Chemical Analysis Report

WQAP-2016-09-12-01

Florida Department of Environmental Protection
Central Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

Event Description: **Merritt's Milll Pond**
Request ID: **RQ-2016-09-12-31**
Customer: **WQAP**
Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
MS #3560
Tallahassee, FL 32399-2400
Attn: Katrina Sanders

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 07-OCT-2016 09:46

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: MERITTS MILL POND 500 METERS UPSTREAM OF DAM **Collection Date/Time: 09/12/2016 10:00**

Field ID: G2WA0009_09122016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830439	EPA 180.1 Rev. 2.0	Turbidity	0.90		NTU	P311084	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P311402	
	SM 2120 B	Color (true)	2.5	U	PCU	P311034	
	SM 2320 B-97	Total Alkalinity	113		mg CaCO3/L	P311258	
	SM 2540 C-97	TDS	145		mg/L	P311521	
	SM 2540 D-97	TSS	2	U	mg/L	P311501	
	SM 4500 F-C-97	Fluoride	0.042	I	mg F/L	P311261	
1830442	EPA 350.1 Rev. 2.0	Ammonia-N	0.041		mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.23		mg N/L	P311100	
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.4		mg N/L	P311589	
	EPA 365.1 Rev. 2.0	Total-P	0.010		mg P/L	P311493	
	SM 5310 B-00	Organic Carbon	1.0		mg C/L	P311339	
1830445	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P311064	
1830459	EPA 200.7 Rev. 4.4	Calcium	48.4		mg/L	P311145	
		Iron	30	U	ug/L	P311145	
		Magnesium	2.90		mg/L	P311145	
		Potassium	0.33	I	mg/L	P311145	
		Sodium	2.0		mg/L	P311145	
		Zinc	5.0	U	ug/L	P311145	
	EPA 200.8 Rev. 5.4	Arsenic	0.29		ug/L	P311145	
		Cadmium	0.020	U	ug/L	P311145	
		Chromium	0.76		ug/L	P311145	
		Copper	0.10	U	ug/L	P311145	
		Lead	0.050	U	ug/L	P311145	
		Nickel	0.050	U	ug/L	P311145	
		Silver	0.0050	U	ug/L	P311145	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: MERITTS MILL POND MID UNDER POWERLINES **Collection Date/Time: 09/12/2016 10:30**

Field ID: G2WA0008_09122016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830440	EPA 180.1 Rev. 2.0	Turbidity	0.80		NTU	P311084	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P311402	
	SM 2120 B	Color (true)	2.5	U	PCU	P311034	
	SM 2320 B-97	Total Alkalinity	119		mg CaCO3/L	P311258	
	SM 2540 C-97	TDS	148		mg/L	P311521	
	SM 2540 D-97	TSS	3	I	mg/L	P311501	
	SM 4500 F-C-97	Fluoride	0.041	I	mg F/L	P311261	
1830443	EPA 350.1 Rev. 2.0	Ammonia-N	0.084		mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.22		mg N/L	P311470	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	2.6		mg N/L	P311589	

Field ID: G2WA0008_09122016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830443	EPA 365.1 Rev. 2.0	Total-P	0.015		mg P/L	P311495	
	SM 5310 B-00	Organic Carbon	0.92	I	mg C/L	P311340	
1830446	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.008	I	mg P/L	P311064	
1830460	EPA 200.7 Rev. 4.4	Calcium	49.9		mg/L	P311145	
		Iron	30	U	ug/L	P311145	
		Magnesium	2.81		mg/L	P311145	
		Potassium	0.39	I	mg/L	P311145	
		Sodium	2.0	I	mg/L	P311145	
		Zinc	5.0	U	ug/L	P311145	
	EPA 200.8 Rev. 5.4	Arsenic	0.29		ug/L	P311145	
		Cadmium	0.020	U	ug/L	P311145	
		Chromium	0.84		ug/L	P311145	
		Copper	0.10	U	ug/L	P311145	
		Lead	0.050	U	ug/L	P311145	
		Nickel	0.050	U	ug/L	P311145	
		Silver	0.0050	U	ug/L	P311145	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: FIELD BLANK **Collection Date/Time: 09/12/2016 10:30**

Field ID: FIELD BLANK Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830448	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P311084	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P311402	
	SM 2120 B	Color (true)	2.5	U	PCU	P311034	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P311258	
	SM 2540 C-97	TDS	15	U	mg/L	P311521	
	SM 2540 D-97	TSS	2	U	mg/L	P311501	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P311261	
1830449	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P311100	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P311589	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P311495	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P311340	
1830450	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P311064	
1830462	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P311145	
		Iron	30	U	ug/L	P311145	
		Magnesium	0.040	U	mg/L	P311145	
		Potassium	0.30	U	mg/L	P311145	
		Sodium	0.50	U	mg/L	P311145	
		Zinc	5.0	U	ug/L	P311145	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P311145	
		Cadmium	0.020	U	ug/L	P311145	
		Chromium	0.050	U	ug/L	P311145	

Field ID: FIELD BLANK Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830462	EPA 200.8 Rev. 5.4	Copper	50.4		ug/L	P311145	
		Lead	0.050	U	ug/L	P311145	
		Nickel	0.050	U	ug/L	P311145	
		Silver	0.0050	U	ug/L	P311145	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: The copper result was confirmed in the undigested sample on 09/15/2016.

Sample Location: MERITTS MILL POND 600 METERS DOWNSTREAM OF JACKSON BLUE SPRING **Collection Date/Time: 09/12/2016 11:00**

Field ID: G2WA0007_09122016 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830441	EPA 180.1 Rev. 2.0	Turbidity	0.15		NTU	P311084	
	EPA 300.0 Rev. 2.1	Chloride	4.7		mg Cl/L	P311402	
	SM 2120 B	Color (true)	2.5	U	PCU	P311034	
	SM 2320 B-97	Total Alkalinity	118		mg CaCO3/L	P311258	
	SM 2540 C-97	TDS	147	A	mg/L	P311521	
	SM 2540 D-97	TSS	2	I	mg/L	P311501	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P311261	
1830444	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.082	I	mg N/L	P311470	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.7		mg N/L	P311589	
	EPA 365.1 Rev. 2.0	Total-P	0.018		mg P/L	P311495	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P311340	
1830447	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.017		mg P/L	P311064	
1830461	EPA 200.7 Rev. 4.4	Calcium	51.5		mg/L	P311145	
		Iron	30	U	ug/L	P311145	
		Magnesium	2.53		mg/L	P311145	
		Potassium	0.40	I	mg/L	P311145	
		Sodium	1.9	I	mg/L	P311145	
		Zinc	5.0	U	ug/L	P311145	
	EPA 200.8 Rev. 5.4	Arsenic	0.26		ug/L	P311145	
		Cadmium	0.020	U	ug/L	P311145	
		Chromium	1.11		ug/L	P311145	
		Copper	0.10	U	ug/L	P311145	
		Lead	0.050	U	ug/L	P311145	
		Nickel	0.050	U	ug/L	P311145	
		Silver	0.0050	U	ug/L	P311145	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: MERITTS MILL POND 600 METERS DOWNSTREAM OF JACKSON BLUE SPRING **Collection Date/Time: 09/12/2016 11:00**

Field ID: G2WA0007_09122016 DUPLICATE Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes

Field ID: G2WA0007_09122016 DUPLICATE Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1830451	EPA 180.1 Rev. 2.0	Turbidity	0.20		NTU	P311084	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P311402	
	SM 2120 B	Color (true)	2.5	U	PCU	P311034	
	SM 2320 B-97	Total Alkalinity	118	A	mg CaCO3/L	P311258	
	SM 2540 C-97	TDS	154		mg/L	P311521	
	SM 2540 D-97	TSS	2	I	mg/L	P311501	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P311261	
1830452	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P311006	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.11	I	mg N/L	P311100	
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.7		mg N/L	P311589	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P311495	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P311340	
1830453	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.017		mg P/L	P311064	
1830463	EPA 200.7 Rev. 4.4	Calcium	51.2		mg/L	P311145	
		Iron	30	U	ug/L	P311145	
		Magnesium	2.53		mg/L	P311145	
		Potassium	0.36	I	mg/L	P311145	
		Sodium	1.9	I	mg/L	P311145	
		Zinc	5.0	U	ug/L	P311145	
	EPA 200.8 Rev. 5.4	Arsenic	0.24		ug/L	P311145	
		Cadmium	0.020	U	ug/L	P311145	
		Chromium	1.09		ug/L	P311145	
		Copper	0.10	U	ug/L	P311145	
		Lead	0.050	U	ug/L	P311145	
		Nickel	0.050	U	ug/L	P311145	
		Silver	0.0050	U	ug/L	P311145	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P311084

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311145

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311145

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311402

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311100

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311470

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311495

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311064

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: SM 2120 B
Batch ID: P311034

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P311258

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO3/L

Reference Method: SM 2540 C-97
Batch ID: P311521

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P311501

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P311339

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Reference Method: SM 5310 B-00
Batch ID: P311340

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	108		P	85 - 115
Magnesium	112		P	85 - 115
Potassium	106		P	85 - 115
Sodium	105		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	98.7		P	85 - 115
Chromium	102		P	85 - 115
Copper	99.6		P	85 - 115
Lead	97.3		P	85 - 115
Nickel	101		P	85 - 115
Silver	97.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311402

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	99.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	102		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311100

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	102		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311470

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	96.6		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	104		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.1		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311495

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311064

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	98.6		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P311258

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P311339

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	102		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P311340

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	103		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830459	Calcium	105		P	80 - 120
1830459	Iron	108	108	P/P	80 - 120
1830459	Magnesium	105	106	P/P	80 - 120
1830459	Potassium	106	107	P/P	80 - 120
1830459	Sodium	102	103	P/P	80 - 120
1830459	Zinc	98.5	98.9	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830459	Arsenic	101	100	P/P	80 - 120
1830459	Cadmium	101	101	P/P	80 - 120
1830459	Chromium	102	101	P/P	80 - 120
1830459	Copper	96.0	98.2	P/P	80 - 120
1830459	Lead	97.0	97.1	P/P	80 - 120
1830459	Nickel	97.7	96.9	P/P	80 - 120
1830459	Silver	99.2	98.3	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311402

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829977	Chloride	98.7		P	90 - 110
1830051	Chloride	98.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830052	Ammonia-N	103	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311100

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830452	Kjeldahl Nitrogen	98.2	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311470

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1828965	Kjeldahl Nitrogen	96.8	87.6	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830084	NO2NO3-N	102	102	P/P	90 - 110
1830084	NO2NO3-N	104		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830036	Total-P	97.8	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311495

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830443	Total-P	98.5	98.2	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311064

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830445	O-Phosphate-P	100	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830451	Fluoride	98.2	98.2	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P311339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1829982	Organic Carbon	101	103	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P311340

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1830443	Organic Carbon	104	105	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P311084

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830470	Turbidity	2.78	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P311145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830459	Calcium	0.692	Spike	P	0 - 20
1830459	Iron	0.0711	Spike	P	0 - 20
1830459	Magnesium	0.261	Spike	P	0 - 20
1830459	Potassium	0.670	Spike	P	0 - 20
1830459	Sodium	0.510	Spike	P	0 - 20
1830459	Zinc	0.406	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830459	Arsenic	1.03	Spike	P	0 - 20
1830459	Cadmium	0.881	Spike	P	0 - 20
1830459	Chromium	0.459	Spike	P	0 - 20
1830459	Copper	2.31	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P311145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830459	Lead	0.115	Spike	P	0 - 20
1830459	Nickel	0.849	Spike	P	0 - 20
1830459	Silver	0.853	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P311402

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829977	Chloride	0.178	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P311006

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830052	Ammonia-N	1.04	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311100

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830452	Kjeldahl Nitrogen	4.98	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P311470

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1828965	Kjeldahl Nitrogen	6.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P311589

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830084	NO2NO3-N	0.489	Spike	P	0 - 15

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830036	Total-P	0.0449	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P311495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830443	Total-P	0.343	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P311064

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830445	O-Phosphate-P	0.596	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P311034

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830502	Color (true)	1.64	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P311258

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830451	Total Alkalinity	1.74	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P311521

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830441	TDS	5.44	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P311261

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830451	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P311339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1829982	Organic Carbon	2.05	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P311340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1830443	Organic Carbon	1.19	Spike	P	0 - 20

Quality Assurance Report
Precision

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A71566
Included Lab Sample IDs: 1830442, 1830443, 1830444, 1830449, 1830452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	103	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71576
Included Lab Sample IDs: 1830439, 1830440, 1830441, 1830448, 1830451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	102	102	P/P	90 - 110
Chloride	102	102	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A71581
Included Lab Sample IDs: 1830439, 1830440, 1830441, 1830448, 1830451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.5	94.9	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A71595
Included Lab Sample IDs: 1830445, 1830446, 1830447, 1830450, 1830453

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.6	99.0	P/P	90 - 110
O-Phosphate-P	99.0	98.3	P/P	90 - 110
O-Phosphate-P	99.1	98.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A71599
Included Lab Sample IDs: 1830439, 1830440, 1830441, 1830448, 1830451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.5	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71656
Included Lab Sample IDs: 1830442, 1830449, 1830452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	104	P/P	90 - 110
Kjeldahl Nitrogen	96.6	103	P/P	90 - 110
Kjeldahl Nitrogen	97.7	96.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A71657
Included Lab Sample IDs: 1830439, 1830440, 1830441, 1830448, 1830451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	105	P/P	90 - 110
Total Alkalinity	105	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A71657
Included Lab Sample IDs: 1830439, 1830440, 1830441, 1830448, 1830451

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	100	P/P	90 - 110
Fluoride	102	101	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A71682
Included Lab Sample IDs: 1830442, 1830443, 1830444, 1830449, 1830452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	105	108	P/P	90 - 110
Organic Carbon	108	108	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A71712
Included Lab Sample IDs: 1830459, 1830460, 1830461, 1830462, 1830463

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.5	98.7	P/P	90 - 110
Arsenic	99.7	99.5	P/P	90 - 110
Cadmium	95.5	97.2	P/P	90 - 110
Cadmium	97.2	98.0	P/P	90 - 110
Chromium	101	102	P/P	90 - 110
Chromium	98.4	101	P/P	90 - 110
Copper	100	99.9	P/P	90 - 110
Copper	99.9	99.0	P/P	90 - 110
Lead	94.4	95.2	P/P	90 - 110
Lead	95.2	95.5	P/P	90 - 110
Nickel	98.3	98.1	P/P	90 - 110
Silver	96.3	96.5	P/P	90 - 110
Silver	96.5	97.6	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A71718
Included Lab Sample IDs: 1830459, 1830460, 1830461, 1830462, 1830463

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	95 - 105
Calcium	102	101	P/P	90 - 110
Iron	102	103	P/P	95 - 105
Iron	103	104	P/P	90 - 110
Magnesium	102	103	P/P	95 - 105
Magnesium	103	103	P/P	90 - 110
Potassium	101	99.9	P/P	95 - 105
Potassium	99.9	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A71718
Included Lab Sample IDs: 1830459, 1830460, 1830461, 1830462, 1830463

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	99.7	99.1	P/P	90 - 110
Sodium	99.7	99.7	P/P	95 - 105
Zinc	100	101	P/P	95 - 105
Zinc	101	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A71721
Included Lab Sample IDs: 1830459, 1830461, 1830462

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	97.2	95.6	P/P	90 - 110
Nickel	96.6	95.6	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A71734
Included Lab Sample IDs: 1830442, 1830443, 1830444, 1830449, 1830452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	102	P/P	90 - 110
NO2NO3-N	104	104	P/P	90 - 110
NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A71756
Included Lab Sample IDs: 1830442, 1830443, 1830444, 1830449, 1830452

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.0	98.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71762
Included Lab Sample IDs: 1830443, 1830444

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.1	94.1	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					2.78	
EPA 200.7 Rev. 4.4	Calcium	105	105				0.692
	Iron	108	108	108			0.0711
	Magnesium	112	105	106			0.261
	Potassium	106	106	107			0.670

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision			
					LCS	SMP	MS	
EPA 200.7 Rev. 4.4	Sodium	105	102	103			0.510	
	Zinc	101	98.5	98.9			0.406	
EPA 200.8 Rev. 5.4	Arsenic	101	101	100			1.03	
	Cadmium	98.7	101	101			0.881	
	Chromium	102	102	101			0.459	
	Copper	99.6	96.0	98.2			2.31	
	Lead	97.3	97.0	97.1			0.115	
	Nickel	101	97.7	96.9			0.849	
	Silver	97.9	99.2	98.3			0.853	
EPA 300.0 Rev. 2.1	Chloride	99.5	98.7	98.5		0.178		
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	105			1.04	
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	98.2	104			4.98	
	Kjeldahl Nitrogen	96.6	96.8	87.6			6.32	
EPA 353.2 Rev. 2.0	NO2NO3-N	104	102	104	102		0.489	RSD
EPA 365.1 Rev. 2.0	Total-P	98.1	97.8	97.8			0.0449	
	Total-P	98.2	98.5	98.2			0.343	
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	100	101			0.596	
SM 2120 B	Color (true)					1.64		
SM 2320 B-97	Total Alkalinity	103				1.74		
SM 2540 C-97	TDS					5.44		
SM 4500 F-C-97	Fluoride	100	98.2	98.2			0.0	
SM 5310 B-00	Organic Carbon	102	101	103			2.05	
	Organic Carbon	103	104	105			1.19	

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1830439, 1830440, 1830441, 1830448, 1830451
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1830459, 1830460, 1830461, 1830462, 1830463
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1830459, 1830460, 1830461, 1830462, 1830463
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1830439, 1830440, 1830441, 1830448, 1830451
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1830442, 1830443, 1830444, 1830449, 1830452
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1830442, 1830443, 1830444, 1830449, 1830452
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1830442, 1830443, 1830444, 1830449, 1830452
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1830442, 1830443, 1830444, 1830449, 1830452
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1830445, 1830446, 1830447, 1830450, 1830453
SM 2120 B / E31780	True Color measured at 450 nm	1830439, 1830440, 1830441, 1830448, 1830451
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1830439, 1830440, 1830441, 1830448, 1830451
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1830439, 1830440, 1830441, 1830448, 1830451
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1830439, 1830440, 1830441, 1830448, 1830451
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1830439, 1830440, 1830441, 1830448, 1830451

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1830442, 1830443, 1830444, 1830449, 1830452

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 180.1 Rev. 2.0	09/12/2016			09/13/2016 16:45	Sima Feizi	1830439, 1830440, 1830441, 1830448, 1830451
EPA 200.7 Rev. 4.4	09/12/2016	09/14/2016	Elliott D. Healy	09/19/2016	Joshua Ayres	1830459, 1830460, 1830461, 1830462, 1830463
EPA 200.8 Rev. 5.4	09/12/2016	09/14/2016	Elliott D. Healy	09/15/2016	Charles J. Peterson	1830459, 1830460, 1830461, 1830462
	09/12/2016	09/14/2016	Elliott D. Healy	09/16/2016	Charles J. Peterson	1830463
	09/12/2016	09/14/2016	Elliott D. Healy	09/19/2016	Charles J. Peterson	1830459, 1830461, 1830462
EPA 300.0 Rev. 2.1	09/12/2016			09/17/2016	Ping Hua	1830439, 1830440, 1830441, 1830448, 1830451
EPA 350.1 Rev. 2.0	09/12/2016			09/13/2016	Sofia Elnemr	1830442, 1830443, 1830444, 1830449, 1830452
EPA 351.2 Rev. 2.0	09/12/2016	09/14/2016	Adrian Shelby	09/15/2016	Christopher Armour	1830442, 1830449, 1830452
	09/12/2016	09/20/2016	Adrian Shelby	09/21/2016	Christopher Armour	1830443, 1830444
EPA 353.2 Rev. 2.0	09/12/2016			09/20/2016	Beverly Y. Sanders	1830442, 1830443, 1830444, 1830449, 1830452
EPA 365.1 Rev. 2.0	09/12/2016	09/20/2016	Lipi Saha	09/21/2016	Lipi Saha	1830442, 1830443, 1830444, 1830449, 1830452
EPA 365.1 Rev. 2.0 dissolved	09/12/2016			09/13/2016 17:42	Julia Storbeck	1830445
	09/12/2016			09/13/2016 18:20	Julia Storbeck	1830450
	09/12/2016			09/13/2016 18:24	Julia Storbeck	1830447
	09/12/2016			09/13/2016 18:25	Julia Storbeck	1830453
	09/12/2016			09/13/2016 19:40	Julia Storbeck	1830446
SM 2120 B	09/12/2016			09/13/2016 14:52	Julie Michelle Frank	1830439
	09/12/2016			09/13/2016 14:53	Julie Michelle Frank	1830440
	09/12/2016			09/13/2016 14:54	Julie Michelle Frank	1830441, 1830448
	09/12/2016			09/13/2016 14:55	Julie Michelle Frank	1830451
SM 2320 B-97	09/12/2016			09/15/2016	Dale L. Simmons	1830439, 1830440, 1830441, 1830448, 1830451
SM 2540 C-97	09/12/2016			09/15/2016	Yijie Li	1830439, 1830440, 1830441, 1830448, 1830451
SM 2540 D-97	09/12/2016			09/15/2016	Yijie Li	1830439, 1830440, 1830441, 1830448, 1830451
SM 4500 F-C-97	09/12/2016			09/15/2016	Dale L. Simmons	1830439, 1830440, 1830441, 1830448, 1830451
SM 5310 B-00	09/12/2016			09/15/2016	Sofia Elnemr	1830442
	09/12/2016			09/16/2016	Sofia Elnemr	1830443, 1830444, 1830449, 1830452