Chemical Analysis Report

NE-DIST-2021-11-23-02

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

Event Description: **Callahan Nassau North**
Request ID: **RQ-2021-11-22-07**
Customer: **NE-DIST**
Project ID: **SMP**

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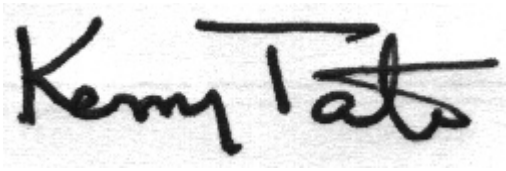
Date Certified: 14-DEC-2021 12:56



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: LITTLE ST. MARYS @ CR 121A **Collection Date/Time: 11/22/2021 10:50**

Field ID: 19010046 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2291021	EPA 180.1 Rev. 2.0	Turbidity	3.3		NTU	P406721	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P407154	
		Sulfate	8.8		mg SO4/L	P407157	
	SM 2120 B-2011	Color (true)	300		PCU	P406716	
	SM 2320 B-2011	Total Alkalinity	20		mg CaCO3/L	P406784	
	SM 2540 C-2011	TDS	117		mg/L	P407014	
	SM 2540 D-2011	TSS	2	I	mg/L	P407051	
	SM 4500 F-C-2011	Fluoride	0.044	I	mg F/L	P406787	
2291022	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P407084	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P406869	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P406741	
	EPA 365.1 Rev. 2.0	Total-P	0.028		mg P/L	P406702	
	SM 5310 B-2011	Organic Carbon	30		mg C/L	P406794	
2291023	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P406711	
2291033	EPA 200.7 Rev. 4.4	Calcium	11.7		mg/L	P406808	
		Iron	940		ug/L	P406808	
		Magnesium	3.43		mg/L	P406808	
		Potassium	1.4		mg/L	P406808	
		Sodium	8.6		mg/L	P406808	
		Strontium	45.3		ug/L	P406808	
		Tin	3.0	U	ug/L	P406808	
		Titanium	2.4	I	ug/L	P406808	
		Vanadium	2.0	U	ug/L	P406808	
		Zinc	5.1	I	ug/L	P406808	
	EPA 200.8 Rev. 5.4	Aluminum	427		ug/L	P406808	
		Antimony	0.057	I	ug/L	P406808	
		Arsenic	0.51		ug/L	P406808	
		Barium	28.2		ug/L	P406808	
		Beryllium	0.042		ug/L	P406808	
		Boron**	23.7		ug/L	P406808	
		Cadmium	0.020	U	ug/L	P406808	
		Chromium	0.74	I	ug/L	P406808	
		Cobalt	0.228		ug/L	P406808	
		Copper	0.42	I	ug/L	P406808	
		Lead	0.50		ug/L	P406808	
		Manganese	26.6		ug/L	P406808	
		Molybdenum	0.15	U	ug/L	P406808	
		Nickel	0.56	I	ug/L	P406808	
		Selenium	0.20	U	ug/L	P406808	
		Silver	0.010	U	ug/L	P406808	
		Thallium	0.10	U	ug/L	P406808	
	SM 2340B	Hardness	43.3		mg/L	P406808	

Field ID: 19010046 Matrix: W-SURF-FRH

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

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for molybdenum are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: MILLS CREEK AT US 301/US1 **Collection Date/Time: 11/22/2021 12:10**

Field ID: 19020048 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2291034	EPA 200.7 Rev. 4.4	Calcium	4.59		mg/L	P406808	
		Iron	1.49E+03		ug/L	P406808	
		Magnesium	1.57		mg/L	P406808	
		Potassium	1.8		mg/L	P406808	
		Sodium	7.0		mg/L	P406808	
		Strontium	20.6		ug/L	P406808	
		Tin	3.0	U	ug/L	P406808	
		Titanium	1.3	I	ug/L	P406808	
		Vanadium	2.0	U	ug/L	P406808	
		Zinc	5.0	U	ug/L	P406808	
	EPA 200.8 Rev. 5.4	Aluminum	449		ug/L	P406808	
		Antimony	0.050	U	ug/L	P406808	
		Arsenic	0.48		ug/L	P406808	
		Barium	18.8		ug/L	P406808	
		Beryllium	0.029	I	ug/L	P406808	
		Boron**	20.1		ug/L	P406808	
		Cadmium	0.020	U	ug/L	P406808	
		Chromium	0.59	I	ug/L	P406808	
		Cobalt	0.349		ug/L	P406808	
		Copper	0.40	U	ug/L	P406808	
		Lead	0.48		ug/L	P406808	
		Manganese	25.2		ug/L	P406808	
		Molybdenum	0.15	U	ug/L	P406808	
		Nickel	0.55	I	ug/L	P406808	
		Selenium	0.20	U	ug/L	P406808	
		Silver	0.010	U	ug/L	P406808	
		Thallium	0.10	U	ug/L	P406808	
	SM 2340B	Hardness	17.9		mg/L	P406808	

Ref. Method and Comment:
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for molybdenum are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Cushing Creek at Lem Turner Rd. **Collection Date/Time: 11/22/2021 13:45**

Field ID: G4NE0306 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2291024	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P406721	
	EPA 300.0 Rev. 2.1	Chloride	21		mg Cl/L	P407154	
		Sulfate	32		mg SO4/L	P407157	
	SM 2120 B-2011	Color (true)	300		PCU	P406716	
	SM 2320 B-2011	Total Alkalinity	59		mg CaCO3/L	P406784	
	SM 2540 C-2011	TDS	205	A	mg/L	P407014	
	SM 2540 D-2011	TSS	2	UA	mg/L	P407051	
	SM 4500 F-C-2011	Fluoride	0.14		mg F/L	P406787	
2291025	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P407084	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P406869	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P406741	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P406702	
	SM 5310 B-2011	Organic Carbon	29		mg C/L	P406794	
2291026	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.024		mg P/L	P406711	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-2011: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P406721

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406808

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: P406808

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: P407154

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407157

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: P407084

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406869

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406741

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406702

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406711

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

Reference Method: SM 2120 B-2011
Batch ID: P406716

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P406784

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

Reference Method: SM 2540 C-2011
Batch ID: P407014

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P407051

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P406787

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P406794

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: P406808

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	102		P	85 - 115
Magnesium	101		P	85 - 115
Potassium	95.9		P	85 - 115
Sodium	97.9		P	85 - 115
Strontium	98.0		P	85 - 115
Tin	100		P	85 - 115
Titanium	99.0		P	85 - 115
Vanadium	98.7		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406808

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	101		P	85 - 115
Barium	107		P	85 - 115
Beryllium	101		P	85 - 115
Boron	97.8		P	85 - 115
Cadmium	99.5		P	85 - 115
Chromium	102		P	85 - 115
Cobalt	107		P	85 - 115
Copper	102		P	85 - 115
Lead	99.0		P	85 - 115
Manganese	102		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	102		P	85 - 115
Selenium	102		P	85 - 115
Silver	102		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407154

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407157

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	98.4		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407084

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	95.0		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406869

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: P406741

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406702

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406711

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.8		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P406716

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	100		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P406784

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P406787

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.0		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P406794

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406808

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291009	Calcium	99.0		P	80 - 120
2291009	Iron	106	106	P/P	80 - 120
2291009	Magnesium	101		P	80 - 120
2291009	Potassium	102	102	P/P	80 - 120
2291009	Sodium	102	100	P/P	80 - 120
2291009	Strontium	100	100	P/P	80 - 120
2291009	Tin	106	106	P/P	80 - 120
2291009	Titanium	101	102	P/P	80 - 120
2291009	Vanadium	105	106	P/P	80 - 120
2291009	Zinc	105	108	P/P	80 - 120
2291225	Iron	105		P	80 - 120
2291225	Magnesium	106		P	80 - 120
2291225	Potassium	108		P	80 - 120
2291225	Sodium	105		P	80 - 120
2291225	Strontium	99.8		P	80 - 120
2291225	Tin	102		P	80 - 120
2291225	Titanium	102		P	80 - 120
2291225	Vanadium	103		P	80 - 120
2291225	Zinc	104		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406808

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291009	Aluminum	102	102	P/P	80 - 120
2291009	Antimony	104	104	P/P	80 - 120
2291009	Arsenic	101	102	P/P	80 - 120
2291009	Barium	107	108	P/P	80 - 120
2291009	Beryllium	97.7	100	P/P	80 - 120
2291009	Boron	98.1	102	P/P	80 - 120
2291009	Cadmium	103	103	P/P	80 - 120
2291009	Chromium	103	104	P/P	80 - 120
2291009	Cobalt	105	106	P/P	80 - 120
2291009	Copper	100	101	P/P	80 - 120
2291009	Lead	100	101	P/P	80 - 120
2291009	Manganese	104	105	P/P	80 - 120
2291009	Nickel	101	102	P/P	80 - 120
2291009	Selenium	101	102	P/P	80 - 120
2291009	Silver	103	105	P/P	80 - 120
2291009	Thallium	104	105	P/P	80 - 120
2291225	Aluminum	96.6		P	80 - 120
2291225	Antimony	104		P	80 - 120
2291225	Arsenic	99.0		P	80 - 120
2291225	Barium	108		P	80 - 120
2291225	Beryllium	99.5		P	80 - 120
2291225	Boron	98.2		P	80 - 120
2291225	Cadmium	102		P	80 - 120
2291225	Chromium	105		P	80 - 120
2291225	Cobalt	104		P	80 - 120
2291225	Copper	95.2		P	80 - 120
2291225	Lead	101		P	80 - 120
2291225	Manganese	106		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406808

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291225	Molybdenum	104		P	80 - 120
2291225	Nickel	101		P	80 - 120
2291225	Selenium	101		P	80 - 120
2291225	Silver	103		P	80 - 120
2291225	Thallium	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407154

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290802	Chloride	99.5		P	90 - 110
2291021	Chloride	97.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407157

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290802	Sulfate	95.8		P	90 - 110
2291021	Sulfate	94.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407084

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290917	Ammonia-N	97.2	96.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406869

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291002	Kjeldahl Nitrogen	88.0	90.8	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290967	NO2NO3-N	100	98.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406702

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2291055	Total-P	101	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406711

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290968	O-Phosphate-P	101	99.5	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P406794

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2290925	Organic Carbon	99.4		P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P406721

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291039	Turbidity	7.53	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P406808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291009	Calcium	0.262	Spike	P	0 - 20
2291009	Iron	0.706	Spike	P	0 - 20
2291009	Magnesium	0.874	Spike	P	0 - 20
2291009	Potassium	0.0124	Spike	P	0 - 20
2291009	Sodium	0.832	Spike	P	0 - 20
2291009	Strontium	0.0642	Spike	P	0 - 20
2291009	Tin	0.0946	Spike	P	0 - 20
2291009	Titanium	1.13	Spike	P	0 - 20
2291009	Vanadium	1.30	Spike	P	0 - 20
2291009	Zinc	3.37	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P406808

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291009	Aluminum	0.000411	Spike	P	0 - 20
2291009	Antimony	0.0428	Spike	P	0 - 20
2291009	Arsenic	0.777	Spike	P	0 - 20
2291009	Barium	1.19	Spike	P	0 - 20
2291009	Beryllium	2.82	Spike	P	0 - 20
2291009	Boron	3.17	Spike	P	0 - 20
2291009	Cadmium	0.697	Spike	P	0 - 20
2291009	Chromium	0.261	Spike	P	0 - 20
2291009	Cobalt	0.645	Spike	P	0 - 20
2291009	Copper	0.232	Spike	P	0 - 20
2291009	Lead	1.03	Spike	P	0 - 20
2291009	Manganese	1.35	Spike	P	0 - 20
2291009	Molybdenum	1.15	Spike	P	0 - 20
2291009	Nickel	1.19	Spike	P	0 - 20
2291009	Selenium	0.789	Spike	P	0 - 20
2291009	Silver	1.31	Spike	P	0 - 20
2291009	Thallium	1.40	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407154

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290802	Chloride	0.273	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P407157

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290802	Sulfate	0.173	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P407084

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290917	Ammonia-N	0.547	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P406869

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291002	Kjeldahl Nitrogen	2.58	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P406741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290967	NO2NO3-N	2.52	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P406702

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291055	Total-P	1.83	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P406711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290968	O-Phosphate-P	1.10	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P406716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290924	Color (true)	1.96	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P406784

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290766	Total Alkalinity	0.818	Sample	P	0 - 5.2

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P407014

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2291024	TDS	4.88	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P406787

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290766	Fluoride	0.0	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P406794

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2290925	Organic Carbon	5.03	Sample	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: A109057
Included Lab Sample IDs: 2291023, 2291026

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.9	99.7	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A109061
Included Lab Sample IDs: 2291021, 2291024

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A109065
Included Lab Sample IDs: 2291021, 2291024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A109078
Included Lab Sample IDs: 2291022, 2291025

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: A109109
Included Lab Sample IDs: 2291021, 2291024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.9	97.4	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A109109
Included Lab Sample IDs: 2291021, 2291024

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

Reference Method: SM 5310 B-2011
Run ID: A109117
Included Lab Sample IDs: 2291022, 2291025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.1	98.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109157
Included Lab Sample IDs: 2291033, 2291034

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	103	P/P	90 - 110
Iron	102	104	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A109157
Included Lab Sample IDs: 2291033, 2291034

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Magnesium	102	104	P/P	90 - 110
Potassium	96.6	98.6	P/P	90 - 110
Sodium	98.8	101	P/P	90 - 110
Strontium	103	102	P/P	90 - 110
Tin	103	103	P/P	90 - 110
Titanium	96.9	99.0	P/P	90 - 110
Vanadium	99.1	99.5	P/P	90 - 110
Zinc	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A109171
Included Lab Sample IDs: 2291022, 2291025

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A109193
Included Lab Sample IDs: 2291022, 2291025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.7	91.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109202
Included Lab Sample IDs: 2291033, 2291034

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	92.4	96.5	P/P	90 - 110
Arsenic	95.7	95.1	P/P	90 - 110
Barium	98.0	101	P/P	90 - 110
Beryllium	94.5	94.4	P/P	90 - 110
Boron	98.0	97.3	P/P	90 - 110
Cadmium	95.1	99.0	P/P	90 - 110
Chromium	95.2	96.0	P/P	90 - 110
Cobalt	98.7	98.1	P/P	90 - 110
Copper	94.5	93.1	P/P	90 - 110
Lead	93.4	94.6	P/P	90 - 110
Manganese	97.3	101	P/P	90 - 110
Molybdenum	95.7	96.7	P/P	90 - 110
Nickel	95.2	94.4	P/P	90 - 110
Selenium	97.2	99.4	P/P	90 - 110
Silver	97.3	98.7	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A109225
Included Lab Sample IDs: 2291033, 2291034

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	93.6	94.9	P/P	90 - 110
Thallium	92.9	91.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A109230
Included Lab Sample IDs: 2291022, 2291025

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.7	95.9	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A109256
Included Lab Sample IDs: 2291021, 2291024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	102	P/P	90 - 110
Chloride	101	101	P/P	90 - 110
Sulfate	100	101	P/P	90 - 110
Sulfate	101	101	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						7.53	
EPA 200.7 Rev. 4.4	Calcium	102	99.0					0.262
	Iron	102	106	106	105			0.706
	Magnesium	101	101	106				0.874
	Potassium	95.9	102	102	108			0.0124
	Sodium	97.9	102	100	105			0.832
	Strontium	98.0	100	100	99.8			0.0642
	Tin	100	106	106	102			0.0946
	Titanium	99.0	101	102	102			1.13
	Vanadium	98.7	105	106	103			1.30
	Zinc	101	105	108	104			3.37
EPA 200.8 Rev. 5.4	Aluminum	102	102	102	96.6			0.0004
	Antimony	101	104	104	104			0.0428
	Arsenic	101	101	102	99.0			0.777
	Barium	107	107	108	108			1.19
	Beryllium	101	97.7	100	99.5			2.82
	Boron	97.8	98.1	102	98.2			3.17
	Cadmium	99.5	103	103	102			0.697
	Chromium	102	105	103	104			0.261
	Cobalt	107	105	106	104			0.645
	Copper	102	100	101	95.2			0.232
	Lead	99.0	100	101	101			1.03
	Manganese	102	104	105	106			1.35
	Molybdenum	101	104					1.15
	Nickel	102	101	102	101			1.19
	Selenium	102	101	102	101			0.789
	Silver	102	103	105	103			1.31
	Thallium	101	105	104	105			1.40
EPA 300.0 Rev. 2.1	Chloride	99.8	99.5	97.9			0.273	
	Sulfate	98.4	95.8	94.2			0.173	
EPA 350.1 Rev. 2.0	Ammonia-N	95.0	97.2	96.4				0.547
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	88.0	90.8				2.58
EPA 353.2 Rev. 2.0	NO2NO3-N	101	100	98.0				2.52
EPA 365.1 Rev. 2.0	Total-P	106	101	103				1.83
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.8	101	99.5				1.10
SM 2120 B-2011	Color (true)	100					1.96	
SM 2320 B-2011	Total Alkalinity	102					0.818	
SM 2540 C-2011	TDS						4.88	
SM 4500 F-C-2011	Fluoride	99.0						0.0
SM 5310 B-2011	Organic Carbon	105	99.4				5.03	

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2291021, 2291024
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2291033, 2291034
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2291033, 2291034
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2291021, 2291024
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2291021, 2291024
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2291022, 2291025
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2291022, 2291025

Reference Method Descriptions

Method	Description	Associated Samples
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2291022, 2291025
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2291022, 2291025
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2291023, 2291026
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2291021, 2291024
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2291021, 2291024
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2291033, 2291034
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2291021, 2291024
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2291021, 2291024
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2291021, 2291024
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2291022, 2291025

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	11/23/2021			11/23/2021 16:13	Khloe J Berg	2291021, 2291024
EPA 200.7 Rev. 4.4	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/01/2021 17:26	Josef B Mick	2291033
	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/01/2021 17:34	Josef B Mick	2291034
EPA 200.8 Rev. 5.4	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/03/2021 17:20	Emily M Philpot	2291033
	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/03/2021 17:29	Emily M Philpot	2291034
	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/06/2021 14:32	Alexander Thompson	2291033
	11/23/2021	11/30/2021 10:30	Vijayalakshmi Reddy	12/06/2021 14:38	Alexander Thompson	2291034
EPA 300.0 Rev. 2.1	11/23/2021			12/07/2021 00:19	James L Waggerby	2291021
	11/23/2021			12/07/2021 03:09	James L Waggerby	2291024
EPA 350.1 Rev. 2.0	11/23/2021			12/06/2021 15:09	Ping Hua	2291022
	11/23/2021			12/06/2021 15:11	Ping Hua	2291025
EPA 351.2 Rev. 2.0	11/23/2021	12/01/2021 11:50	Benjamin T. Nordmann	12/03/2021 11:23	Alexandra J Mattheus	2291022
	11/23/2021	12/01/2021 11:50	Benjamin T. Nordmann	12/03/2021 11:25	Alexandra J Mattheus	2291025
EPA 353.2 Rev. 2.0	11/23/2021			11/24/2021 09:44	Beverly Y. Sanders	2291022
	11/23/2021			11/24/2021 09:46	Beverly Y. Sanders	2291025
EPA 365.1 Rev. 2.0	11/23/2021	11/24/2021 15:46	Simonne.V. Calhoun	12/02/2021 12:19	Shengyu Ding	2291022
	11/23/2021	11/24/2021 15:46	Simonne.V. Calhoun	12/02/2021 12:20	Shengyu Ding	2291025
EPA 365.1 Rev. 2.0 dissolved	11/23/2021			11/23/2021 14:33	James L Waggerby	2291023
	11/23/2021			11/23/2021 14:34	James L Waggerby	2291026
SM 2120 B-2011	11/23/2021			11/23/2021 15:44	Blanca Fach	2291021
	11/23/2021			11/23/2021 15:45	Blanca Fach	2291024
SM 2320 B-2011	11/23/2021			11/24/2021 23:23	Dale L. Simmons	2291021
	11/23/2021			11/24/2021 23:36	Dale L. Simmons	2291024
SM 2340B	11/23/2021			12/01/2021 17:26	Josef B Mick	2291033
	11/23/2021			12/01/2021 17:34	Josef B Mick	2291034
SM 2540 C-2011	11/23/2021			11/24/2021 14:26	Yijie Li	2291021, 2291024
SM 2540 D-2011	11/23/2021			11/24/2021 14:26	Yijie Li	2291021, 2291024
SM 4500 F-C-2011	11/23/2021			11/24/2021 23:23	Dale L. Simmons	2291021
	11/23/2021			11/24/2021 23:36	Dale L. Simmons	2291024
SM 5310 B-2011	11/23/2021			11/27/2021 08:14	Touraj Touran	2291022
	11/23/2021			11/27/2021 08:25	Touraj Touran	2291025