Chemical Analysis Report

TLH-ROC-2018-11-20-02

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

Event Description: **RUN_9 (WBID 1274 Apalachicola Bay) Kit D**
Request ID: **RQ-2018-10-22-23**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
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Certified by: Colin Wright, Program Administrator

Date Certified: 11-DEC-2018 12:41

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: Apalachicola Bay near St. George Island **Collection Date/Time: 11/20/2018 10:40**

Field ID: G2TLHR0036 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2043213	EPA 180.1 Rev. 2.0	Turbidity	3.5		NTU	P355001	
	SM 2320 B-97	Total Alkalinity	64		mg CaCO3/L	P355275	
	SM 2540 D-97	TSS	6	IA	mg/L	P355465	
	SM 4500 F-C-97	Fluoride	0.38		mg F/L	P355277	
2043216	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P355248	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.39	I	mg N/L	P355126	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.26		mg N/L	P355145	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P355082	
	SM 5310 B-00	Organic Carbon	4.9		mg C/L	P355327	
2043219	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P355044	
2043231	EPA 200.7 Rev. 4.4	Iron	310	I	ug/L	P355158	
		Zinc	15	U	ug/L	P355158	
	EPA 200.8 Rev. 5.4	Arsenic	0.97		ug/L	P355158	
		Cadmium	0.060	U	ug/L	P355158	
		Chromium	1.2	U	ug/L	P355158	
		Copper	0.60	U	ug/L	P355158	
		Lead	0.15	U	ug/L	P355158	
		Nickel	0.60	U	ug/L	P355158	
		Silver	0.030	U	ug/L	P355158	

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: Apalachicola Bay 1200m South of US 98 Bridge Collection Date/Time: 11/20/2018 11:30

Field ID: G2TLHR0035 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2043214	EPA 180.1 Rev. 2.0	Turbidity	7.3		NTU	P355001	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P355468	
	SM 2540 D-97	TSS	6	I	mg/L	P355463	
	SM 4500 F-C-97	Fluoride	0.079	I	mg F/L	P355473	
2043217	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P355249	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P355127	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.17		mg N/L	P355328	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P355083	
	SM 5310 B-00	Organic Carbon	5.0		mg C/L	P355325	
2043220	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P355042	
2043232	EPA 200.7 Rev. 4.4	Iron	700		ug/L	P355105	
		Zinc	5.0	U	ug/L	P355105	
	EPA 200.8 Rev. 5.4	Arsenic	0.48		ug/L	P355105	
		Cadmium	0.020	U	ug/L	P355105	
		Chromium	0.51	I	ug/L	P355105	
		Copper	0.61	I	ug/L	P355105	
		Lead	0.26		ug/L	P355105	
		Nickel	0.47	I	ug/L	P355105	
		Silver	0.010	U	ug/L	P355105	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 353.2 Rev. 2.0: The result was confirmed on 11/28/2018.

Sample Location: Apalachicola Bay 1200m South of US 98 Bridge Collection Date/Time: 11/20/2018 11:35

Field ID: GTLHR0035_DUP Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2043215	EPA 180.1 Rev. 2.0	Turbidity	6.6		NTU	P355001	
	SM 2320 B-97	Total Alkalinity	36		mg CaCO3/L	P355468	
	SM 2540 D-97	TSS	5	I	mg/L	P355464	
	SM 4500 F-C-97	Fluoride	0.079	I	mg F/L	P355473	
2043218	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P355249	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P355127	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.30		mg N/L	P355328	
	EPA 365.1 Rev. 2.0	Total-P	0.030		mg P/L	P355083	
	SM 5310 B-00	Organic Carbon	4.9		mg C/L	P355325	
2043221	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P355042	
2043233	EPA 200.7 Rev. 4.4	Iron	610		ug/L	P355105	
		Zinc	5.0	U	ug/L	P355105	
	EPA 200.8 Rev. 5.4	Arsenic	0.44		ug/L	P355105	
		Cadmium	0.020	U	ug/L	P355105	
		Chromium	0.45	I	ug/L	P355105	
		Copper	0.61	I	ug/L	P355105	
		Lead	0.22		ug/L	P355105	
		Nickel	0.42	I	ug/L	P355105	
		Silver	0.010	U	ug/L	P355105	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 353.2 Rev. 2.0: The result was confirmed on 11/28/2018.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P355001

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355105

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355158

Component	Result	Code	Units
Iron	30	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355105

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355158

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355248

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355249

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355126

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355127

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355145

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355328

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355082

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355083

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355042

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355044

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

Reference Method: SM 2320 B-97
Batch ID: P355275

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P355468

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

Reference Method: SM 2540 D-97
Batch ID: P355463

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P355464

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P355465

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P355277

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P355473

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P355325

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

Reference Method: SM 5310 B-00
Batch ID: P355327

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: P355105

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	104		P	85 - 115
Zinc	99.8		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	102		P	85 - 115
Zinc	98.4		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355105

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	109		P	85 - 115
Cadmium	105		P	85 - 115
Chromium	104		P	85 - 115
Copper	105		P	85 - 115
Lead	104		P	85 - 115
Nickel	105		P	85 - 115
Silver	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355158

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	103		P	85 - 115
Cadmium	106		P	85 - 115
Chromium	105		P	85 - 115
Copper	101		P	85 - 115
Lead	101		P	85 - 115
Nickel	101		P	85 - 115
Silver	99.3		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355248

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	94.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355249

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.0		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355126

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355127

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	100		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355145

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	100		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355328

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355082

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355083

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355042

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355044

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

Reference Method: SM 2320 B-97
Batch ID: P355275

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	100		P	98 - 107

Reference Method: SM 2320 B-97
Batch ID: P355468

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.9		P	98 - 107

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P355277

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.9		P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P355473

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P355325

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P355327

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355105

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043083	Iron	97.4	98.1	P/P	80 - 120
2043083	Zinc	96.2	96.3	P/P	80 - 120
2043420	Iron	100		P	80 - 120
2043420	Zinc	94.7		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043231	Iron	100	101	P/P	70 - 130
2043231	Zinc	101	103	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355105

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043083	Arsenic	115	115	P/P	80 - 120
2043083	Cadmium	103	102	P/P	80 - 120
2043083	Chromium	84.4	82.9	P/P	80 - 120
2043083	Copper	97.0	96.5	P/P	80 - 120
2043083	Lead	107	105	P/P	80 - 120
2043083	Nickel	92.4	91.8	P/P	80 - 120
2043083	Silver	96.8	93.6	P/P	80 - 120
2043420	Arsenic	107		P	80 - 120
2043420	Cadmium	108		P	80 - 120
2043420	Chromium	102		P	80 - 120
2043420	Copper	100		P	80 - 120
2043420	Lead	102		P	80 - 120
2043420	Nickel	99.4		P	80 - 120
2043420	Silver	102		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355158

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043231	Arsenic	113	113	P/P	80 - 120
2043231	Cadmium	99.5	102	P/P	80 - 120
2043231	Chromium	88.7	87.3	P/P	80 - 120
2043231	Copper	102	101	P/P	80 - 120
2043231	Lead	110	110	P/P	80 - 120
2043231	Nickel	105	105	P/P	80 - 120
2043231	Silver	91.1	92.0	P/P	80 - 120

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355248

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2042956	Ammonia-N	98.2	105	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355249

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043079	Ammonia-N	102	99.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355126

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2042956	Kjeldahl Nitrogen	104	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355127

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043244	Kjeldahl Nitrogen	90.2	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355145

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2042959	NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355328

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043238	NO2NO3-N	99.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355082

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2042957	Total-P	96.2	98.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355083

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043197	Total-P	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355042

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043245	O-Phosphate-P	97.6	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355044

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043219	O-Phosphate-P	97.0	101	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P355277

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043307	Fluoride	99.5	99.5	P/P	91 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P355473

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043270	Fluoride	98.6	98.0	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P355325

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043003	Organic Carbon	98.6	95.6	P/P	85 - 115

Reference Method: SM 5310 B-00
Batch ID: P355327

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2043216	Organic Carbon	94.8	94.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P355001

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043165	Turbidity	4.98	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355105

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043083	Iron	0.634	Spike	P	0 - 20
2043083	Zinc	0.0857	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P355158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043231	Iron	0.519	Spike	P	0 - 20
2043231	Zinc	2.41	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355105

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043083	Arsenic	0.360	Spike	P	0 - 20
2043083	Cadmium	1.66	Spike	P	0 - 20
2043083	Chromium	1.84	Spike	P	0 - 20
2043083	Copper	0.537	Spike	P	0 - 20
2043083	Lead	1.71	Spike	P	0 - 20
2043083	Nickel	0.611	Spike	P	0 - 20
2043083	Silver	3.41	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P355158

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043231	Arsenic	0.230	Spike	P	0 - 20
2043231	Cadmium	2.09	Spike	P	0 - 20
2043231	Chromium	1.56	Spike	P	0 - 20
2043231	Copper	0.612	Spike	P	0 - 20
2043231	Lead	0.542	Spike	P	0 - 20
2043231	Nickel	0.241	Spike	P	0 - 20
2043231	Silver	0.902	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355248

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2042956	Ammonia-N	4.03	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P355249

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043079	Ammonia-N	1.44	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355126

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2042956	Kjeldahl Nitrogen	4.71	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P355127

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043244	Kjeldahl Nitrogen	8.51	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355145

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2042959	NO2NO3-N	0.396	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P355328

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043238	NO2NO3-N	0.564	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355082

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2042957	Total-P	2.16	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P355083

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043197	Total-P	0.0243	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355042

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043245	O-Phosphate-P	1.09	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P355044

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043219	O-Phosphate-P	3.64	Spike	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P355275

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043307	Total Alkalinity	0.456	Sample	P	0 - 1.6

Reference Method: SM 2320 B-97
Batch ID: P355468

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043270	Total Alkalinity	1.03	Sample	P	0 - 1.6

Reference Method: SM 4500 F-C-97
Batch ID: P355277

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043307	Fluoride	0.0	Spike	P	0 - 3.5

Reference Method: SM 4500 F-C-97
Batch ID: P355473

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043270	Fluoride	0.530	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P355325

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043003	Organic Carbon	2.03	Spike	P	0 - 20

Reference Method: SM 5310 B-00
Batch ID: P355327

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2043216	Organic Carbon	0.0467	Spike	P	0 - 20

* 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 180.1 Rev. 2.0
Run ID: A87897
Included Lab Sample IDs: 2043213, 2043214, 2043215

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	100	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A87931
Included Lab Sample IDs: 2043219, 2043220, 2043221

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	100	100	P/P	90 - 110
O-Phosphate-P	99.9	99.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A87974
Included Lab Sample IDs: 2043216

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A87981
Included Lab Sample IDs: 2043216, 2043217, 2043218

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A88004
Included Lab Sample IDs: 2043216

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	106	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A88009
Included Lab Sample IDs: 2043217, 2043218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	106	P/P	90 - 110
Kjeldahl Nitrogen	106	106	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A88015
Included Lab Sample IDs: 2043216, 2043217, 2043218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	98.8	P/P	90 - 110
Ammonia-N	98.8	98.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A88028
Included Lab Sample IDs: 2043213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.1	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A88028
Included Lab Sample IDs: 2043213

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.1	100	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A88042
Included Lab Sample IDs: 2043216, 2043217, 2043218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.2	95.8	P/P	90 - 110
Organic Carbon	96.6	95.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A88043
Included Lab Sample IDs: 2043217, 2043218

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A88044
Included Lab Sample IDs: 2043232, 2043233

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	98.8	97.0	P/P	90 - 110
Zinc	101	99.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88046
Included Lab Sample IDs: 2043232, 2043233

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	103	100	P/P	90 - 110
Cadmium	100	99.9	P/P	90 - 110
Chromium	98.2	98.8	P/P	90 - 110
Copper	102	100	P/P	90 - 110
Lead	99.9	100	P/P	90 - 110
Nickel	99.6	99.0	P/P	90 - 110
Silver	100	99.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A88057
Included Lab Sample IDs: 2043231

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Iron	99.7	99.6	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A88057
Included Lab Sample IDs: 2043231

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Zinc	102	102	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A88076
Included Lab Sample IDs: 2043231

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	103	104	P/P	90 - 110
Cadmium	103	104	P/P	90 - 110
Chromium	100	101	P/P	90 - 110
Copper	102	104	P/P	90 - 110
Lead	103	102	P/P	90 - 110
Nickel	103	104	P/P	90 - 110
Silver	97.2	98.3	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A88097
Included Lab Sample IDs: 2043214, 2043215

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A88097
Included Lab Sample IDs: 2043214, 2043215

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	99.5	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						4.98	
EPA 200.7 Rev. 4.4	Iron	104	97.4	98.1	100			0.634
	Iron	102	100	101				0.519
	Zinc	99.8	96.2	96.3	94.7			0.0857
	Zinc	98.4	101	103				2.41
EPA 200.8 Rev. 5.4	Arsenic	109	115	115	107			0.360
	Arsenic	103	113	113				0.230
	Cadmium	105	103	102	108			1.66
	Cadmium	106	99.5	102				2.09
	Chromium	104	84.4	82.9	102			1.84
	Chromium	105	88.7	87.3				1.56
	Copper	105	97.0	96.5	100			0.537
	Copper	101	102	101				0.612
	Lead	104	107	105	102			1.71
	Lead	101	110	110				0.542
	Nickel	105	92.4	91.8	99.4			0.611
	Nickel	101	105	105				0.241
	Silver	104	96.8	93.6	102			3.41
	Silver	99.3	91.1	92.0				0.902
EPA 350.1 Rev. 2.0	Ammonia-N	94.5	98.2	105				4.03
	Ammonia-N	96.0	102	99.8				1.44
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	104	98.5				4.71
	Kjeldahl Nitrogen	100	90.2	100				8.51
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	101				0.396
	NO2NO3-N	99.0	99.2					0.564
EPA 365.1 Rev. 2.0	Total-P	104	96.2	98.3				2.16
	Total-P	103	100	100				0.0243
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6	97.6	99.3				1.09
	O-Phosphate-P	102	97.0	101				3.64
SM 2320 B-97	Total Alkalinity	100					0.456	
	Total Alkalinity	99.9					1.03	
SM 4500 F-C-97	Fluoride	96.9	99.5	99.5				0.0
	Fluoride	97.9	98.6	98.0				0.530
SM 5310 B-00	Organic Carbon	94.8	98.6	95.6				2.03
	Organic Carbon	94.6	94.8	94.9				0.0467

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2043213, 2043214, 2043215
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2043231, 2043232, 2043233
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2043231, 2043232, 2043233
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2043216, 2043217, 2043218
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2043216, 2043217, 2043218
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2043216, 2043217, 2043218
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2043216, 2043217, 2043218
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2043219, 2043220, 2043221

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2043213, 2043214, 2043215
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2043213, 2043214, 2043215
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2043213, 2043214, 2043215
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2043216, 2043217, 2043218

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	11/20/2018			11/20/2018 16:59	Megan Treadwell	2043213, 2043214, 2043215
EPA 200.7 Rev. 4.4	11/20/2018	11/26/2018 17:30	Elliott D. Healy	11/28/2018 14:41	Betina Topolski	2043232
	11/20/2018	11/26/2018 17:30	Elliott D. Healy	11/28/2018 14:44	Betina Topolski	2043233
	11/20/2018	11/27/2018 17:35	Elliott D. Healy	11/30/2018 11:05	Betina Topolski	2043231
EPA 200.8 Rev. 5.4	11/20/2018	11/26/2018 17:30	Elliott D. Healy	11/29/2018 16:34	Robert K Palmer	2043232
	11/20/2018	11/26/2018 17:30	Elliott D. Healy	11/29/2018 16:43	Robert K Palmer	2043233
	11/20/2018	11/27/2018 17:35	Elliott D. Healy	11/30/2018 11:40	Allison Taylor	2043231
EPA 350.1 Rev. 2.0	11/20/2018			11/28/2018 14:01	Ping Hua	2043216
	11/20/2018			11/28/2018 14:25	Ping Hua	2043217
	11/20/2018			11/28/2018 14:27	Ping Hua	2043218
EPA 351.2 Rev. 2.0	11/20/2018	11/27/2018 12:30	Adrian Shelby	11/28/2018 12:11	Joseph Suarez	2043216
	11/20/2018	11/27/2018 12:30	Adrian Shelby	11/28/2018 14:25	Joseph Suarez	2043217
	11/20/2018	11/27/2018 12:30	Adrian Shelby	11/28/2018 14:29	Joseph Suarez	2043218
EPA 353.2 Rev. 2.0	11/20/2018			11/27/2018 13:11	Lauren Bottorf	2043216
	11/20/2018			11/29/2018 11:37	Lauren Bottorf	2043217
	11/20/2018			11/29/2018 11:38	Lauren Bottorf	2043218
EPA 365.1 Rev. 2.0	11/20/2018	11/26/2018 12:15	Sima Feizi	11/27/2018 13:47	Beverly Y. Sanders	2043216
	11/20/2018	11/26/2018 12:15	Sima Feizi	11/27/2018 13:58	Beverly Y. Sanders	2043217
	11/20/2018	11/26/2018 12:15	Sima Feizi	11/27/2018 13:59	Beverly Y. Sanders	2043218
EPA 365.1 Rev. 2.0 dissolved	11/20/2018			11/21/2018 15:29	Jhamieka S. Greenwood	2043219
	11/20/2018			11/21/2018 15:50	Jhamieka S. Greenwood	2043220, 2043221
SM 2320 B-97	11/20/2018			11/29/2018 00:49	Dale L. Simmons	2043213
	11/20/2018			11/30/2018 05:16	Dale L. Simmons	2043214
	11/20/2018			11/30/2018 05:27	Dale L. Simmons	2043215
SM 2540 D-97	11/20/2018			11/26/2018 16:02	Yijie Li	2043213, 2043214, 2043215
SM 4500 F-C-97	11/20/2018			11/29/2018 00:11	Dale L. Simmons	2043213
	11/20/2018			11/30/2018 05:16	Dale L. Simmons	2043214
	11/20/2018			11/30/2018 05:27	Dale L. Simmons	2043215
SM 5310 B-00	11/20/2018			11/28/2018 18:43	Megan Treadwell	2043217
	11/20/2018			11/28/2018 18:56	Megan Treadwell	2043218
	11/20/2018			11/29/2018 05:03	Megan Treadwell	2043216