

Chemical Analysis Report

NW-DIST-2021-12-07-02

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

Event Description: **Holmes Bay Run**
Request ID: **RQ-2021-11-15-38**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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Date Certified: 28-DEC-2021 10:43



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: Pine Log Creek upstream of Highway 20

Collection Date/Time: 12/06/2021 11:10

Field ID: G3NW0454

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2293490	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P407147	
	EPA 300.0 Rev. 2.1	Chloride	2.4		mg Cl/L	P407362	
		Sulfate	0.77		mg SO4/L	P407365	
		Color (true)	100		PCU	P407134	
	SM 2320 B-2011	Total Alkalinity	2.3	I	mg CaCO3/L	P407287	
	SM 2540 C-2011	TDS	27		mg/L	P407671	
	SM 2540 D-2011	TSS	2	I	mg/L	P407693	
2293491	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P407293	
	EPA 350.1 Rev. 2.0	Ammonia-N	0.01		mg N/L	P407718	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29		mg N/L	P407517	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.019		mg N/L	P407182	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P407169	
2293492	SM 5310 B-2011	Organic Carbon	7.5		mg C/L	P407605	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P407119	
2293503	EPA 200.7 Rev. 4.4	Calcium	1.67		mg/L	P407239	
		Iron	240		ug/L	P407239	
		Magnesium	0.43		mg/L	P407239	
		Potassium	0.30	U	mg/L	P407239	
		Sodium	1.4	I	mg/L	P407239	
		Strontium	6.6	I	ug/L	P407239	
		Tin	3.0	U	ug/L	P407239	
	EPA 200.8 Rev. 5.4	Titanium	0.94	I	ug/L	P407239	
		Vanadium	2.0	U	ug/L	P407239	
		Zinc	5.0	U	ug/L	P407239	
		Aluminum	136		ug/L	P407239	
		Antimony	0.050	U	ug/L	P407239	
		Arsenic	0.22		ug/L	P407239	
		Barium	4.39		ug/L	P407239	
		Beryllium	0.010	U	ug/L	P407239	
		Boron**	8.5		ug/L	P407239	
		Cadmium	0.020	U	ug/L	P407239	
		Chromium	0.40	U	ug/L	P407239	
		Cobalt	0.059	I	ug/L	P407239	
		Copper	0.40	U	ug/L	P407239	
		Lead	0.20	U	ug/L	P407239	
		Manganese	8.96		ug/L	P407239	
		Molybdenum	0.15	U	ug/L	P407239	
		Nickel	0.50	U	ug/L	P407239	
		Selenium	0.20	U	ug/L	P407239	
		Silver	0.010	U	ug/L	P407239	
		Thallium	0.10	U	ug/L	P407239	
	SM 2340B	Hardness	5.9		mg/L	P407239	

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: FB

Collection Date/Time: 12/06/2021 11:25

Field ID: FB_12062021

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2293504	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P407239	
		Iron	30	U	ug/L	P407239	
		Magnesium	0.040	U	mg/L	P407239	
		Potassium	0.30	U	mg/L	P407239	
		Sodium	0.50	U	mg/L	P407239	
		Strontium	2.0	U	ug/L	P407239	
		Tin	3.0	U	ug/L	P407239	
		Titanium	0.75	U	ug/L	P407239	
		Vanadium	2.0	U	ug/L	P407239	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P407239	
		Aluminum	5.0	U	ug/L	P407239	
		Antimony	0.050	U	ug/L	P407239	
		Arsenic	0.050	U	ug/L	P407239	
		Barium	0.20	U	ug/L	P407239	
		Beryllium	0.010	U	ug/L	P407239	
		Boron**	2.0	U	ug/L	P407239	
		Cadmium	0.020	U	ug/L	P407239	
		Chromium	0.40	U	ug/L	P407239	
		Cobalt	0.020	U	ug/L	P407239	
		Copper	0.40	U	ug/L	P407239	
		Lead	0.20	U	ug/L	P407239	
		Manganese	0.10	U	ug/L	P407239	
		Molybdenum	0.15	U	ug/L	P407239	
		Nickel	0.50	U	ug/L	P407239	
		Selenium	0.20	U	ug/L	P407239	
		Silver	0.010	U	ug/L	P407239	
		Thallium	0.10	U	ug/L	P407239	
	SM 2340B	Hardness	0.35	U	mg/L	P407239	

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P407147

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P407239

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: P407239

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 300.0 Rev. 2.1
Batch ID: P407362

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407365

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407718

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407517

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407182

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407169

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407119

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

Reference Method: SM 2120 B-2011
Batch ID: P407134

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P407287

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

Reference Method: SM 2540 C-2011
Batch ID: P407671

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P407693

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P407293

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P407605

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: P407239

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	98.0		P	85 - 115
Iron	105		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	98.6		P	85 - 115
Sodium	103		P	85 - 115
Strontium	98.6		P	85 - 115
Tin	99.1		P	85 - 115
Titanium	98.5		P	85 - 115
Vanadium	97.5		P	85 - 115
Zinc	98.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P407239

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	101		P	85 - 115
Barium	107		P	85 - 115
Beryllium	99.9		P	85 - 115
Boron	97.6		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	104		P	85 - 115
Cobalt	103		P	85 - 115
Copper	102		P	85 - 115
Lead	98.3		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	103		P	85 - 115
Nickel	103		P	85 - 115
Selenium	98.3		P	85 - 115
Silver	101		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P407362

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P407365

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

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P407718

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

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P407517

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P407182

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P407169

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P407119

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

Reference Method: SM 2120 B-2011
Batch ID: P407134

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.9		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P407287

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.7		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P407293

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P407605

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P407239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293216	Calcium	92.5		P	80 - 120
2293216	Iron	102	105	P/P	80 - 120
2293216	Magnesium	99.9	104	P/P	80 - 120
2293216	Potassium	96.0	96.3	P/P	80 - 120
2293216	Sodium	96.9	96.6	P/P	80 - 120
2293216	Strontium	94.6	95.0	P/P	80 - 120
2293216	Tin	97.3	96.8	P/P	80 - 120
2293216	Titanium	98.0	97.2	P/P	80 - 120
2293216	Vanadium	98.3	97.4	P/P	80 - 120
2293216	Zinc	96.8	95.5	P/P	80 - 120
2293846	Calcium	99.3		P	80 - 120
2293846	Iron	103		P	80 - 120
2293846	Magnesium	105		P	80 - 120
2293846	Potassium	94.3		P	80 - 120
2293846	Sodium	96.9		P	80 - 120
2293846	Strontium	96.6		P	80 - 120
2293846	Tin	98.3		P	80 - 120
2293846	Titanium	99.8		P	80 - 120
2293846	Vanadium	99.5		P	80 - 120
2293846	Zinc	99.1		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P407239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293216	Aluminum	98.9	101	P/P	80 - 120
2293216	Antimony	103	104	P/P	80 - 120
2293216	Arsenic	102	101	P/P	80 - 120
2293216	Barium	108	106	P/P	80 - 120
2293216	Beryllium	104	101	P/P	80 - 120
2293216	Boron	94.2	94.4	P/P	80 - 120
2293216	Cadmium	103	105	P/P	80 - 120
2293216	Chromium	105	105	P/P	80 - 120
2293216	Cobalt	102	102	P/P	80 - 120
2293216	Copper	98.5	99.9	P/P	80 - 120
2293216	Lead	97.9	97.8	P/P	80 - 120
2293216	Manganese	103	105	P/P	80 - 120
2293216	Molybdenum	105	107	P/P	80 - 120
2293216	Nickel	102	101	P/P	80 - 120
2293216	Selenium	100	100	P/P	80 - 120
2293216	Silver	101	100	P/P	80 - 120
2293216	Thallium	105	105	P/P	80 - 120
2293846	Aluminum	103		P	80 - 120
2293846	Antimony	103		P	80 - 120
2293846	Arsenic	98.6		P	80 - 120
2293846	Barium	107		P	80 - 120
2293846	Beryllium	107		P	80 - 120
2293846	Boron	98.2		P	80 - 120
2293846	Cadmium	104		P	80 - 120
2293846	Chromium	106		P	80 - 120
2293846	Cobalt	102		P	80 - 120
2293846	Copper	101		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P407239

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293846	Lead	98.5		P	80 - 120
2293846	Manganese	106		P	80 - 120
2293846	Molybdenum	104		P	80 - 120
2293846	Nickel	101		P	80 - 120
2293846	Selenium	97.8		P	80 - 120
2293846	Silver	101		P	80 - 120
2293846	Thallium	104		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P407362

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292967	Chloride	102		P	90 - 110
2293205	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P407365

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2292967	Sulfate	98.5		P	90 - 110
2293205	Sulfate	97.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P407718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293369	Ammonia-N	99.8	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P407517

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293480	Kjeldahl Nitrogen	98.5	93.1	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P407182

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293479	NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P407169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293479	Total-P	108	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P407119

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293464	O-Phosphate-P	99.3	98.3	P/P	90 - 110

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P407293

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293857	Fluoride	101	101	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P407605

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2293908	Organic Carbon	97.2	95.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P407147

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293476	Turbidity	0.421	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P407239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293216	Calcium	0.991	Spike	P	0 - 20
2293216	Iron	2.63	Spike	P	0 - 20
2293216	Magnesium	2.21	Spike	P	0 - 20
2293216	Potassium	0.283	Spike	P	0 - 20
2293216	Sodium	0.153	Spike	P	0 - 20
2293216	Strontium	0.449	Spike	P	0 - 20
2293216	Tin	0.474	Spike	P	0 - 20
2293216	Titanium	0.756	Spike	P	0 - 20
2293216	Vanadium	0.830	Spike	P	0 - 20
2293216	Zinc	1.30	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P407239

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293216	Aluminum	1.75	Spike	P	0 - 20
2293216	Antimony	0.449	Spike	P	0 - 20
2293216	Arsenic	0.963	Spike	P	0 - 20
2293216	Barium	1.60	Spike	P	0 - 20
2293216	Beryllium	3.56	Spike	P	0 - 20
2293216	Boron	0.193	Spike	P	0 - 20
2293216	Cadmium	1.55	Spike	P	0 - 20
2293216	Chromium	0.418	Spike	P	0 - 20
2293216	Cobalt	0.00997	Spike	P	0 - 20
2293216	Copper	1.38	Spike	P	0 - 20
2293216	Lead	0.110	Spike	P	0 - 20
2293216	Manganese	1.74	Spike	P	0 - 20
2293216	Molybdenum	1.05	Spike	P	0 - 20
2293216	Nickel	1.06	Spike	P	0 - 20
2293216	Selenium	0.258	Spike	P	0 - 20
2293216	Silver	0.379	Spike	P	0 - 20
2293216	Thallium	0.258	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407362

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292967	Chloride	0.722	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P407365

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2292967	Sulfate	0.922	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P407718

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293369	Ammonia-N	0.721	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0

Batch ID: P407517

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293480	Kjeldahl Nitrogen	3.44	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P407182

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293479	NO2NO3-N	1.00	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P407169

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293479	Total-P	0.433	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P407119

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293464	O-Phosphate-P	0.609	Spike	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P407134

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293477	Color (true)	0.654	Sample	P	0 - 20

Reference Method: SM 2320 B-2011

Batch ID: P407287

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293857	Total Alkalinity	0.339	Sample	P	0 - 5.2

Quality Assurance Report Precision

Reference Method: SM 2540 C-2011
Batch ID: P407671

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293907	TDS	1.63	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P407293

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293857	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P407605

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2293908	Organic Carbon	1.16	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A109244

Included Lab Sample IDs: 2293492

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	101	99.2	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A109249

Included Lab Sample IDs: 2293490

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	101	P/P	85 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A109254

Included Lab Sample IDs: 2293490

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A109256

Included Lab Sample IDs: 2293490

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	104	104	P/P	90 - 110
Sulfate	100	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A109264

Included Lab Sample IDs: 2293491

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

Reference Method: SM 2320 B-2011

Run ID: A109312

Included Lab Sample IDs: 2293490

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	98.4	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A109312

Included Lab Sample IDs: 2293490

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A109327

Included Lab Sample IDs: 2293503, 2293504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.0	98.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A109327

Included Lab Sample IDs: 2293503, 2293504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.0	99.3	P/P	90 - 110
Iron	99.3	99.1	P/P	90 - 110
Iron	99.3	101	P/P	90 - 110
Magnesium	99.5	99.5	P/P	90 - 110
Magnesium	99.6	101	P/P	90 - 110
Potassium	93.6	95.1	P/P	90 - 110
Potassium	93.7	94.0	P/P	90 - 110
Sodium	96.3	96.6	P/P	90 - 110
Sodium	96.5	98.1	P/P	90 - 110
Strontium	96.5	96.8	P/P	90 - 110
Strontium	97.7	96.6	P/P	90 - 110
Tin	95.7	95.7	P/P	90 - 110
Tin	96.4	96.2	P/P	90 - 110
Titanium	93.2	93.3	P/P	90 - 110
Titanium	93.3	93.4	P/P	90 - 110
Vanadium	92.9	93.2	P/P	90 - 110
Vanadium	93.2	92.5	P/P	90 - 110
Zinc	94.9	94.6	P/P	90 - 110
Zinc	95.7	95.0	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A109330

Included Lab Sample IDs: 2293503, 2293504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.8	97.2	P/P	90 - 110
Aluminum	98.4	96.8	P/P	90 - 110
Antimony	94.6	95.0	P/P	90 - 110
Antimony	95.4	94.6	P/P	90 - 110
Arsenic	97.6	97.8	P/P	90 - 110
Arsenic	97.8	94.8	P/P	90 - 110
Barium	98.3	99.5	P/P	90 - 110
Barium	99.5	98.7	P/P	90 - 110
Beryllium	95.6	96.7	P/P	90 - 110
Beryllium	96.7	92.9	P/P	90 - 110
Boron	92.0	96.0	P/P	90 - 110
Boron	95.0	92.0	P/P	90 - 110
Cadmium	98.2	98.8	P/P	90 - 110
Cadmium	98.8	99.2	P/P	90 - 110
Chromium	97.7	97.8	P/P	90 - 110
Chromium	98.3	97.7	P/P	90 - 110
Cobalt	95.6	94.7	P/P	90 - 110
Cobalt	97.4	95.6	P/P	90 - 110
Copper	94.8	94.3	P/P	90 - 110
Copper	97.1	94.8	P/P	90 - 110
Lead	92.3	93.1	P/P	90 - 110
Lead	92.6	92.3	P/P	90 - 110
Manganese	97.9	99.5	P/P	90 - 110
Manganese	99.2	97.9	P/P	90 - 110
Molybdenum	98.1	98.6	P/P	90 - 110
Molybdenum	98.9	98.1	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A109330

Included Lab Sample IDs: 2293503, 2293504

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	96.1	95.3	P/P	90 - 110
Nickel	97.8	96.1	P/P	90 - 110
Selenium	96.2	98.3	P/P	90 - 110
Selenium	98.3	96.1	P/P	90 - 110
Silver	96.2	96.3	P/P	90 - 110
Silver	96.3	96.4	P/P	90 - 110
Thallium	96.5	96.6	P/P	90 - 110
Thallium	96.6	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A109370

Included Lab Sample IDs: 2293491

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

Reference Method: SM 5310 B-2011

Run ID: A109452

Included Lab Sample IDs: 2293491

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.4	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A109486

Included Lab Sample IDs: 2293491

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	103	99.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A109493

Included Lab Sample IDs: 2293491

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.0	102	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			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.421	
EPA 200.7 Rev. 4.4	Calcium	98.0	92.5	99.3				0.991
	Iron	105	102	105	103			2.63
	Magnesium	108	99.9	104	105			2.21
	Potassium	98.6	96.0	96.3	94.3			0.283
	Sodium	103	96.9	96.6	96.9			0.153
	Strontium	98.6	94.6	95.0	96.6			0.449
	Tin	99.1	97.3	96.8	98.3			0.474
	Titanium	98.5	98.0	97.2	99.8			0.756
	Vanadium	97.5	98.3	97.4	99.5			0.830
	Zinc	98.9	96.8	95.5	99.1			1.30
EPA 200.8 Rev. 5.4	Aluminum	102	98.9	101	103			1.75
	Antimony	104	103	104	103			0.449
	Arsenic	101	102	101	98.6			0.963
	Barium	107	108	106	107			1.60
	Beryllium	99.9	104	101	107			3.56
	Boron	97.6	94.2	94.4	98.2			0.193
	Cadmium	103	103	105	104			1.55
	Chromium	104	105	105	106			0.418
	Cobalt	103	102	102	102			0.0099
	Copper	102	98.5	99.9	101			1.38
	Lead	98.3	97.9	97.8	98.5			0.110
	Manganese	102	103	105	106			1.74
	Molybdenum	103	105	107	104			1.05
	Nickel	103	102	101	101			1.06
	Selenium	98.3	100	100	97.8			0.258
	Silver	101	101	100	101			0.379
	Thallium	103	105	105	104			0.258
EPA 300.0 Rev. 2.1	Chloride	101	102	100			0.722	
	Sulfate	97.0	98.5	97.0			0.922	
EPA 350.1 Rev. 2.0	Ammonia-N	98.6	99.8	101				0.721
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	98.5	93.1				3.44
EPA 353.2 Rev. 2.0	NO2NO3-N	104	99.5	100				1.00
EPA 365.1 Rev. 2.0	Total-P	104	108	108				0.433
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.5	99.3	98.3				0.609
SM 2120 B-2011	Color (true)	99.9					0.654	
SM 2320 B-2011	Total Alkalinity	99.7					0.339	
SM 2540 C-2011	TDS						1.63	
SM 4500 F-C-2011	Fluoride	101	101	101				0.0
SM 5310 B-2011	Organic Carbon	94.8	97.2	95.6				1.16

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2293490
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2293503, 2293504
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2293503, 2293504
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2293490
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2293490
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2293491
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2293491

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2293491
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2293491
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2293492
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2293490
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2293490
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2293503, 2293504
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2293490
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2293490
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2293490
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2293491

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	12/07/2021			12/07/2021 17:29	Khloe J Berg	2293490
EPA 200.7 Rev. 4.4	12/07/2021	12/09/2021 11:00	Vijayalakshmi Reddy	12/10/2021 20:23	Josef B Mick	2293504
	12/07/2021	12/09/2021 11:00	Vijayalakshmi Reddy	12/10/2021 23:22	Josef B Mick	2293503
EPA 200.8 Rev. 5.4	12/07/2021	12/09/2021 11:00	Vijayalakshmi Reddy	12/10/2021 15:50	Alexander Thompson	2293504
	12/07/2021	12/09/2021 11:00	Vijayalakshmi Reddy	12/10/2021 18:34	Alexander Thompson	2293503
EPA 300.0 Rev. 2.1	12/07/2021			12/10/2021 16:52	Roberta Tatti	2293490
EPA 350.1 Rev. 2.0	12/07/2021			12/20/2021 14:40	Roberta Tatti	2293491
EPA 351.2 Rev. 2.0	12/07/2021	12/16/2021 10:33	Alexandra J Mattheus	12/17/2021 14:49	Alexandra J Mattheus	2293491
EPA 353.2 Rev. 2.0	12/07/2021			12/08/2021 09:48	Beverly Y. Sanders	2293491
EPA 365.1 Rev. 2.0	12/07/2021	12/09/2021 14:45	Simonne.V. Calhoun	12/14/2021 11:50	Shengyu Ding	2293491
EPA 365.1 Rev. 2.0 dissolved	12/07/2021			12/07/2021 15:27	James L Waggeberby	2293492
SM 2120 B-2011	12/07/2021			12/07/2021 15:42	Sarah A Nixon	2293490
SM 2320 B-2011	12/07/2021			12/09/2021 21:21	Dale L. Simmons	2293490
SM 2340B	12/07/2021			12/10/2021 20:23	Josef B Mick	2293504
	12/07/2021			12/10/2021 23:22	Josef B Mick	2293503
SM 2540 C-2011	12/07/2021			12/10/2021 15:28	Yijie Li	2293490
SM 2540 D-2011	12/07/2021			12/10/2021 15:28	Yijie Li	2293490
SM 4500 F-C-2011	12/07/2021			12/09/2021 21:21	Dale L. Simmons	2293490
SM 5310 B-2011	12/07/2021			12/17/2021 00:25	Khloe J Berg	2293491