Chemical Analysis Report

CEN-DIST-2020-09-24-02

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

Event Description: **SJR Above Puzzle**
Request ID: **RQ-2020-09-21-50**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Kalina Warren

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 14-OCT-2020 14:21

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: SJR @ Power Line Crossing **Collection Date/Time: 09/23/2020 11:32**

Field ID: G3CE0015 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2198009	EPA 180.1 Rev. 2.0	Turbidity	1.5		NTU	P387815	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P388092	
		Sulfate	19		mg SO4/L	P388096	
	SM 2120 B-2011	Color (true)	280		PCU	P387817	
	SM 2320 B-2011	Total Alkalinity	55		mg CaCO3/L	P388086	
	SM 2540 C-2011	TDS	384		mg/L	P388195	
	SM 2540 D-2011	TSS	2	U	mg/L	P388119	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P387942	
2198011	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P387884	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P387979	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.014		mg N/L	P387912	
	EPA 365.1 Rev. 2.0	Total-P	0.072		mg P/L	P387968	MS
	SM 5310 B-2011	Organic Carbon	29		mg C/L	P387982	
2198013	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.042		mg P/L	P387811	
2198023	EPA 200.7 Rev. 4.4	Barium	23.8		ug/L	P387933	
		Calcium	35.2		mg/L	P387933	
		Iron	520		ug/L	P387933	
		Magnesium	9.04		mg/L	P387933	
		Potassium	2.6		mg/L	P387933	
		Sodium	68.8		mg/L	P387933	
		Zinc	5.0	U	ug/L	P387933	
	EPA 200.8 Rev. 5.4	Aluminum	83		ug/L	P387933	
		Antimony	0.050	U	ug/L	P387933	
		Arsenic	0.77		ug/L	P387933	
		Beryllium	0.010	U	ug/L	P387933	
		Boron**	36.0		ug/L	P387933	
		Cadmium	0.020	U	ug/L	P387933	
		Chromium	0.40	U	ug/L	P387933	
		Copper	0.40	U	ug/L	P387933	
		Lead	0.20	U	ug/L	P387933	
		Nickel	0.50	U	ug/L	P387933	
		Selenium	0.20	U	ug/L	P387933	
		Silver	0.010	U	ug/L	P387933	
		Thallium	0.10	U	ug/L	P387933	
	SM 2340B	Hardness	125		mg/L	P387933	

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: SJR @ 250m Nnw of Power Line Crossing **Collection Date/Time: 09/23/2020 11:45**

Field ID: G3CE0031 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2198010	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P387815	
	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P388092	
		Sulfate	18		mg SO4/L	P388096	
	SM 2120 B-2011	Color (true)	280		PCU	P387817	
	SM 2320 B-2011	Total Alkalinity	55		mg CaCO3/L	P388086	
	SM 2540 C-2011	TDS	363	J	mg/L	P388195	
	SM 2540 D-2011	TSS	2	I	mg/L	P388119	
	SM 4500 F-C-2011	Fluoride	0.11		mg F/L	P387942	
2198012	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P387889	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P387979	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.016		mg N/L	P387912	
	EPA 365.1 Rev. 2.0	Total-P	0.071		mg P/L	P387968	MS
	SM 5310 B-2011	Organic Carbon	29		mg C/L	P387982	
2198014	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.046		mg P/L	P387811	
2198024	EPA 200.7 Rev. 4.4	Barium	24.0		ug/L	P387933	
		Calcium	36.2		mg/L	P387933	
		Iron	540		ug/L	P387933	
		Magnesium	9.31		mg/L	P387933	
		Potassium	2.6		mg/L	P387933	
		Sodium	69.7		mg/L	P387933	
		Zinc	5.0	U	ug/L	P387933	
	EPA 200.8 Rev. 5.4	Aluminum	62		ug/L	P387933	
		Antimony	0.050	U	ug/L	P387933	
		Arsenic	0.77		ug/L	P387933	
		Beryllium	0.010	U	ug/L	P387933	
		Boron**	36.2		ug/L	P387933	
		Cadmium	0.020	U	ug/L	P387933	
		Chromium	0.40	U	ug/L	P387933	
		Copper	0.40	U	ug/L	P387933	
		Lead	0.20	U	ug/L	P387933	
		Nickel	0.50	U	ug/L	P387933	
		Selenium	0.22	I	ug/L	P387933	
		Silver	0.010	U	ug/L	P387933	
		Thallium	0.10	U	ug/L	P387933	
	SM 2340B	Hardness	129		mg/L	P387933	

Ref. Method and Comment:
SM 2540 C-2011: A constant dry weight was not attained.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P387815

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P387933

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387933

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388092

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388096

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387884

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387889

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387979

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387912

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387968

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387811

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

Reference Method: SM 2120 B-2011
Batch ID: P387817

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P388086

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

Reference Method: SM 2540 C-2011
Batch ID: P388195

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P388119

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P387942

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P387982

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: P387933

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	103		P	85 - 115
Iron	103		P	85 - 115
Magnesium	100		P	85 - 115
Potassium	103		P	85 - 115
Sodium	99.5		P	85 - 115
Zinc	91.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387933

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	97.4		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	101		P	85 - 115
Beryllium	96.8		P	85 - 115
Boron	95.2		P	85 - 115
Cadmium	104		P	85 - 115
Chromium	100		P	85 - 115
Copper	100		P	85 - 115
Lead	99.7		P	85 - 115
Nickel	100		P	85 - 115
Selenium	103		P	85 - 115
Silver	103		P	85 - 115
Thallium	97.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388092

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388096

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387884

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	92.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387889

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.7		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387979

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	92.5		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387912

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387968

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387811

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

Reference Method: SM 2120 B-2011
Batch ID: P387817

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	96.5		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P388086

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.8		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P387942

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	101		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P387982

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P387933

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197906	Barium	103		P	80 - 120
2197906	Calcium	105		P	80 - 120
2197906	Iron	111		P	80 - 120
2197906	Magnesium	107		P	80 - 120
2197906	Potassium	103		P	80 - 120
2197906	Sodium	107		P	80 - 120
2197906	Zinc	97.6		P	80 - 120
2198102	Barium	105	107	P/P	80 - 120
2198102	Calcium	107	110	P/P	80 - 120
2198102	Iron	109	111	P/P	80 - 120
2198102	Magnesium	106	108	P/P	80 - 120
2198102	Potassium	109	109	P/P	80 - 120
2198102	Sodium	113	113	P/P	80 - 120
2198102	Zinc	95.2	97.0	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387933

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197906	Aluminum	98.9		P	80 - 120
2197906	Antimony	107		P	80 - 120
2197906	Arsenic	104		P	80 - 120
2197906	Beryllium	94.3		P	80 - 120
2197906	Boron	98.9		P	80 - 120
2197906	Cadmium	105		P	80 - 120
2197906	Chromium	104		P	80 - 120
2197906	Copper	98.5		P	80 - 120
2197906	Lead	103		P	80 - 120
2197906	Nickel	100		P	80 - 120
2197906	Selenium	103		P	80 - 120
2197906	Silver	100		P	80 - 120
2197906	Thallium	102		P	80 - 120
2198102	Aluminum	101	102	P/P	80 - 120
2198102	Antimony	104	104	P/P	80 - 120
2198102	Arsenic	104	102	P/P	80 - 120
2198102	Beryllium	96.7	95.3	P/P	80 - 120
2198102	Boron	98.3	98.3	P/P	80 - 120
2198102	Cadmium	104	102	P/P	80 - 120
2198102	Chromium	102	102	P/P	80 - 120
2198102	Copper	104	103	P/P	80 - 120
2198102	Lead	102	102	P/P	80 - 120
2198102	Nickel	102	102	P/P	80 - 120
2198102	Selenium	105	104	P/P	80 - 120
2198102	Silver	103	102	P/P	80 - 120
2198102	Thallium	101	102	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388092

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197720	Chloride	103		P	90 - 110
2197931	Chloride	103		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388096

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197720	Sulfate	98.9		P	90 - 110
2197931	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387884

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197330	Ammonia-N	100	97.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387889

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197899	Ammonia-N	94.1	96.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387979

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2198099	Kjeldahl Nitrogen	99.2	88.0	P/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387912

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197935	NO2NO3-N	92.8	92.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387968

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197883	Total-P	112	113	F/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387811

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197930	O-Phosphate-P	97.4	97.1	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P387942

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197928	Fluoride	99.6	100	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P387982

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2197863	Organic Carbon	100	99.5	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P387815

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197928	Turbidity	0.124	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P387933

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2198102	Barium	2.21	Spike	P	0 - 20
2198102	Calcium	1.54	Spike	P	0 - 20
2198102	Iron	1.41	Spike	P	0 - 20
2198102	Magnesium	0.982	Spike	P	0 - 20
2198102	Potassium	0.130	Spike	P	0 - 20
2198102	Sodium	0.285	Spike	P	0 - 20
2198102	Zinc	1.87	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P387933

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2198102	Aluminum	1.11	Spike	P	0 - 20
2198102	Antimony	0.654	Spike	P	0 - 20
2198102	Arsenic	1.19	Spike	P	0 - 20
2198102	Beryllium	1.54	Spike	P	0 - 20
2198102	Boron	0.0357	Spike	P	0 - 20
2198102	Cadmium	1.54	Spike	P	0 - 20
2198102	Chromium	0.394	Spike	P	0 - 20
2198102	Copper	0.391	Spike	P	0 - 20
2198102	Lead	0.734	Spike	P	0 - 20
2198102	Nickel	0.00777	Spike	P	0 - 20
2198102	Selenium	1.32	Spike	P	0 - 20
2198102	Silver	0.968	Spike	P	0 - 20
2198102	Thallium	0.350	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388092

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197720	Chloride	0.719	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P388096

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197720	Sulfate	0.320	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387884

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197330	Ammonia-N	1.43	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387889

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197899	Ammonia-N	1.24	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387979

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2198099	Kjeldahl Nitrogen	8.13	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387912

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197935	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P387968

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197883	Total-P	0.634	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P387811

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197930	O-Phosphate-P	0.145	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P387817

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197898	Color (true)	0.223	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P388086

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2198744	Total Alkalinity	1.35	Sample	P	0 - 8.1

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P388195

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197898	TDS	2.46	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P387942

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197928	Fluoride	0.467	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P387982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2197863	Organic Carbon	0.401	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: A101184
Included Lab Sample IDs: 2198013, 2198014

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.2	98.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A101185
Included Lab Sample IDs: 2198009, 2198010

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	100	P/P	95 - 105

Reference Method: SM 2120 B-2011
Run ID: A101186
Included Lab Sample IDs: 2198009, 2198010

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	98.5	99.1	P/P	90 - 115

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A101210
Included Lab Sample IDs: 2198011, 2198012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	102	100	P/P	90 - 110
Ammonia-N	97.1	96.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A101223
Included Lab Sample IDs: 2198011, 2198012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	97.0	97.0	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A101239
Included Lab Sample IDs: 2198009, 2198010

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

Reference Method: SM 5310 B-2011
Run ID: A101262
Included Lab Sample IDs: 2198011, 2198012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.6	100	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A101267
Included Lab Sample IDs: 2198023, 2198024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	103	107	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A101267
Included Lab Sample IDs: 2198023, 2198024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	105	104	P/P	90 - 110
Iron	107	107	P/P	90 - 110
Magnesium	104	104	P/P	90 - 110
Potassium	105	105	P/P	90 - 110
Sodium	109	109	P/P	90 - 110
Zinc	94.8	98.1	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A101281
Included Lab Sample IDs: 2198009, 2198010

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	107	107	P/P	90 - 110
Sulfate	105	105	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A101288
Included Lab Sample IDs: 2198011, 2198012

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	91.3	95.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A101296
Included Lab Sample IDs: 2198023, 2198024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	99.7	98.2	P/P	90 - 110
Cadmium	100	101	P/P	90 - 110
Chromium	97.6	101	P/P	90 - 110
Copper	99.4	95.1	P/P	90 - 110
Lead	101	101	P/P	90 - 110
Nickel	98.5	94.4	P/P	90 - 110
Selenium	103	102	P/P	90 - 110
Silver	102	102	P/P	90 - 110
Thallium	97.3	96.3	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A101307
Included Lab Sample IDs: 2198009, 2198010

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	95.8	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A101309
Included Lab Sample IDs: 2198011, 2198012

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A101328
Included Lab Sample IDs: 2198023, 2198024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	100	97.0	P/P	90 - 110
Antimony	106	106	P/P	90 - 110
Beryllium	93.9	92.3	P/P	90 - 110
Boron	97.0	96.1	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.124	
EPA 200.7 Rev. 4.4	Barium	101	103	105	107			2.21
	Calcium	103	105	107	110			1.54
	Iron	103	111	109	111			1.41
	Magnesium	100	107	106	108			0.982
	Potassium	103	103	109	109			0.130
	Sodium	99.5	107	113	113			0.285
	Zinc	91.7	97.6	95.2	97.0			1.87
EPA 200.8 Rev. 5.4	Aluminum	97.4	101	102	98.9			1.11
	Antimony	104	104	104	107			0.654
	Arsenic	101	104	102	104			1.19
	Beryllium	96.8	96.7	95.3	94.3			1.54
	Boron	95.2	98.3	98.3	98.9			0.0357
	Cadmium	104	104	102	105			1.54
	Chromium	100	102	102	104			0.394
	Copper	100	104	103	98.5			0.391
	Lead	99.7	102	102	103			0.734
	Nickel	100	102	102	100			0.0077
	Selenium	103	105	104	103			1.32
	Silver	103	103	102	100			0.968
	Thallium	97.4	101	102	102			0.350
EPA 300.0 Rev. 2.1	Chloride	105	103	103			0.719	
	Sulfate	103	98.9	100			0.320	
EPA 350.1 Rev. 2.0	Ammonia-N	92.6	100	97.2				1.43
	Ammonia-N	98.7	94.1	96.0				1.24
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	92.5	99.2	88.0				8.13
EPA 353.2 Rev. 2.0	NO2NO3-N	98.5	92.8	92.8				0.0
EPA 365.1 Rev. 2.0	Total-P	108	112	113				0.634
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.4	97.4	97.1				0.145
SM 2120 B-2011	Color (true)	96.5					0.223	
SM 2320 B-2011	Total Alkalinity	98.8					1.35	
SM 2540 C-2011	TDS						2.46	
SM 4500 F-C-2011	Fluoride	101	99.6	100				0.467
SM 5310 B-2011	Organic Carbon	102	100	99.5				0.401

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2198009, 2198010
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2198023, 2198024
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2198023, 2198024
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2198009, 2198010
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2198009, 2198010
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2198011, 2198012
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2198011, 2198012
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2198011, 2198012
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2198011, 2198012
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2198013, 2198014
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2198009, 2198010
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2198009, 2198010

Reference Method Descriptions

Method	Description	Associated Samples
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2198023, 2198024
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2198009, 2198010
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2198009, 2198010
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2198009, 2198010
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2198011, 2198012

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	09/24/2020			09/24/2020 14:51	Yen Ta	2198009, 2198010
EPA 200.7 Rev. 4.4	09/24/2020	09/28/2020 17:30	Elliott D. Healy	09/29/2020 19:29	Betina Topolski	2198023
	09/24/2020	09/28/2020 17:30	Elliott D. Healy	09/29/2020 19:37	Betina Topolski	2198024
EPA 200.8 Rev. 5.4	09/24/2020	09/28/2020 17:30	Elliott D. Healy	09/30/2020 23:28	Alexander Thompson	2198023
	09/24/2020	09/28/2020 17:30	Elliott D. Healy	09/30/2020 23:36	Alexander Thompson	2198024
	09/24/2020	09/28/2020 17:30	Elliott D. Healy	10/01/2020 15:56	Alexander Thompson	2198023
	09/24/2020	09/28/2020 17:30	Elliott D. Healy	10/01/2020 16:02	Alexander Thompson	2198024
EPA 300.0 Rev. 2.1	09/24/2020			09/30/2020 22:39	Lipi Saha	2198009
	09/24/2020			09/30/2020 22:53	Lipi Saha	2198010
EPA 350.1 Rev. 2.0	09/24/2020			09/26/2020 12:40	Ping Hua	2198011
	09/24/2020			09/26/2020 15:12	Ping Hua	2198012
EPA 351.2 Rev. 2.0	09/24/2020	09/29/2020 15:45	David Boose	09/30/2020 12:43	Elliott Rodriguez	2198011
	09/24/2020	09/29/2020 15:45	David Boose	09/30/2020 12:45	Elliott Rodriguez	2198012
EPA 353.2 Rev. 2.0	09/24/2020			09/28/2020 09:36	Beverly Y. Sanders	2198011
	09/24/2020			09/28/2020 09:37	Beverly Y. Sanders	2198012
EPA 365.1 Rev. 2.0	09/24/2020	09/29/2020 12:36	Yen Ta	09/30/2020 16:48	Benjamin T. Nordmann	2198011
	09/24/2020	09/29/2020 12:36	Yen Ta	09/30/2020 16:49	Benjamin T. Nordmann	2198012
EPA 365.1 Rev. 2.0 dissolved	09/24/2020			09/24/2020 14:53	Samantha Davila	2198013
	09/24/2020			09/24/2020 14:54	Samantha Davila	2198014
SM 2120 B-2011	09/24/2020			09/24/2020 15:56	Benjamin T. Nordmann	2198009, 2198010
SM 2320 B-2011	09/24/2020			09/30/2020 18:03	Dale L. Simmons	2198009
	09/24/2020			09/30/2020 18:13	Dale L. Simmons	2198010
SM 2340B	09/24/2020			09/29/2020 19:29	Betina Topolski	2198023
	09/24/2020			09/29/2020 19:37	Betina Topolski	2198024
SM 2540 C-2011	09/24/2020			09/25/2020 18:22	Madeline Gruver	2198009, 2198010
SM 2540 D-2011	09/24/2020			09/25/2020 18:22	Madeline Gruver	2198009, 2198010
SM 4500 F-C-2011	09/24/2020			09/25/2020 18:51	Dale L. Simmons	2198009
	09/24/2020			09/25/2020 19:05	Dale L. Simmons	2198010
SM 5310 B-2011	09/24/2020			09/29/2020 06:29	David Boose	2198011
	09/24/2020			09/29/2020 06:44	David Boose	2198012