Chemical Analysis Report

TLH-ROC-2022-06-09-02

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-2022-05-30-50**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
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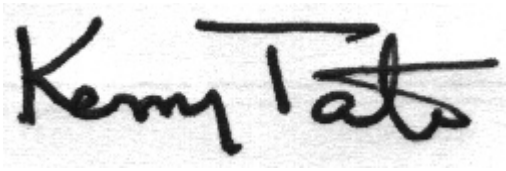
Certified by: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 01-JUL-2022 13:07



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: Direct runoff Gulf @ mouth **Collection Date/Time: 06/09/2022 10:40**

Field ID: G1TLHR0115 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2333619	EPA 180.1 Rev. 2.0	Turbidity	6.1		NTU	P414997	
	SM 2320 B-2011	Total Alkalinity	128		mg CaCO3/L	P415497	
	SM 2540 D-2011	TSS	11		mg/L	P415436	
	SM 4500-F- C-2011	Fluoride	0.53		mg F/L	P415773	
2333621	EPA 350.1 Rev. 2.0	Ammonia-N	0.084		mg N/L	P415588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.60		mg N/L	P415404	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.54		mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.094		mg P/L	P415184	
	SM 5310 B-2011	Organic Carbon	6.1		mg C/L	P415408	
2333623	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.054		mg P/L	P415018	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Direct runoff Gulf ENCOC FCOLI **Collection Date/Time: 06/09/2022 10:30**

Field ID: G1TLHR0116 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2333620	EPA 180.1 Rev. 2.0	Turbidity	4.0		NTU	P414997	
	SM 2320 B-2011	Total Alkalinity	132	A	mg CaCO3/L	P415497	
	SM 2540 D-2011	TSS	9	I	mg/L	P415436	
	SM 4500-F- C-2011	Fluoride	0.47		mg F/L	P415773	
2333622	EPA 350.1 Rev. 2.0	Ammonia-N	0.079		mg N/L	P415588	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.53		mg N/L	P415160	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.59		mg N/L	P415832	
	EPA 365.1 Rev. 2.0	Total-P	0.091		mg P/L	P415467	
	SM 5310 B-2011	Organic Carbon	6.3		mg C/L	P415408	
2333624	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.056		mg P/L	P415018	

Ref. Method and Comment:
SM 2540 D-2011: 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: 06/09/2022 12:10**

Field ID: G1TLHR0065 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2333633	EPA 200.7 Rev. 4.4	Calcium	94.0		mg/L	P415073	
		Iron	170		ug/L	P415073	
		Magnesium	12.4		mg/L	P415073	
		Potassium	0.48	I	mg/L	P415073	
		Sodium	5.1		mg/L	P415073	
		Strontium	420		ug/L	P415073	
		Tin	6.0	U	ug/L	P415073	
		Titanium	1.4	I	ug/L	P415073	
		Vanadium	2.0	U	ug/L	P415073	
		Zinc	5.0	U	ug/L	P415073	
	EPA 200.8 Rev. 5.4	Aluminum	71		ug/L	P415073	
		Antimony	0.050	U	ug/L	P415073	
		Arsenic	0.11	I	ug/L	P415073	
		Barium	19.8		ug/L	P415073	
		Beryllium	0.010	U	ug/L	P415073	
		Boron**	15.2		ug/L	P415073	
		Cadmium	0.020	U	ug/L	P415073	
		Chromium	0.40	U	ug/L	P415073	
		Cobalt	0.182		ug/L	P415073	
		Copper	0.40	U	ug/L	P415073	
		Lead	0.20	U	ug/L	P415073	
		Manganese	244		ug/L	P415073	
		Molybdenum	0.15	U	ug/L	P415073	
		Nickel	0.50	U	ug/L	P415073	
		Selenium	0.20	U	ug/L	P415073	
		Silver	0.010	U	ug/L	P415073	
		Thallium	0.10	U	ug/L	P415073	
	SM 2340 B-2011	Hardness	286		mg/L	P415073	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414997

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415073

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
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Titanium	0.75	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415073

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Barium	0.20	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	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 350.1 Rev. 2.0
Batch ID: P415588

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415160

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415184

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415018

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

Reference Method: SM 2320 B-2011
Batch ID: P415497

Component	Result	Code	Units
Total Alkalinity	1.0	U	mg CaCO3/L

Reference Method: SM 2540 D-2011
Batch ID: P415436

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500-F- C-2011
Batch ID: P415773

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P415408

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414997

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	103		P	85 - 115
Iron	101		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	103		P	85 - 115
Sodium	102		P	85 - 115
Strontium	98.8		P	85 - 115
Tin	98.0		P	85 - 115
Titanium	99.0		P	85 - 115
Vanadium	92.6		P	85 - 115
Zinc	97.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.4		P	85 - 115
Antimony	100		P	85 - 115
Arsenic	99.0		P	85 - 115
Barium	103		P	85 - 115
Beryllium	93.4		P	85 - 115
Boron	99.3		P	85 - 115
Cadmium	97.4		P	85 - 115
Chromium	97.1		P	85 - 115
Cobalt	104		P	85 - 115
Copper	97.6		P	85 - 115
Lead	100		P	85 - 115
Manganese	97.7		P	85 - 115
Molybdenum	99.0		P	85 - 115
Nickel	99.1		P	85 - 115
Selenium	98.0		P	85 - 115
Silver	105		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415588

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415160

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	96.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415184

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415018

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

Reference Method: SM 2320 B-2011
Batch ID: P415497

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	94 - 106

Reference Method: SM 4500-F- C-2011
Batch ID: P415773

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.9		P	96 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415408

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.0		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333337	Calcium	102		P	80 - 120
2333337	Iron	102		P	80 - 120
2333337	Magnesium	102		P	80 - 120
2333337	Potassium	108		P	80 - 120
2333337	Sodium	101		P	80 - 120
2333337	Strontium	99.8		P	80 - 120
2333337	Tin	99.1		P	80 - 120
2333337	Titanium	103		P	80 - 120
2333337	Vanadium	94.9		P	80 - 120
2333337	Zinc	100		P	80 - 120
2333846	Calcium	100	103	P/P	80 - 120
2333846	Iron	99.7	100	P/P	80 - 120
2333846	Magnesium	100	101	P/P	80 - 120
2333846	Potassium	110	111	P/P	80 - 120
2333846	Sodium	103	104	P/P	80 - 120
2333846	Strontium	98.6	98.4	P/P	80 - 120
2333846	Tin	98.5	97.5	P/P	80 - 120
2333846	Titanium	99.5	100	P/P	80 - 120
2333846	Vanadium	92.2	93.0	P/P	80 - 120
2333846	Zinc	95.4	96.3	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333337	Aluminum	102		P	80 - 120
2333337	Antimony	102		P	80 - 120
2333337	Arsenic	99.3		P	80 - 120
2333337	Barium	105		P	80 - 120
2333337	Beryllium	92.7		P	80 - 120
2333337	Boron	103		P	80 - 120
2333337	Cadmium	102		P	80 - 120
2333337	Chromium	98.8		P	80 - 120
2333337	Cobalt	105		P	80 - 120
2333337	Copper	99.5		P	80 - 120
2333337	Lead	101		P	80 - 120
2333337	Manganese	101		P	80 - 120
2333337	Molybdenum	100		P	80 - 120
2333337	Nickel	98.9		P	80 - 120
2333337	Selenium	95.2		P	80 - 120
2333337	Silver	106		P	80 - 120
2333337	Thallium	103		P	80 - 120
2333846	Aluminum	99.5	99.4	P/P	80 - 120
2333846	Antimony	100	100	P/P	80 - 120
2333846	Arsenic	99.4	98.1	P/P	80 - 120
2333846	Barium	104	103	P/P	80 - 120
2333846	Beryllium	92.4	93.3	P/P	80 - 120
2333846	Boron	102	102	P/P	80 - 120
2333846	Cadmium	97.6	97.7	P/P	80 - 120
2333846	Chromium	95.5	97.0	P/P	80 - 120
2333846	Cobalt	102	102	P/P	80 - 120
2333846	Copper	96.7	96.2	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333846	Lead	100	101	P/P	80 - 120
2333846	Manganese	97.1	96.0	P/P	80 - 120
2333846	Molybdenum	98.8	98.4	P/P	80 - 120
2333846	Nickel	96.6	96.4	P/P	80 - 120
2333846	Selenium	97.7	95.1	P/P	80 - 120
2333846	Silver	104	103	P/P	80 - 120
2333846	Thallium	102	103	P/P	80 - 120

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415588

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334810	Ammonia-N	104	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415160

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333485	Kjeldahl Nitrogen	108	97.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333621	Kjeldahl Nitrogen	102	109	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334290	NO2NO3-N	95.7	99.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415184

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333484	Total-P	94.4	94.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2334683	Total-P	102	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415018

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333361	O-Phosphate-P	97.3	98.1	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500-F- C-2011
Batch ID: P415773

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333620	Fluoride	99.0	99.0	P/P	94 - 104

Reference Method: SM 5310 B-2011
Batch ID: P415408

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2333622	Organic Carbon	92.0	92.4	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P414997

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333549	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P415073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333846	Calcium	2.16	Spike	P	0 - 20
2333846	Iron	0.748	Spike	P	0 - 20
2333846	Magnesium	0.757	Spike	P	0 - 20
2333846	Potassium	0.691	Spike	P	0 - 20
2333846	Sodium	0.393	Spike	P	0 - 20
2333846	Strontium	0.182	Spike	P	0 - 20
2333846	Tin	0.951	Spike	P	0 - 20
2333846	Titanium	0.820	Spike	P	0 - 20
2333846	Vanadium	0.867	Spike	P	0 - 20
2333846	Zinc	0.953	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P415073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333846	Aluminum	0.0722	Spike	P	0 - 20
2333846	Antimony	0.0323	Spike	P	0 - 20
2333846	Arsenic	1.28	Spike	P	0 - 20
2333846	Barium	0.214	Spike	P	0 - 20
2333846	Beryllium	0.960	Spike	P	0 - 20
2333846	Boron	0.213	Spike	P	0 - 20
2333846	Cadmium	0.0798	Spike	P	0 - 20
2333846	Chromium	1.53	Spike	P	0 - 20
2333846	Cobalt	0.830	Spike	P	0 - 20
2333846	Copper	0.598	Spike	P	0 - 20
2333846	Lead	0.308	Spike	P	0 - 20
2333846	Manganese	0.938	Spike	P	0 - 20
2333846	Molybdenum	0.417	Spike	P	0 - 20
2333846	Nickel	0.216	Spike	P	0 - 20
2333846	Selenium	2.74	Spike	P	0 - 20
2333846	Silver	1.37	Spike	P	0 - 20
2333846	Thallium	0.661	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P415588

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334810	Ammonia-N	1.01	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415160

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333485	Kjeldahl Nitrogen	8.81	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P415404

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333621	Kjeldahl Nitrogen	4.85	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P415832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334290	NO2NO3-N	3.47	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415184

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333484	Total-P	0.182	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P415467

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2334683	Total-P	1.85	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P415018

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333361	O-Phosphate-P	0.581	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P415497

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333620	Total Alkalinity	0.939	Sample	P	0 - 3.8

Reference Method: SM 4500-F- C-2011
Batch ID: P415773

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333620	Fluoride	0.0	Spike	P	0 - 1.6

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P415408

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2333622	Organic Carbon	0.416	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A112710
Included Lab Sample IDs: 2333619, 2333620

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: A112724
Included Lab Sample IDs: 2333623, 2333624

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	98.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112787
Included Lab Sample IDs: 2333633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.7	98.2	P/P	90 - 110
Antimony	98.4	97.8	P/P	90 - 110
Arsenic	97.5	97.4	P/P	90 - 110
Barium	98.8	97.9	P/P	90 - 110
Boron	98.0	99.2	P/P	90 - 110
Cadmium	98.9	97.3	P/P	90 - 110
Chromium	96.8	97.0	P/P	90 - 110
Cobalt	101	101	P/P	90 - 110
Copper	95.8	95.8	P/P	90 - 110
Lead	98.4	97.8	P/P	90 - 110
Manganese	98.2	97.7	P/P	90 - 110
Molybdenum	97.3	97.2	P/P	90 - 110
Nickel	96.9	96.6	P/P	90 - 110
Selenium	94.8	96.3	P/P	90 - 110
Silver	103	104	P/P	90 - 110
Thallium	96.4	95.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112806
Included Lab Sample IDs: 2333633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.6	96.9	P/P	90 - 110
Iron	99.6	96.7	P/P	90 - 110
Magnesium	98.6	96.5	P/P	90 - 110
Potassium	103	99.0	P/P	90 - 110
Sodium	100	97.7	P/P	90 - 110
Strontium	98.3	96.2	P/P	90 - 110
Titanium	96.1	97.0	P/P	90 - 110
Vanadium	97.9	96.8	P/P	90 - 110
Zinc	95.8	96.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112826
Included Lab Sample IDs: 2333633

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A112826
Included Lab Sample IDs: 2333633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Beryllium	94.8	96.0	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A112892
Included Lab Sample IDs: 2333633

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Tin	98.9	96.2	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A112926
Included Lab Sample IDs: 2333621, 2333622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.9	97.7	P/P	90 - 110
Organic Carbon	98.2	94.9	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A112938
Included Lab Sample IDs: 2333621

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.2	100	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A112951
Included Lab Sample IDs: 2333619, 2333620

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	103	P/P	90 - 110
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A112990
Included Lab Sample IDs: 2333621, 2333622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	98.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A112994
Included Lab Sample IDs: 2333622

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113005
Included Lab Sample IDs: 2333621

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A113005
Included Lab Sample IDs: 2333621

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A113015
Included Lab Sample IDs: 2333622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	99.8	99.8	P/P	90 - 110

Reference Method: SM 4500-F- C-2011
Run ID: A113067
Included Lab Sample IDs: 2333619, 2333620

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A113114
Included Lab Sample IDs: 2333621, 2333622

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	98.5	98.0	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	97.0					0.0	
EPA 200.7 Rev. 4.4	Calcium	103	100	102	103			2.16
	Iron	101	102	99.7	100			0.748
	Magnesium	102	102	100	101			0.757
	Potassium	103	108	110	111			0.691
	Sodium	102	101	103	104			0.393
	Strontium	98.8	99.8	98.6	98.4			0.182
	Tin	98.0	99.1	98.5	97.5			0.951
	Titanium	99.0	103	99.5	100			0.820
	Vanadium	92.6	94.9	92.2	93.0			0.867
	Zinc	97.7	100	95.4	96.3			0.953
EPA 200.8 Rev. 5.4	Aluminum	98.4	99.5	99.4	102			0.0722
	Antimony	100	100	100	102			0.0323
	Arsenic	99.0	99.4	98.1	99.3			1.28
	Barium	103	104	103	105			0.214
	Beryllium	93.4	92.4	93.3	92.7			0.960
	Boron	99.3	102	102	103			0.213
	Cadmium	97.4	97.6	97.7	102			0.0798
	Chromium	97.1	95.5	97.0	98.8			1.53
	Cobalt	104	102	102	105			0.830
	Copper	97.6	96.7	96.2	99.5			0.598
	Lead	100	100	101	101			0.308
	Manganese	97.7	97.1	96.0	101			0.938
	Molybdenum	99.0	98.8	98.4	100			0.417
	Nickel	99.1	96.6	96.4	98.9			0.216
	Selenium	98.0	97.7	95.1	95.2			2.74
	Silver	105	104	103	106			1.37
	Thallium	100	102	103	103			0.661
EPA 350.1 Rev. 2.0	Ammonia-N	100	104	105				1.01
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	105	108	97.2				8.81
	Kjeldahl Nitrogen	102	102	109				4.85
EPA 353.2 Rev. 2.0	NO2NO3-N	96.5	95.7	99.2				3.47
EPA 365.1 Rev. 2.0	Total-P	101	94.4	94.6				0.182
	Total-P	107	102	100				1.85
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	97.3	98.1				0.581
SM 2320 B-2011	Total Alkalinity	104					0.939	
SM 4500-F- C-2011	Fluoride	98.9	99.0	99.0				0.0
SM 5310 B-2011	Organic Carbon	96.0	92.0	92.4				0.416

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2333619, 2333620
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2333633
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2333633
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2333621, 2333622
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2333621, 2333622
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2333621, 2333622
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2333621, 2333622
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2333623, 2333624

Reference Method Descriptions

Method	Description	Associated Samples
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2333619, 2333620
SM 2340 B-2011	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2333633
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2333619, 2333620
SM 4500-F- C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2333619, 2333620
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2333621, 2333622

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	06/09/2022			06/09/2022 14:24	Khloe J Berg	2333619
	06/09/2022			06/09/2022 14:25	Khloe J Berg	2333620
EPA 200.7 Rev. 4.4	06/09/2022	06/12/2022 10:44	Emily M Philpot	06/13/2022 17:15	McKinley C Carter	2333633
	06/09/2022	06/12/2022 10:44	Emily M Philpot	06/16/2022 22:31	McKinley C Carter	2333633
EPA 200.8 Rev. 5.4	06/09/2022	06/12/2022 10:44	Emily M Philpot	06/13/2022 19:10	Emily M Philpot	2333633
	06/09/2022	06/12/2022 10:44	Emily M Philpot	06/14/2022 14:22	Alexander Thompson	2333633
EPA 350.1 Rev. 2.0	06/09/2022			06/22/2022 16:07	Judith K. Clark	2333621
	06/09/2022			06/22/2022 16:11	Judith K. Clark	2333622
EPA 351.2 Rev. 2.0	06/09/2022	06/16/2022 09:51	Samantha L Bates	06/20/2022 13:24	Alexandra J Mattheus	2333622
	06/09/2022	06/22/2022 15:49	Samantha L Bates	06/23/2022 11:37	Alexandra J Mattheus	2333621
EPA 353.2 Rev. 2.0	06/09/2022			06/27/2022 14:22	Touraj Touran	2333621
	06/09/2022			06/27/2022 14:24	Touraj Touran	2333622
EPA 365.1 Rev. 2.0	06/09/2022	06/15/2022 11:23	Simonne.V. Calhoun	06/20/2022 16:32	James L Waggerby	2333621
	06/09/2022	06/22/2022 17:36	Adam P Silver	06/23/2022 14:01	James L Waggerby	2333622
EPA 365.1 Rev. 2.0 dissolved	06/09/2022			06/09/2022 17:20	Nathaniel J Jones	2333623
	06/09/2022			06/09/2022 17:21	Nathaniel J Jones	2333624
SM 2320 B-2011	06/09/2022			06/18/2022 23:39	Dale L. Simmons	2333620
	06/09/2022			06/19/2022 03:19	Dale L. Simmons	2333619
SM 2340 B-2011	06/09/2022			06/13/2022 17:15	McKinley C Carter	2333633
SM 2540 D-2011	06/09/2022			06/14/2022 14:14	Yijie Li	2333619, 2333620
SM 4500-F- C-2011	06/09/2022			06/25/2022 15:09	Dale L. Simmons	2333620
	06/09/2022			06/25/2022 16:38	Dale L. Simmons	2333619
SM 5310 B-2011	06/09/2022			06/18/2022 03:37	Khloe J Berg	2333622
	06/09/2022			06/18/2022 06:28	Khloe J Berg	2333621