Chemical Analysis Report

TLH-ROC-2019-08-13-01

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

Event Description: **Run 2**
Request ID: **RQ-2019-08-12-36**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

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Report Comment: Inadvertently certified report prior to site location correction.

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 09-SEP-2019 10:42

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 by the Florida Department of Health Environmental Laboratory Certification Program 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: STEINHATCHEE RIVER @ S CANAL R **Collection Date/Time: 08/13/2019 10:25**

Field ID: G1TLHR0064 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2111119	EPA 180.1 Rev. 2.0	Turbidity	45		NTU	P369076	
	EPA 300.0 Rev. 2.1	Chloride	5.2		mg Cl/L	P369493	
		Sulfate	2.3		mg SO4/L	P369496	
	SM 2120 B	Color (true)	400		PCU	P369051	
	SM 2320 B-97	Total Alkalinity	68		mg CaCO3/L	P369442	
	SM 2540 C-97	TDS	155		mg/L	P369722	
	SM 2540 D-97	TSS	37		mg/L	P369476	
	SM 4500 F-C-97	Fluoride	0.086	I	mg F/L	P369445	
2111120	EPA 350.1 Rev. 2.0	Ammonia-N	0.14		mg N/L	P369592	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P369223	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.17		mg N/L	P369237	
	EPA 365.1 Rev. 2.0	Total-P	0.26		mg P/L	P369103	
	SM 5310 B-00	Organic Carbon	39		mg C/L	P369232	
2111121	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.096		mg P/L	P368972	
2111125	EPA 200.7 Rev. 4.4	Barium	12.9		ug/L	P369121	
		Calcium	33.6		mg/L	P369121	
		Iron	2.00E+03		ug/L	P369121	
		Magnesium	3.91		mg/L	P369121	
		Potassium	0.30	U	mg/L	P369121	
		Sodium	3.1		mg/L	P369121	
		Zinc	5.0	U	ug/L	P369121	
	EPA 200.8 Rev. 5.4	Aluminum	1.23E+03		ug/L	P369121	
		Antimony	0.050	U	ug/L	P369121	
		Arsenic	0.50		ug/L	P369121	
		Boron**	15.3		ug/L	P369121	
		Cadmium	0.051	I	ug/L	P369121	
		Chromium	2.1		ug/L	P369121	
		Copper	0.57	I	ug/L	P369121	
		Lead	1.24		ug/L	P369121	
		Nickel	0.68	I	ug/L	P369121	
		Selenium	0.22	I	ug/L	P369121	
		Silver	0.010	U	ug/L	P369121	
		Thallium	0.10	U	ug/L	P369121	

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: STEINHATCHEE RIVER 40M N OF YEARLING RD **Collection Date/Time: 08/13/2019 10:45**

Field ID: G1TLHR0065 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2111116	EPA 180.1 Rev. 2.0	Turbidity	36	A	NTU	P369076	
	EPA 300.0 Rev. 2.1	Chloride	5.1		mg Cl/L	P369493	
		Sulfate	1.2		mg SO4/L	P369496	
	SM 2120 B	Color (true)	320		PCU	P369051	
	SM 2320 B-97	Total Alkalinity	74		mg CaCO3/L	P369442	
	SM 2540 C-97	TDS	138		mg/L	P369722	
	SM 2540 D-97	TSS	34		mg/L	P369476	
	SM 4500 F-C-97	Fluoride	0.10		mg F/L	P369445	
2111117	EPA 350.1 Rev. 2.0	Ammonia-N	0.14		mg N/L	P369592	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.6		mg N/L	P369223	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.14		mg N/L	P369237	
	EPA 365.1 Rev. 2.0	Total-P	0.28		mg P/L	P369103	
	SM 5310 B-00	Organic Carbon	33		mg C/L	P369232	
2111118	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P368972	

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: P369076

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P369121

Component	Result	Code	Units
Barium	1.0	U	ug/L
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

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369121

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369493

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369496

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369592

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: P369223

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369237

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P369103

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368972

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

Reference Method: SM 2120 B
Batch ID: P369051

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P369442

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

Reference Method: SM 2540 C-97
Batch ID: P369722

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P369476

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P369445

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P369232

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: P369121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	103		P	85 - 115
Calcium	105		P	85 - 115
Iron	106		P	85 - 115
Magnesium	112		P	85 - 115
Potassium	108		P	85 - 115
Sodium	97.5		P	85 - 115
Zinc	100		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.9		P	85 - 115
Antimony	98.7		P	85 - 115
Arsenic	101		P	85 - 115
Boron	101		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	99.6		P	85 - 115
Copper	99.2		P	85 - 115
Lead	101		P	85 - 115
Nickel	99.9		P	85 - 115
Selenium	96.4		P	85 - 115
Silver	100		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369493

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	97.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369496

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369592

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369223

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	93.3		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369237

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P369103

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368972

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

Reference Method: SM 2120 B
Batch ID: P369051

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	102		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P369442

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P369445

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.9		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P369232

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P369121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111646	Barium	102	102	P/P	80 - 120
2111646	Calcium	105		P	80 - 120
2111646	Iron	104	106	P/P	80 - 120
2111646	Magnesium	106	107	P/P	80 - 120
2111646	Potassium	102	106	P/P	80 - 120
2111646	Sodium	99.3		P	80 - 120
2111646	Zinc	100	100	P/P	80 - 120
2111792	Barium	100		P	80 - 120
2111792	Calcium	103		P	80 - 120
2111792	Iron	105		P	80 - 120
2111792	Magnesium	104		P	80 - 120
2111792	Potassium	103		P	80 - 120
2111792	Sodium	99.1		P	80 - 120
2111792	Zinc	103		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111646	Aluminum	97.1	95.8	P/P	80 - 120
2111646	Antimony	100	101	P/P	80 - 120
2111646	Arsenic	103	102	P/P	80 - 120
2111646	Boron	101	98.8	P/P	80 - 120
2111646	Cadmium	103	103	P/P	80 - 120
2111646	Chromium	101	99.9	P/P	80 - 120
2111646	Copper	98.4	98.3	P/P	80 - 120
2111646	Lead	103	101	P/P	80 - 120
2111646	Nickel	101	101	P/P	80 - 120
2111646	Selenium	95.5	94.9	P/P	80 - 120
2111646	Silver	101	98.6	P/P	80 - 120
2111646	Thallium	105	104	P/P	80 - 120
2111792	Aluminum	98.0		P	80 - 120
2111792	Antimony	101		P	80 - 120
2111792	Arsenic	104		P	80 - 120
2111792	Boron	99.5		P	80 - 120
2111792	Cadmium	102		P	80 - 120
2111792	Chromium	99.0		P	80 - 120
2111792	Copper	99.0		P	80 - 120
2111792	Lead	103		P	80 - 120
2111792	Nickel	99.6		P	80 - 120
2111792	Selenium	97.9		P	80 - 120
2111792	Silver	99.9		P	80 - 120
2111792	Thallium	107		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369493

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110889	Chloride	97.8	98.8	P/P	90 - 110
2111205	Chloride	98.9		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369496

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110889	Sulfate	102	103	P/P	90 - 110
2111205	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369592

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111111	Ammonia-N	98.6	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369223

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111042	Kjeldahl Nitrogen	87.7	89.8	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369237

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111111	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P369103

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111213	Total-P	105	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368972

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2110891	O-Phosphate-P	98.9	99.4	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P369445

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111620	Fluoride	96.3	96.9	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P369232

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2111211	Organic Carbon	102	101	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P369076

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111116	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P369121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111646	Barium	0.0839	Spike	P	0 - 20
2111646	Calcium	0.693	Spike	P	0 - 20
2111646	Iron	2.07	Spike	P	0 - 20
2111646	Magnesium	1.23	Spike	P	0 - 20
2111646	Potassium	2.24	Spike	P	0 - 20
2111646	Sodium	0.315	Spike	P	0 - 20
2111646	Zinc	0.0742	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P369121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111646	Aluminum	1.21	Spike	P	0 - 20
2111646	Antimony	0.177	Spike	P	0 - 20
2111646	Arsenic	0.311	Spike	P	0 - 20
2111646	Boron	2.01	Spike	P	0 - 20
2111646	Cadmium	0.686	Spike	P	0 - 20
2111646	Chromium	0.866	Spike	P	0 - 20
2111646	Copper	0.0887	Spike	P	0 - 20
2111646	Lead	1.81	Spike	P	0 - 20
2111646	Nickel	0.308	Spike	P	0 - 20
2111646	Selenium	0.578	Spike	P	0 - 20
2111646	Silver	2.22	Spike	P	0 - 20
2111646	Thallium	0.844	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369493

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110889	Chloride	0.873	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P369496

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110889	Sulfate	0.600	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P369592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111111	Ammonia-N	0.497	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P369223

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111042	Kjeldahl Nitrogen	1.91	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P369237

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111111	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P369103

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111213	Total-P	3.41	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P368972

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2110891	O-Phosphate-P	0.504	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P369051

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111191	Color (true)	1.28	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P369442

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111620	Total Alkalinity	0.0323	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P369722

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111191	TDS	7.67	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P369445

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111620	Fluoride	0.519	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P369232

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2111211	Organic Carbon	0.237	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 365.1 Rev. 2.0 dissolved
Run ID: A93480
Included Lab Sample IDs: 2111118, 2111121

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

Reference Method: SM 2120 B
Run ID: A93516
Included Lab Sample IDs: 2111116, 2111119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	104	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A93525
Included Lab Sample IDs: 2111116, 2111119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	101	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A93552
Included Lab Sample IDs: 2111117, 2111120

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A93581
Included Lab Sample IDs: 2111125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Calcium	101	102	P/P	90 - 110
Iron	101	101	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	99.8	100	P/P	90 - 110
Zinc	100	99.3	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A93586
Included Lab Sample IDs: 2111117, 2111120

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A93589
Included Lab Sample IDs: 2111117, 2111120

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A93607
Included Lab Sample IDs: 2111125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	100	96.9	P/P	95 - 105

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A93624
Included Lab Sample IDs: 2111117, 2111120

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	94.9	94.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A93642
Included Lab Sample IDs: 2111125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	98.7	96.8	P/P	90 - 110
Antimony	92.4	93.6	P/P	90 - 110
Arsenic	100	96.9	P/P	90 - 110
Boron	97.6	94.2	P/P	90 - 110
Cadmium	96.1	94.8	P/P	90 - 110
Chromium	96.4	96.7	P/P	90 - 110
Copper	101	96.6	P/P	90 - 110
Lead	99.0	98.8	P/P	90 - 110
Nickel	100	95.7	P/P	90 - 110
Silver	99.1	97.2	P/P	90 - 110
Thallium	93.4	92.4	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A93694
Included Lab Sample IDs: 2111116, 2111119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A93694
Included Lab Sample IDs: 2111116, 2111119

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A93717
Included Lab Sample IDs: 2111116, 2111119

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.8	99.3	P/P	90 - 110
Chloride	99.3	99.8	P/P	90 - 110
Sulfate	103	104	P/P	90 - 110
Sulfate	104	105	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A93751
Included Lab Sample IDs: 2111117, 2111120

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	101	P/P	90 - 110
Ammonia-N	99.6	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A94039
Included Lab Sample IDs: 2111125

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Selenium	94.9	95.8	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						0.0	
EPA 200.7 Rev. 4.4	Barium	103	102	102	100			0.0839
	Calcium	105	105	103				0.693
	Iron	106	104	106	105			2.07
	Magnesium	112	106	107	104			1.23
	Potassium	108	102	106	103			2.24
	Sodium	97.5	99.3	99.1				0.315
	Zinc	100	100	100	103			0.0742
EPA 200.8 Rev. 5.4	Aluminum	99.9	97.1	95.8	98.0			1.21
	Antimony	98.7	100	101	101			0.177
	Arsenic	101	103	102	104			0.311
	Boron	101	99.5	101	98.8			2.01
	Cadmium	101	103	103	102			0.686
	Chromium	99.6	101	99.9	99.0			0.866
	Copper	99.2	98.4	98.3	99.0			0.0887
	Lead	101	103	101	103			1.81
	Nickel	99.9	101	101	99.6			0.308
	Selenium	96.4	95.5	94.9	97.9			0.578
	Silver	100	101	98.6	99.9			2.22
	Thallium	101	105	104	107			0.844
EPA 300.0 Rev. 2.1	Chloride	97.0	97.8	98.8	98.9			0.873
	Sulfate	101	102	103	103			0.600
EPA 350.1 Rev. 2.0	Ammonia-N	96.4	98.6	99.1				0.497
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	93.3	87.7	89.8				1.91
EPA 353.2 Rev. 2.0	NO2NO3-N	100	100	100				0.0
EPA 365.1 Rev. 2.0	Total-P	102	105	101				3.41
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	98.9	99.4				0.504
SM 2120 B	Color (true)	102					1.28	
SM 2320 B-97	Total Alkalinity	102					0.0323	
SM 2540 C-97	TDS						7.67	
SM 4500 F-C-97	Fluoride	98.9	96.3	96.9				0.519
SM 5310 B-00	Organic Carbon	99.6	102	101				0.237

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2111116, 2111119
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2111125
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2111125
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2111116, 2111119
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2111116, 2111119
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2111117, 2111120
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2111117, 2111120
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2111117, 2111120
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2111117, 2111120

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2111118, 2111121
SM 2120 B / E31780	True Color measured at 450 nm	2111116, 2111119
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2111116, 2111119
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2111116, 2111119
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2111116, 2111119
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2111116, 2111119
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2111117, 2111120

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	08/13/2019			08/14/2019 19:08	Rosalyn Ballman	2111116, 2111119
EPA 200.7 Rev. 4.4	08/13/2019	08/15/2019 16:05	Elliott D. Healy	08/16/2019 16:08	Alexander Thompson	2111125
	08/13/2019	08/15/2019 16:05	Elliott D. Healy	08/19/2019 11:22	Alexander Thompson	2111125
EPA 200.8 Rev. 5.4	08/13/2019	08/15/2019 16:05	Elliott D. Healy	08/20/2019 07:04	Martin Acosta	2111125
	08/13/2019	08/15/2019 16:05	Elliott D. Healy	09/06/2019 13:37	Robert K Palmer	2111125
EPA 300.0 Rev. 2.1	08/13/2019			08/21/2019 01:55	Jhamieka S. Greenwood	2111116
	08/13/2019			08/21/2019 02:31	Jhamieka S. Greenwood	2111119
EPA 350.1 Rev. 2.0	08/13/2019			08/23/2019 11:34	Ping Hua	2111117
	08/13/2019			08/23/2019 11:41	Ping Hua	2111120
EPA 351.2 Rev. 2.0	08/13/2019	08/16/2019 14:55	Sima Feizi	08/20/2019 09:02	Joseph Suarez	2111117
	08/13/2019	08/16/2019 14:55	Sima Feizi	08/20/2019 09:03	Joseph Suarez	2111120
EPA 353.2 Rev. 2.0	08/13/2019			08/19/2019 08:31	Beverly Y. Sanders	2111117
	08/13/2019			08/19/2019 08:32	Beverly Y. Sanders	2111120
EPA 365.1 Rev. 2.0	08/13/2019	08/15/2019 13:11	Vijayalakshmi Reddy	08/16/2019 10:42	Lipi Saha	2111117
	08/13/2019	08/15/2019 13:11	Vijayalakshmi Reddy	08/16/2019 10:43	Lipi Saha	2111120
EPA 365.1 Rev. 2.0 dissolved	08/13/2019			08/13/2019 16:42	Jhamieka S. Greenwood	2111118
	08/13/2019			08/13/2019 16:43	Jhamieka S. Greenwood	2111121
SM 2120 B	08/13/2019			08/14/2019 18:24	Madeline Funaro	2111116
	08/13/2019			08/14/2019 18:25	Madeline Funaro	2111119
SM 2320 B-97	08/13/2019			08/21/2019 00:22	Dale L. Simmons	2111116
	08/13/2019			08/21/2019 00:35	Dale L. Simmons	2111119
SM 2540 C-97	08/13/2019			08/19/2019 15:20	Yijie Li	2111116, 2111119
SM 2540 D-97	08/13/2019			08/19/2019 15:20	Yijie Li	2111116, 2111119
SM 4500 F-C-97	08/13/2019			08/21/2019 00:22	Dale L. Simmons	2111116
	08/13/2019			08/21/2019 00:35	Dale L. Simmons	2111119
SM 5310 B-00	08/13/2019			08/17/2019 00:18	Madeline Funaro	2111117
	08/13/2019			08/17/2019 00:30	Madeline Funaro	2111120