.) in Hampton, NH and Eurofins Frontier Global Sciences (EFGS) in Bothell, WA. EFGS was contracted for their experience with metals testing in accordance with EPA Method 1640 *Determination of Trace Elements in Water by Preconcentration and Inductively Coupled Plasma-Mass Spectrometry, April 1997.* Method 1640 allows for lower detection limits than EPA Method 200.8 for metals determination through a procedure that reduces interferences typically present in seawater. Additional information on sampling techniques and methodology

can be found in the project QAFSP. See Table 2 for the project sampling matrix which lists the water quality parameters, sample source, sampling technique, analytical testing methods and designated laboratory.

Table 2: Project sample matrix including analytical parameters, sample sources, analytical methods, and designated laboratory.

SAMPLE MATRIX				
Laboratory Parameter	**River**	**WWTF**	**Analytical Method**	**Laboratory**
Biochemical Oxygen Demand (BOD_5)	Grab	24-hour Comp	SM 5210 B	EnviroSystems
Enterococci & Fecal Coliform	Grab	Grab	SM 92222 D	EnviroSystems
Total Suspended Solids (TSS)	Grab	24-hour Comp	SM 2540 D	EnviroSystems
Total Dissolved Solids (TDS)	Grab	24-hour Comp	SM 2540 C	EnviroSystems
Ammonia as N (NH3-N)	Grab	24-hour Comp	SM 4500-NH3 G	EnviroSystems
Chlorine (Total Residual)	NA	Grab	SM 4500-Cl D	WWTF
Total Kjeldahl Nitrogen (TKN)	Grab	24-hour Comp	SM 4500-NH3 G	EnviroSystems
Nitrate + Nitrite as Nitrogen	Grab	24-hour Comp	SM 4500-NO3 F	EnviroSystems
Oil and Grease	Grab	Grab	EPA 1664 A	EnviroSystems
Total Phosphorus	Grab	24-hour Comp	SM 4500-P E	EnviroSystems
Turbidity (NTU)	Grab	Grab	SM 2130 B	EnviroSystems
Total Phenols	Grab	24-hour Comp	EPA 420.1	EnviroSystems
Volatile Organic Compounds	Grab	Grab	EPA 624	EnviroSystems
Acid-Base-Neutral Extractable Compounds (ABNs)	Grab	24-hour Comp	EPA 625 / 8270	EnviroSystems
Total Recoverable Metals (Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Ni, Se, Ag, Tl, Zn)	NA	24-hour Comp	EPA 200.8 CWA Trace Metals	Eurofins FGS
Total Hg	NA	24-hour Comp	EPA 1631 E	Eurofins FGS
Total Cyanide (CN)	NA	24-hour Comp	SM 4500-Cn E	Eurofins FGS
Total Recoverable Metals (Sb, Be, Cr, Fe, Tl)	Grab (unfiltered)	NA	EPA 200.8 CWA Trace Metals	Eurofins FGS
Dissolved Metals (As, Cd, Cu, Pb, Ni, Se, Ag, Zn)	Grab (filtered)	NA	EPA 1640 RP	Eurofins FGS
Total Cyanide (CN)	Grab (unfiltered)	NA	SM 4500-Cn E	Eurofins FGS
Dissolved Hg	Grab (filtered)	NA	EPA 1631 E	Eurofins FGS
Field Parameter				
Dissolved Oxygen	In-Situ	Grab	Field Meter	Field Team / WWTF
Temperature	In-Situ	Grab	Field Meter	Field Team / WWTF
pH	In-Situ	Grab	Field Meter	Field Team / WWTF
Conductivity	In-Situ	Grab	Field Meter	Field Team / WWTF

Sampling for trace metals in the River and at both WWTFs was conducted in accordance with "clean hands" techniques as defined in EPA Method 1669 *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels, July 1996.* Clean hands sampling practices included receiving "trace clean" certified sample bottles for dissolved mercury, total mercury, dissolved metals, total cyanide, 2.5L bottles of reagent water, Nalgene vacuum filters, and laboratory gloves from EFGS. These materials were delivered prior to each sampling round and remained double-bagged until used in the sampling process. After sample bottles were filled, they were immediately returned to the double-bags and stored at 4°C until shipment to EFGS. The total cyanide and dissolved metals samples were stored, packaged and delivered using thermal preservation as required. A record of the temperature of each sample container when it reached the appropriate

laboratory was recorded on the chain-of-custody for each round of sampling and can be found in Appendix B of this report.

2.3. Quality Control Samples

Quality Control samples consisted of duplicate samples, equipment blanks, trip blanks, matrix spike and matrix spike duplicates. The number and type of QC samples for each round can be found in the sample count tables in Appendix A. See Table 3 for a detailed description and rationale of each QC sample type. WWTF equipment blanks were collected prior to starting the 24-hour composite sample program. These consisted of drawing "trace clean" reagent water through the new sample and pump tubing and into the designated sample containers. These samples were capped and stored at 4°C until delivery to the laboratory. River equipment blanks consisted of running "trace clean" reagent water through the vacuum filters and pouring the filtrate into the designated containers for delivery to the appropriate laboratory.

Table 3: Description and rationale of quality control samples.

Quality Control Sample Type	Sample Description	Rationale
Equipment Blank	"Trace Clean" reagent water passed through equipment in the field and collected in the same manner used to collect water quality samples.	To verify that decontamination procedures are adequate and that field and laboratory protocols and procedures do not contaminate samples.
Trip Blank	Deionized water placed in sample container by the laboratory, carried to the study site with other bottles and equipment, and returned to the laboratory unopened for analysis.	To verify that the shipping, handling, and intermittent storage of containers does not result in contamination or cross-contamination of samples
Duplicate Sample	Two water quality samples collected sequentially for the same analytes.	To assess the combined effects of field and laboratory procedures on the measurement variability.
Replicate Sample	Two or more field sample measurements (dissolved oxygen, temperature, pH, conductivity) collected sequentially while in the field.	To assess the precision of measurement in relation to instrument variability and sampler error
Spike Matrix	A sample of either river or WWTF effluent water to which a spike solution is added (spikes will be for metals).	To assess the recovery bias and variability in relation to different water matrices.

3. Results

As noted, analytical testing was conducted at two laboratories for this project, Enthalpy Analytical (EA) in Hampton, NH and Eurofins Frontier Global Sciences (EFGS) in Bothell, WA. The sampling program was followed as detailed in the approved QAFSP and the total sample counts were as planned. Sample results are included in Table 4 – Table 7. Additional details for each sampling round can be found in Appendix B including the field COCs, laboratory COCs and laboratory reports.

Quality control sample results are included in Table 8 – Table 10. The equipment blank results (Table 8) were primarily below method reporting limits (MRL) except for total zinc at the WWTFs. The source of the zinc contamination in the equipment blank samples is not specifically known. Some potential sources are the galvanized hose clamps used for securing the sample tubing, other galvanized equipment in the WWTF treatment process, or from laboratory contamination.

All QC samples were collected as planned in the QAFSP except for the following instance:

- The 24-hour composite sample for Round 1 at Pease did not have sufficient volume to fill all the sample bottles.

This was a result of a lower daily flow than expected over the 24-hour period. The decision was made to omit the duplicate bottles for biological oxygen demand (BOD), total dissolved solids (TDS), and total phenolic compounds (TPhen). These duplicate samples were completed during Round 2 instead. All other Round 1 samples were completed as planned.

The analytical results for total and dissolved metals were reported down to the method detection limit (MDL) instead of the method reporting limit (MRL), where possible. If the sample result was below the MDL, then the result is considered non-detect (ND).

Tables 4 through 7 present the sampling results for each location by date. Table 8 presents the MDL and MRL reporting limits for each parameter.

Table 4: Water Quality Sampling Results for Conventional Pollutants, Bacteria and Field Samples

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Nutrients / Solids / other													
Ammonia-N	mg/L as N	ND	3.6	ND	ND	2.1	ND	ND	3.4	ND	0.65	3.2	ND
Nitrate plus nitrite-N	mg/L as N	0.34	0.8	ND	1.4	3.68	0.06	0.6	3.2	0.09	0.54	2.42	0.14
Total Kjeldahl Nitrogen	mg/L as N	1.2	6	0.16	1	2.85	ND	1.72	5.35	0.345	1.7	4.6	0.15
Total Nitrogen	mg/L as N	1.5	6.8	ND	2.4	6.53	0.06	2.32	8.55	0.435	2.24	7.02	0.29
Total phosphorus	mg/L	1.2	52	0.033	0.25	51	1.4	0.61	30	0.084	0.77	31	0.047
Total suspended solids	mg/L	1.7	17	20	4.6	6.1	3.9	12	15	29	27	19	15
Total dissolved solids	mg/L	710	2,100	31,000	740	1,800	26,000	630	1,600	12,000	1,200	1,900	21,000
Turbidity	NTU	1.23	8.33	0.62	2.04	3.64	0.87	7.38	2.43	1.07	2.2	2	2.3
Oil and grease	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Biochemical Oxygen Demand	mg/L	ND	13	ND	ND	ND	ND	31	6.2	ND	ND	7.8	ND
Total Phenolic Compounds	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Residual Chlorine	mg/L	0.00	0.00	-	-	0.02	-	0.01	0.01	-	3.2	0	-
Total Cyanide	mg/L	ND	0.012	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bacteria													
Fecal Coliform	CFU/100mL	5	3	2	1	1	1	5	ND	107	ND	1	20
Enterococcus	CFU/100mL	7	40	ND	ND	ND	1	ND	2	143	69	40	13
Field Parameters													
Conductivity	mS/cm	1318	336	44.3	1185	3.57	39.79	1174	12.88	21.6	1.287	2.62	28.242
Dissolved oxygen	mg/L	0.2	4.04	7.5	8.48	2.44	8.15	8.88	5.07	10.9	9.69	3.74	9.87
pH		6.63	7.42	7.95	7.59	7.19	-	7.04	7.18	7.71	7.19	7.23	7.78
Temperature	deg C	22.8	26.7	20.1	17.0	19.1	12	14.3	15.5	5.6	10.3	16.2	14.3

Note: Each WWTF has additional testing and routine testing performed as part of the NPDES permit. This table does not include this data.

Table 5: Water Quality Sampling Results for Total Metals and Dissolved Metals

		Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
Parameter	**Units**	**Newington**	**Pease**	**River**	**Newington**	**Pease**	**River**	**Newington**	**Pease**	**River**	**Newington**	**Pease**	**River**
Total Metals													
Mercury	µg/L	0.99	3.17	-	1.45	2.16	-	12.6	5.15	-	6.82	6.49	-
Antimony	µg/L	0.118	0.23	0.356	0.16	0.315	0.624	0.114	0.197	0.154	0.125	0.158	ND
Arsenic	µg/L	1.28	3.64	-	0.87	4.57	-	1	4.63	-	0.7	3.15	-
Beryllium	µg/L	0.005	0.004	ND	0.007	ND	ND	ND	ND	ND	0.004	ND	ND
Cadmium	µg/L	0.014	ND	-	0.015	0.095	-	0.05	0.118	-	0.053	0.052	-
Chromium	µg/L	0.39	0.73	0.38	0.42	0.48	0.43	0.29	0.59	0.71	0.26	0.49	0.93
Copper	µg/L	2.16	10.8	-	2.4	19.8	-	6.03	17.5	-	5.94	9.76	-
Iron	µg/L	63	802	142	57	254	189	142	271	304	159	215	145
Lead	µg/L	0.4	1.03	-	2	0.224	-	1.3	0.304	-	0.82	0.211	-
Nickel	µg/L	2.22	8.31	-	2.31	4.61	-	2.37	3.65	-	2.72	3.58	-
Selenium	µg/L	1.09	1.45	-	1.11	1.35	-	1.59	2.23	-	1.2	1.44	-
Silver	µg/L	0.217	0.027	-	0.267	0.016	-	0.953	0.03	-	2.75	0.019	-
Thallium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	ng/L	85.4	96.4	-	93.2	84.9	-	85.5	117	-	80.5	71.4	-
Dissolved Metals													
Dissolved Mercury	ng/L	-	-	0.35	-	-	1.38	-	-	1.23	-	-	0.59
Dissolved Arsenic	µg/L	-	-	0.97	-	-	0.88	-	-	0.76	-	-	0.85
Dissolved Cadmium	µg/L	-	-	0.135	-	-	0.038	-	-	0.05	-	-	0.04
Dissolved Copper	µg/L	-	-	0.71	-	-	0.53	-	-	0.60	-	-	0.44
Dissolved Lead	µg/L	-	-	0.021	-	-	0.024	-	-	0.11	-	-	0.03
Dissolved Nickel	µg/L	-	-	0.48	-	-	0.41	-	-	0.68	-	-	0.54
Dissolved Selenium	µg/L	-	-	ND	-	-	ND	-	-	ND	-	-	ND
Dissolved Silver	µg/L	-	-	0.09	-	-	0.02	-	-	0.02	-	-	0.03
Dissolved Zinc	µg/L	-	-	0.57	-	-	0.91	-	-	2.39	-	-	1.80

Table 6: Water Quality Sampling Results for Volatile Organic Compounds

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Volatile Organic Compounds													
1,1,1,2-tetrachloroethane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,1,1-trichloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-tetrachloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-trichloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloroethene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,1-dichloropropene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2,3-trichlorobenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2,3-trichloropropane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2,4-trichlorobenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2,4-trimethylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2-dibromo-3-chloropropane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2-dibromoethane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,2-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichloropropane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,3,5-trimethylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
1,3-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,3-dichloropropane	ug/L	-	-	-	U	U	U	-	-	-	U	U	U
1,4-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,2-dichloropropane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
2-Butanone (MEK)	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
2-chloroethylvinylether	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-chlorotoluene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
2-Hexanone	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
2-methoxy-2-methylbutane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
4-bromofluorobenzene	%	98	97	92	104	104	108	106	104	97	100	98	98
4-chlorotoluene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
4-isopropyltoluene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
4-Methyl-2-pentanone	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
Acetone	ug/L	U	17	U	-	-	-	U	U	U	U	U	U
acrolein	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
acrylonitrile	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Volatile Organic Compounds (continued)													
bromobenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
bromochloromethane	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
bromodichloromethane	ug/L	71	53	U	140	40	U	30	28	U	22	14	U
bromoform	ug/L	6.7	2.2	U	7	U	U	1.6	U	U	2.3	U	U
bromomethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
Carbon disulfide	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
carbon tetrachloride	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
chlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
chloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
chloroform	ug/L	40	66	U	220	92	U	53	74	U	18	25	U
chloromethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,2-dichloroethene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-dichloropropene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
dibromochloromethane	ug/L	54	24	U	79	18	U	17	10	U	12	6.6	U
dibromofluoromethane	%	-	-	-	108	104	100	-	-	-	88	86	88
dibromomethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
dichlorodifluoromethane	ug/L	-	-	-	U	U	U	-	-	-	U	U	U
diethylether	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
diisopropyl ether	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
ethylbenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
ethyl-t-butyl ether	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
Fluorobenzene	%	94	99	95	-	-	-	108	108	96	-	-	-
hexachlorobutadiene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
iodomethane	ug/L	-	-	-	-	-	-	-	-	-	3.1	U	U
isopropylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
m- and p-xylene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
methylene chloride	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
methyl-t-butyl ether	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
naphthalene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
n-butylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
n-propylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
o-xylene	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
p/m-Xylene	ug/L	U	U	U	-	-	-	U	U	U	-	-	-
Pentafluorobenzene	%	96	98	104	-	-	-	120	120	98	-	-	-

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Volatile Organic Compounds (continued)													
sec-butylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
Styrene	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
tert-butanol	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
tert-butylbenzene	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
tetrachloroethene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
tetrahydrofuran	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
toluene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
toluene-d8	%	-	-	-	102	100	102	-	-	-	94	96	96
trans-1,2-dichloroethene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-dichloropropene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,4-dichloro-2-bute	ug/L	-	-	-	-	-	-	-	-	-	U	U	U
trichloroethene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
trichlorofluoromethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl acetate	ug/L	U	U	U	-	-	-	U	U	U	U	U	U
vinyl chloride	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
Xylenes, Total	ug/L	U	U	U	-	-	-	U	U	U	-	-	-

Table 7: Water Quality Sampling Results for Acid and Base Neutral Compounds (Semi-volatile Organic Compounds)

		Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
Parameter	Units	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Acid-Base-Neutral Compounds (Semivolatile Organics)													
1,2,4-trichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,2-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,2-diphenylhydrazine (azobenze	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,3-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
1,4-dichlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4,5-trichlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4,6-tribromophenol	%	-	95.29	75.05	114.825	109.05	89.745	63.68	64.5	59.865	81.775	59.63	62.355
2,4,6-trichlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dichlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dimethylphenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dinitrophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,4-dinitrotoluene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,6-dichlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2,6-dinitrotoluene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-chloronaphthalene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-chlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-fluorobiphenyl	%	-	32.57	47.42	62.57	61.9	62.98	56.98	47.38	60.36	41.18	32.63	41.52
2-fluorophenol	%	-	39.77	49.245	55.545	55.63	57.265	35.255	37.645	44.65	23.115	22.19	33.675
2-methylnaphthalene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-methylphenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-nitroaniline	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
2-nitrophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
3,3'-dichlorobenzidine	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
3-nitroaniline	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4,6-dinitro-2-methylphenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-bromophenyl-phenylether	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-chloro-3-methylphenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-chloroaniline	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-chlorophenyl-phenylether	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-methylphenol (p-cresol)	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-nitroaniline	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
4-nitrophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
acenaphthylene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Acid-Base-Neutral Compounds (Semivolatile Organics) (continued)													
aniline	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
anthracene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzidine	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)anthracene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzo(a)pyrene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzo(b)fluoranthene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzo(g,h,i)perylene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzo(k)fluoranthene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzoic acid	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
benzyl alcohol	ug/L	U	54	U	U	U	U	U	U	U	U	U	U
bis(2-chloroethoxy)methane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroethyl)ether	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)ether	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
bis(2-ethylhexyl)phthalate	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
butylbenzylphthalate	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
carbazole	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
chrysene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
dibenzo(a,h)anthracene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
dibenzofuran	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
diethylphthalate	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
dimethylphthalate	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
di-n-butylphthalate	ug/L	U	U	U	U, B	U, B	26	12	20	29	19	21	25
di-n-octylphthalate	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
fluoranthene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
fluorene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
hexachloro-1,3-butadiene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
hexachlorocyclopentadiene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
hexachloroethane	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
indeno(1,2,3-cd)pyrene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
isophorone	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
naphthalene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
nitrobenzene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
nitrobenzene-d5	%	-	39.21	55.34	66.5	67.28	70.71	57.84	50.91	60.11	43.43	35.62	44.32

Parameter	Units	Round 1 - Sept. 16-17, 2018			Round 2 - Oct. 17-18, 2018			Round 3 - Nov. 14-15, 2018			Round 4 - Dec. 11-12, 2018		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Acid-Base-Neutral Compounds (Semivolatile Organics) (continued)													
N-nitrosodimethylamine	ug/L	-	U	U	U	U	U	U	U	U	U	U	U
N-nitroso-di-n-propylamine	ug/L	U	4.4	U	U	U	U	U	U	U	U	U	U
N-nitrosodiphenylamine	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
pentachlorophenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
phenanthrene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
phenol	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
phenol-d5	%	-	24.86	36.36	45.98	46	62.86	31.545	33.48	48.345	21.73	19.515	41.41
pyrene	ug/L	U	U	U	U	U	U	U	U	U	U	U	U
pyridine	ug/L	-	U	U	U	U	U	U	U	U	U	U	U
terphenyl-d14	%	-	41.48	34.48	85.48	86	66.69	67.31	64.32	60.34	75.18	59.11	64.26

Table 8: Method detection limit (MDL) and method reporting limit (MRL) for all target parameters in this project.

Laboratory Parameter	Analytical Method	MDL	MRL	Units
Biochemical Oxygen Demand (BOD_5)	SM 5210 B		5	mg/L
Enterococci & Fecal Coliform	SM 92222 D		1	CFU/100mL
Total Suspended Solids (TSS)	SM 2540 D	0.4	10	mg/L
Total Dissolved Solids (TDS)	SM 2540 C	0.4	10	mg/L
Ammonia as N (NH_3-N)	SM 4500-NH3 G	0.1	0.1	mg/L
Chlorine (Total Residual)	SM 4500-Cl D		0.02	mg/L
Total Kjeldahl Nitrogen (TKN)	SM 4500-NH3 G	0.1	0.1	mg/L
Nitrate + Nitrite as Nitrogen (NO_3 + NO_2 as N)	SM 4500-NO3 F	0.008	0.05	mg/L
Oil and Grease	EPA 1664 A		10	mg/L
Total Phosphorus (TP)	SM 4500-P E	0.008	0.02	mg/L
Turbidity	SM 2130 B			NTU
Total Phenols	EPA 420.1		0.05	mg/L
Volatile Organic Compounds (VOC)	EPA 624		5	µg/L
Acid-Base-Neutral Extractable Compounds (ABNs)	EPA 625 / 8270		5	µg/L
Total Recoverable Metals - Fresh Water (CWA Trace Metals)				
Antimony (Sb)	EPA 200.8	0.009	0.02	µg/L
Arsenic (As)	EPA 200.8	0.1	0.3	µg/L
Beryllium (Be)	EPA 200.8	0.004	0.06	µg/L
Cadmium (Cd)	EPA 200.8	0.008	0.02	µg/L
Total Chromium	EPA 200.8	0.02	0.1	µg/L
Copper (Cu)	EPA 200.8	0.02	0.1	µg/L
Iron (Fe)	EPA 200.8	1.1	10	µg/L
Lead (Pb)	EPA 200.8	0.005	0.04	µg/L
Nickel (Ni)	EPA 200.8	0.04	0.1	µg/L
Selenium (Se)	EPA 200.8	0.44	0.6	µg/L
Silver (Ag)	EPA 200.8	0.002	0.02	µg/L
Thallium (Tl)	EPA 200.8	0.006	0.02	µg/L
Zinc (Zn)	EPA 200.8	0.16	0.5	µg/L
Total Mercury (Hg)	EPA 1631 E	0.0834	0.5	ng/L
Total Cyanide (CN)	SM 4500-CN E	0.007	0.02	mg/L
Total Recoverable Metals - Seawater (CWA Trace Metals)				
Antimony (Sb)	EPA 200.8	0.09	0.2	µg/L

Beryllium (Be)	EPA 200.8	0.04	0.6	µg/L
Total Chromium	EPA 200.8	0.2	1.0	µg/L
Iron (Fe)	EPA 200.8	11	100	µg/L
Thallium (Tl)	EPA 200.8	0.06	0.2	µg/L
Total Cyanide (CN)	SM 4500-CN E	0.007	0.02	mg/L
Dissolved Metals in Seawater				
Arsenic (As)	EPA 1640 RP	0.0395	0.375	µg/L
Cadmium (Cd)	EPA 1640 RP	0.0203	0.1	µg/L
Copper (Cu)	EPA 1640 RP	0.078	0.25	µg/L
Lead (Pb)	EPA 1640 RP	0.02	0.1	µg/L
Nickel (Ni)	EPA 1640 RP	0.0751	0.25	µg/L
Selenium (Se)	EPA 1640 RP	0.156	1.5	µg/L
Silver (Ag)	EPA 1640 RP	0.01	0.1	µg/L
Zinc (Zn)	EPA 1640 RP	0.139	0.5	µg/L
Dissolved Hg	EPA 1631 E	0.0834	0.5	ng/L

Table 9: Quality Control (QC) Equipment Blank Results for Newington WWTF, Pease WWTF, and Piscataqua River.

Parameter	UNITS	ROUND 1			ROUND 2			ROUND 3			ROUND 4		
		Newington	Pease	River	Newington	Pease	River	Newington	Pease	River	Newington	Pease	River
Total Metals													
Mercury	ng/L	ND	*0.11*	-	ND	ND	-	ND	ND	-	ND	ND	-
Antimony	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	*0.01*	ND	ND	ND
Arsenic	µg/L	ND	ND	-	ND	*0.14*	-	ND	ND	-	ND	ND	-
Beryllium	µg/L	*0.007*	*0.008*	*0.007*	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	µg/L	ND	ND	-	ND	ND	-	ND	ND	-	ND	ND	-
Chromium	µg/L	*0.03*	ND	ND	ND	*0.05*	*0.06*	ND	ND	ND	ND	ND	ND
Copper	µg/L	*0.07*	*0.05*	-	*0.03*	*0.07*	-	*0.05*	*0.04*	-	*0.04*	*0.02*	-
Iron	µg/L	*2*	ND	*2*	ND	*3*	ND	ND	ND	ND	ND	ND	ND
Lead	µg/L	ND	ND	-	ND	*0.01*	-	ND	ND	-	ND	ND	-
Nickel	µg/L	**0.13**	ND	-	ND	**0.2**	-	*0.05*	ND	-	ND	ND	-
Selenium	µg/L	ND	ND	-	ND	**1.71**	-	ND	ND	-	ND	ND	-
Silver	µg/L	*0.002*	ND	-	ND	ND	-	ND	ND	-	ND	ND	-
Thallium	µg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	µg/L	*1.53*	**15.6**	-	**9.86**	**9.25**	-	**5.51**	**31.3**	-	**5.38**	**22.3**	-
Dissolved Metals													
Dissolved Mercury	ng/L	-	-	ND	-	-	ND	-	-	ND	-	-	ND
Dissolved Arsenic	µg/L	-	-	Note 1	-	-	ND	-	-	ND	-	-	ND
Dissolved Cadmium	µg/L	-	-	Note 1	-	-	*0.026*	-	-	**0.123**	-	-	*0.02*
Dissolved Copper	µg/L	-	-	Note 1	-	-	ND	-	-	ND	-	-	ND
Dissolved Lead	µg/L	-	-	Note 1	-	-	ND	-	-	ND	-	-	ND
Dissolved Nickel	µg/L	-	-	Note 1	-	-	*0.17*	-	-	*0.2*	-	-	ND
Dissolved Selenium	µg/L	-	-	Note 1	-	-	ND	-	-	ND	-	-	ND
Dissolved Silver	µg/L	-	-	Note 1	-	-	*0.03*	-	-	*0.02*	-	-	*0.03*
Dissolved Zinc	µg/L	-	-	Note 1	-	-	*0.32*	-	-	*0.24*	-	-	*0.31*
Dissolved Chromium	µg/L	-	-	Note 1	-	-	*0.06*	-	-		-	-	

1) Round 1, River equipment blank sample not generated in field due to insufficient volume of "trace clean" reagent water.

2) All values in "*italics*" are below the method reporting limit (MRL) and above the method detection limit (MDL).

3) All values that are "**bold**" are above the MRL.

Table 10: Quality Control (QC) Equipment Blank and Trip Blank Results.

Parameter	UNITS	ROUND 1				ROUND 2	ROUND 3	ROUND 4
		NEW_EB	PEASE_EB	RIVER_EB	RIVER_TB	RIVER_TB	RIVER_TB	RIVER_TB
Volatile Organic Componds								
1,1,1,2-tetrachloroethane	ug/L	-	-	-	-	-	-	U
1,1,1-trichloroethane	ug/L	U	U	U	U	U	U	U
1,1,2,2-tetrachloroethane	ug/L	U	U	U	U	U	U	U
1,1,2-trichloroethane	ug/L	U	U	U	U	U	U	U
1,1-dichloroethane	ug/L	U	U	U	U	U	U	U
1,1-dichloroethene	ug/L	U	U	U	U	U	U	U
1,1-dichloropropene	ug/L	-	-	-	-	-	-	U
1,2,3-trichlorobenzene	ug/L	-	-	-	-	-	-	U
1,2,3-trichloropropane	ug/L	-	-	-	-	-	-	U
1,2,4-trichlorobenzene	ug/L	-	-	-	-	-	-	U
1,2,4-trimethylbenzene	ug/L	-	-	-	-	-	-	U
1,2-dibromo-3-chloropropane	ug/L	-	-	-	-	-	-	U
1,2-dibromoethane	ug/L	-	-	-	-	-	-	U
1,2-dichlorobenzene	ug/L	U	U	U	U	U	U	U
1,2-dichloroethane	ug/L	U	U	U	U	U	U	U
1,2-dichloropropane	ug/L	U	U	U	U	U	U	U
1,3,5-trimethylbenzene	ug/L	-	-	-	-	-	-	U
1,3-dichlorobenzene	ug/L	U	U	U	U	U	U	U
1,3-dichloropropane	ug/L	-	-	-	-	U	-	U
1,4-dichlorobenzene	ug/L	U	U	U	U	U	U	U
2,2-dichloropropane	ug/L	-	-	-	-	-	-	U
2-Butanone	ug/L	U	U	U	U	-	U	U
2-chloroethylvinylether	ug/L	U	U	U	U	U	U	U
2-chlorotoluene	ug/L	-	-	-	-	-	-	U
2-Hexanone	ug/L	U	U	U	U	-	U	U
2-methoxy-2-methylbutane	ug/L	-	-	-	-	-	-	U
4-bromofluorobenzene	%	101	101	102	103	104	107	98
4-chlorotoluene	ug/L	-	-	-	-	-	-	U
4-isopropyltoluene	ug/L	-	-	-	-	-	-	U
4-Methyl-2-pentanone	ug/L	U	U	U	U	-	U	U
Acetone	ug/L	U	U	U	U	-	U	**140**
acrolein	ug/L	U	U	U	U	U	U	U
acrylonitrile	ug/L	U	U	U	U	U	U	U
benzene	ug/L	U	U	U	U	U	U	U
bromobenzene	ug/L	-	-	-	-	-	-	U
bromochloromethane	ug/L	-	-	-	-	-	-	U
bromodichloromethane	ug/L	U	U	U	U	U	U	U
bromoform	ug/L	U	U	U	U	U	U	U
bromomethane	ug/L	U	U	U	U	U	U	U
Carbon disulfide	ug/L	U	U	U	U	-	U	U
carbon tetrachloride	ug/L	U	U	U	U	U	U	U
chlorobenzene	ug/L	U	U	U	U	U	U	U
chloroethane	ug/L	U	U	U	U	U	U	U
chloroform	ug/L	U	U	U	U	U	U	U
chloromethane	ug/L	U	U	U	U	U	U	U

Parameter	UNITS	ROUND 1				ROUND 2	ROUND 3	ROUND 4
		NEW_EB	PEASE_EB	RIVER_EB	RIVER_TB	RIVER_TB	RIVER_TB	RIVER_TB
Volatile Organic Componds (continued)								
cis-1,2-dichloroethene	ug/L	U	U	U	U	U	U	U
cis-1,3-dichloropropene	ug/L	U	U	U	U	U	U	U
dibromochloromethane	ug/L	U	U	U	U	U	U	U
dibromofluoromethane	%	-	-	-	-	98	-	88
dibromomethane	ug/L	U	U	U	U	U	U	U
dichlorodifluoromethane	ug/L	-	-	-	-	U	-	U
diethylether	ug/L	-	-	-	-	-	-	U
diisopropyl ether	ug/L	-	-	-	-	-	-	U
ethylbenzene	ug/L	U	U	U	U	U	U	U
ethyl-t-butyl ether	ug/L	-	-	-	-	-	-	U
Fluorobenzene	%	99	88	101	101	-	102	-
hexachlorobutadiene	ug/L	-	-	-	-	-	-	U
iodomethane	ug/L	-	-	-	-	-	-	3
isopropylbenzene	ug/L	-	-	-	-	-	-	U
m- and p-xylene	ug/L	-	-	-	-	-	-	U
methylene chloride	ug/L	U	**1.2**	U	U	U	U	**260**
methyl-t-butyl ether	ug/L	-	-	-	-	-	-	U
naphthalene	ug/L	-	-	-	-	-	-	U
n-butylbenzene	ug/L	-	-	-	-	-	-	U
n-propylbenzene	ug/L	-	-	-	-	-	-	U
o-xylene	ug/L	U	U	U	U	-	U	U
p/m-Xylene	ug/L	U	U	U	U	-	U	-
Pentafluorobenzene	%	96	94	106	107	-	117	-
sec-butylbenzene	ug/L	-	-	-	-	-	-	U
Styrene	ug/L	U	U	U	U	-	U	U
tert-butanol	ug/L	-	-	-	-	-	-	U
tert-butylbenzene	ug/L	-	-	-	-	-	-	U
tetrachloroethene	ug/L	U	U	U	U	U	U	U
tetrahydrofuran	ug/L	-	-	-	-	-	-	U
toluene	ug/L	U	U	U	U	U	U	U
toluene-d8	%	-	-	-	-	104	-	98
trans-1,2-dichloroethene	ug/L	U	U	U	U	U	U	U
trans-1,3-dichloropropene	ug/L	U	U	U	U	U	U	U
trans-1,4-dichloro-2-bute	ug/L	-	-	-	-	-	-	U
trichloroethene	ug/L	U	U	U	U	U	U	U
trichlorofluoromethane	ug/L	U	U	U	U	U	U	U
Vinyl acetate	ug/L	U	U	U	U	-	U	U
vinyl chloride	ug/L	U	U	U	U	U	U	U
Xylenes, Total	ug/L	U	U	U	U	-	U	-
1) Round 1, River equipment blank sample not generated in field due to insufficient volume of "trace clean" reagent water.								
2) All values in "*italics*" are below the method reporting limit (MRL) and above the method detection limit (MDL).								
3) All values that are "**bold**" are above the MRL.								

Table 11: Quality Control (QC) Equipment Blank and Trip Blank Results.

Parameter	UNITS	ROUND 1				ROUND 2	ROUND 3	ROUND 4
		NEW_EB	PEASE_EB	RIVER_EB	RIVER_TB	RIVER_TB	RIVER_TB	RIVER_TB
Acid-Base-Neutral Compounds								
1,2,4-trichlorobenzene	ug/L	U	U	U	U	U	U	U
1,2-dichlorobenzene	ug/L	U	U	U	U	U	U	U
1,2-diphenylhydrazine (azobenzene)	ug/L	U	U	U	U	U	U	U
1,3-dichlorobenzene	ug/L	U	U	U	U	U	U	U
1,4-dichlorobenzene	ug/L	U	U	U	U	U	U	U
1-methylnaphthalene	ug/L	-	-	U	U	-	-	-
2,4,5-trichlorophenol	ug/L	U	U	U	U	U	U	U
2,4,6-tribromophenol	%	65.625	69.8	68.725	59.805	119.34	89.71	92.005
2,4,6-trichlorophenol	ug/L	U	U	U	U	U	U	U
2,4-dichlorophenol	ug/L	U	U	U	U	U	U	U
2,4-dimethylphenol	ug/L	U	U	U	U	U	U	U
2,4-dinitrophenol	ug/L	U	U	U	U	U	U	U
2,4-dinitrotoluene	ug/L	U	U	U	U	U	U	U
2,6-dichlorophenol	ug/L	U	U	U	U	U	U	U
2,6-dinitrotoluene	ug/L	U	U	U	U	U	U	U
2-chloronaphthalene	ug/L	U	U	U	U	U	U	U
2-chlorophenol	ug/L	U	U	U	U	U	U	U
2-fluorobiphenyl	%	58.87	51.91	51.25	39.45	70.64	58.98	65.13
2-fluorophenol	%	31.51	37.255	27.495	28.195	54.4	50.025	40.995
2-methylnaphthalene	ug/L	U	U	U	U	U	U	U
2-methylphenol	ug/L	U	U	U	U	U	U	U
2-nitroaniline	ug/L	U	U	U	U	U	U	U
2-nitrophenol	ug/L	U	U	U	U	U	U	U
3,3'-dichlorobenzidine	ug/L	U	U	U	U	U	U	U
3-nitroaniline	ug/L	U	U	U	U	U	U	U
4,6-dinitro-2-methylphenol	ug/L	U	U	U	U	U	U	U
4-bromophenyl-phenylether	ug/L	U	U	U	U	U	U	U
4-chloro-3-methylphenol	ug/L	U	U	U	U	U	U	U
4-chloroaniline	ug/L	U	U	U	U	U	U	U
4-chlorophenyl-phenylether	ug/L	U	U	U	U	U	U	U
4-methylphenol (p-cresol)	ug/L	U	U	U	U	U	U	U
4-nitroaniline	ug/L	U	U	U	U	U	U	U
4-nitrophenol	ug/L	U	U	U	U	U	U	U
acenaphthene	ug/L	U	U	U	U	U	U	U
acenaphthylene	ug/L	U	U	U	U	U	U	U
aniline	ug/L	U	U	U	U	U	U	U
anthracene	ug/L	U	U	U	U	U	U	U
benzidine	ug/L	U	U	U	U	U	U	U
benzo(a)anthracene	ug/L	U	U	U	U	U	U	U
benzo(a)pyrene	ug/L	U	U	U	U	U	U	U
benzo(b)fluoranthene	ug/L	U	U	U	U	U	U	U
benzo(g,h,i)perylene	ug/L	U	U	U	U	U	U	U
benzo(k)fluoranthene	ug/L	U	U	U	U	U	U	U

Parameter	UNITS	ROUND 1				ROUND 2	ROUND 3	ROUND 4
		NEW_EB	PEASE_EB	RIVER_EB	RIVER_TB	RIVER_TB	RIVER_TB	RIVER_TB
Acid-Base-Neutral Compounds (continued)								
benzoic acid	ug/L	U	U	U	U	U	U	U
benzyl alcohol	ug/L	U	U	U	U	U	U	U
bis(2-chloroethoxy)methane	ug/L	U	U	U	U	U	U	U
bis(2-chloroethyl)ether	ug/L	U	U	U	U	U	U	U
bis(2-chloroisopropyl)ether	ug/L	U	U	U	U	U	U	U
bis(2-ethylhexyl)phthalate	ug/L	**6.7**	U	**2.8**	U	U	U	U
butylbenzylphthalate	ug/L	U	U	U	U	U	U	U
carbazole	ug/L	U	U	U	U	U	U	U
chrysene	ug/L	U	U	U	U	U	U	U
dibenzo(a,h)anthracene	ug/L	U	U	U	U	U	U	U
dibenzofuran	ug/L	U	U	U	U	U	U	U
diethylphthalate	ug/L	U	U	U	U	U	U	U
dimethylphthalate	ug/L	U	U	U	U	U	U	U
di-n-butylphthalate	ug/L	U	U	U	U	**4.6**	**8.2**	**8.5**
di-n-octylphthalate	ug/L	U	U	U	U	U	U	U
fluoranthene	ug/L	U	U	U	U	U	U	U
fluorene	ug/L	U	U	U	U	U	U	U
hexachloro-1,3-butadiene	ug/L	U	U	U	U	U	U	U
hexachlorobenzene	ug/L	U	U	U	U	U	U	U
hexachlorocyclopentadiene	ug/L	U	U	U	U	U	U	U
hexachloroethane	ug/L	U	U	U	U	U	U	U
indeno(1,2,3-cd)pyrene	ug/L	U	U	U	U	U	U	U
isophorone	ug/L	U	U	U	U	U	U	U
naphthalene	ug/L	U	U	U	U	U	U	U
nitrobenzene	ug/L	U	U	U	U	U	U	U
nitrobenzene-d5	%	55.45	52.22	50.44	39.94	78.22	59.73	62.23
N-nitrosodimethylamine	ug/L	U	U	U	U	U	U	U
N-nitroso-di-n-propylamine	ug/L	U	U	U	U	U	U	U
N-nitrosodiphenylamine	ug/L	U	U	U	U	U	U	U
pentachlorophenol	ug/L	U	U	U	U	U	U	U
phenanthrene	ug/L	U	U	U	U	U	U	U
phenol	ug/L	U	U	U	U	U	U	U
phenol-d5	%	18.605	24.245	19.2	19.335	45.965	43.615	38.16
pyrene	ug/L	U	U	U	U	U	U	U
pyridine	ug/L	U	U	U	U	U	U	U
terphenyl-d14	%	89.52	81.58	64.48	53.56	113.33	80.11	87.35
Other								
Total Phenolic Compounds	mg/L	ND	ND	ND	ND	ND	ND	ND
Total Cyanide	mg/L	ND	ND	ND		ND	ND	ND
1) Round 1, River equipment blank sample not generated in field due to insufficient volume of "trace clean" reagent water.								
2) All values in "*italics*" are below the method reporting limit (MRL) and above the method detection limit (MDL).								
3) All values that are "**bold**" are above the MRL.								