Chemical Analysis Report

WAS-SECT-2020-12-07-02

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

Event Description: **Merrit's Mill Pond BMAP**
Request ID: **RQ-2020-11-02-05**
Customer: **WAS-SECT**
Project ID: **BMAP**

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Date Certified: 29-DEC-2020 11:01

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: Merritts Mill Pond 600 Meters Downstream of Jackson Blue Sp **Collection Date/Time: 12/07/2020 12:37**

Field ID: G2WA0007 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2211321	EPA 180.1 Rev. 2.0	Turbidity	0.20		NTU	P390848	
	EPA 300.0 Rev. 2.1	Chloride	5.0		mg Cl/L	P391016	
		Sulfate	1.4		mg SO4/L	P391017	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P390920	
	SM 2320 B-2011	Total Alkalinity	121		mg CaCO3/L	P391089	
	SM 2540 C-2011	TDS	159		mg/L	P391169	
	SM 2540 D-2011	TSS	2	U	mg/L	P391149	
	SM 4500 F-C-2011	Fluoride	0.036	I	mg F/L	P390970	
2211323	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P391082	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P391117	
	EPA 353.2 Rev. 2.0	NO2NO3-N	3.8		mg N/L	P390960	
	EPA 365.1 Rev. 2.0	Total-P	0.021		mg P/L	P390982	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P391060	
2211325	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P390853	
2211329	EPA 200.7 Rev. 4.4	Barium	6.2		ug/L	P390843	
		Calcium	52.3		mg/L	P390843	
		Iron	30	U	ug/L	P390843	
		Magnesium	2.45		mg/L	P390843	
		Potassium	0.45	I	mg/L	P390843	
		Sodium	1.9	I	mg/L	P390843	
		Strontium	41.5		ug/L	P390843	
		Tin	3.0	U	ug/L	P390843	
		Titanium	1.1	I	ug/L	P390843	
		Vanadium	2.0	U	ug/L	P390843	
		Zinc	5.0	U	ug/L	P390843	
	EPA 200.8 Rev. 5.4	Aluminum	5.5	I	ug/L	P390843	
		Antimony	0.050	U	ug/L	P390843	
		Arsenic	0.23		ug/L	P390843	
		Beryllium	0.015	I	ug/L	P390843	
		Boron**	7.8	I	ug/L	P390843	
		Cadmium	0.020	U	ug/L	P390843	
		Chromium	1.2	I	ug/L	P390843	
		Cobalt	0.020	U	ug/L	P390843	
		Copper	0.40	U	ug/L	P390843	
		Lead	0.20	U	ug/L	P390843	
		Manganese	0.20	I	ug/L	P390843	
		Molybdenum	0.15	U	ug/L	P390843	
		Nickel	0.50	U	ug/L	P390843	
		Selenium	0.20	U	ug/L	P390843	
		Silver	0.010	U	ug/L	P390843	
		Thallium	0.10	U	ug/L	P390843	
	SM 2340B	Hardness	141		mg/L	P390843	

Field ID: G2WA0007 Matrix: W-SURF-FRH

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

Ref. Method and Comment:
SM 2540 C-2011: The reported result is consistent with the conductivity measured in the laboratory, 288 umhos/cm.
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: 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 potassium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Sample Location: Shangri La Spring Vent **Collection Date/Time: 12/07/2020 12:20**

Field ID: G2WA0022 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2211322	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P390848	
	EPA 300.0 Rev. 2.1	Chloride	5.0		mg Cl/L	P391016	
		Sulfate	1.4		mg SO4/L	P391017	
	SM 2120 B-2011	Color (true)	2.5	U	PCU	P390921	
	SM 2320 B-2011	Total Alkalinity	137	A	mg CaCO3/L	P391089	
	SM 2540 C-2011	TDS	198	A	mg/L	P391169	
	SM 2540 D-2011	TSS	2	UA	mg/L	P391149	
	SM 4500 F-C-2011	Fluoride	0.040	I	mg F/L	P390970	
2211324	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P391082	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P391117	
	EPA 353.2 Rev. 2.0	NO2NO3-N	4.1		mg N/L	P390960	
	EPA 365.1 Rev. 2.0	Total-P	0.024		mg P/L	P390984	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P391060	
2211326	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.024		mg P/L	P390854	
2211330	EPA 200.7 Rev. 4.4	Barium	5.3		ug/L	P390843	
		Calcium	60.5		mg/L	P390843	
		Iron	30	U	ug/L	P390843	
		Magnesium	2.07		mg/L	P390843	
		Potassium	0.44	I	mg/L	P390843	
		Sodium	2.0		mg/L	P390843	
		Strontium	49.2		ug/L	P390843	
		Tin	3.0	U	ug/L	P390843	
		Titanium	1.1	I	ug/L	P390843	
		Vanadium	2.0	U	ug/L	P390843	
		Zinc	5.0	U	ug/L	P390843	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P390843	
		Antimony	0.050	U	ug/L	P390843	
		Arsenic	0.20		ug/L	P390843	
		Beryllium	0.010	U	ug/L	P390843	
		Boron**	7.9	I	ug/L	P390843	
		Cadmium	0.020	U	ug/L	P390843	
		Chromium	1.5	I	ug/L	P390843	
		Cobalt	0.020	U	ug/L	P390843	
		Copper	0.40	U	ug/L	P390843	
		Lead	0.20	U	ug/L	P390843	
		Manganese	0.10	I	ug/L	P390843	
		Molybdenum	0.15	U	ug/L	P390843	
		Nickel	0.50	U	ug/L	P390843	
		Selenium	0.22	I	ug/L	P390843	
		Silver	0.010	U	ug/L	P390843	
		Thallium	0.10	U	ug/L	P390843	
	SM 2340B	Hardness	160		mg/L	P390843	

Field ID: G2WA0022 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.
EPA 351.2 Rev. 2.0: 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 potassium are unavailable for one of two spiked samples 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: P390848

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390843

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
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: P390843

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
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: P391016

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391017

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: P391082

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391117

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390960

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390982

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390984

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390853

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390854

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

Reference Method: SM 2120 B-2011
Batch ID: P390920

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B-2011
Batch ID: P390921

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-2011
Batch ID: P391089

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

Reference Method: SM 2540 C-2011
Batch ID: P391169

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P391149

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P390970

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P391060

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: P390843

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	108		P	85 - 115
Calcium	103		P	85 - 115
Iron	107		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	98.7		P	85 - 115
Sodium	105		P	85 - 115
Strontium	105		P	85 - 115
Tin	111		P	85 - 115
Titanium	105		P	85 - 115
Vanadium	103		P	85 - 115
Zinc	110		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390843

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	99.9		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	100		P	85 - 115
Beryllium	104		P	85 - 115
Boron	97.5		P	85 - 115
Cadmium	98.1		P	85 - 115
Chromium	103		P	85 - 115
Cobalt	105		P	85 - 115
Copper	98.8		P	85 - 115
Lead	103		P	85 - 115
Manganese	96.4		P	85 - 115
Molybdenum	101		P	85 - 115
Nickel	98.4		P	85 - 115
Selenium	99.3		P	85 - 115
Silver	107		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391016

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391017

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	99.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391082

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391117

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: P390960

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: P390982

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390984

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390853

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390854

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

Reference Method: SM 2120 B-2011
Batch ID: P390920

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.0		P	90 - 110

Reference Method: SM 2120 B-2011
Batch ID: P390921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.6		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P391089

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	93 - 104

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-2011
Batch ID: P390970

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P391060

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390843

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211165	Barium	104		P	80 - 120
2211165	Calcium	103		P	80 - 120
2211165	Iron	105		P	80 - 120
2211165	Magnesium	99.0		P	80 - 120
2211165	Sodium	99.8		P	80 - 120
2211165	Strontium	104		P	80 - 120
2211165	Tin	105		P	80 - 120
2211165	Titanium	102		P	80 - 120
2211165	Vanadium	99.9		P	80 - 120
2211165	Zinc	108		P	80 - 120
2211329	Barium	102	90.5	P/P	80 - 120
2211329	Calcium	84.2		P	80 - 120
2211329	Iron	103	88.5	P/P	80 - 120
2211329	Magnesium	98.9	100	P/P	80 - 120
2211329	Potassium	96.4	82.5	P/P	80 - 120
2211329	Sodium	103	82.3	P/P	80 - 120
2211329	Strontium	103	87.9	P/P	80 - 120
2211329	Tin	105	88.7	P/P	80 - 120
2211329	Titanium	101	88.6	P/P	80 - 120
2211329	Vanadium	101	88.1	P/P	80 - 120
2211329	Zinc	102	86.8	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390843

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211165	Aluminum	103		P	80 - 120
2211165	Antimony	104		P	80 - 120
2211165	Arsenic	98.2		P	80 - 120
2211165	Beryllium	104		P	80 - 120
2211165	Boron	101		P	80 - 120
2211165	Cadmium	97.2		P	80 - 120
2211165	Chromium	102		P	80 - 120
2211165	Cobalt	103		P	80 - 120
2211165	Copper	96.0		P	80 - 120
2211165	Lead	104		P	80 - 120
2211165	Manganese	96.8		P	80 - 120
2211165	Molybdenum	100		P	80 - 120
2211165	Nickel	95.7		P	80 - 120
2211165	Selenium	96.9		P	80 - 120
2211165	Silver	106		P	80 - 120
2211165	Thallium	106		P	80 - 120
2211329	Aluminum	102	100	P/P	80 - 120
2211329	Antimony	105	105	P/P	80 - 120
2211329	Arsenic	101	98.9	P/P	80 - 120
2211329	Beryllium	102	103	P/P	80 - 120
2211329	Boron	94.7	95.2	P/P	80 - 120
2211329	Cadmium	98.0	98.1	P/P	80 - 120
2211329	Chromium	101	102	P/P	80 - 120
2211329	Cobalt	104	104	P/P	80 - 120
2211329	Copper	95.7	94.6	P/P	80 - 120
2211329	Lead	102	103	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390843

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211329	Manganese	96.9	96.9	P/P	80 - 120
2211329	Molybdenum	104	104	P/P	80 - 120
2211329	Nickel	96.9	96.2	P/P	80 - 120
2211329	Selenium	98.4	96.7	P/P	80 - 120
2211329	Silver	106	108	P/P	80 - 120
2211329	Thallium	102	105	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391016

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211305	Chloride	99.0		P	90 - 110
2211680	Chloride	97.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391017

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211305	Sulfate	99.6		P	90 - 110
2211680	Sulfate	98.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391082

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211323	Ammonia-N	96.6	96.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390960

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211307	NO2NO3-N	97.0	97.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390982

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211259	Total-P	103	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390984

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211324	Total-P	105	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390853

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211264	O-Phosphate-P	98.6	99.8	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390854

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211326	O-Phosphate-P	101	100	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P390970

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211416	Fluoride	97.7	99.0	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P391060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2211260	Organic Carbon	98.4	98.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P390848

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211256	Turbidity	5.09	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P390843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211329	Barium	12.2	Spike	P	0 - 20
2211329	Calcium	16.5	Spike	P	0 - 20
2211329	Iron	15.6	Spike	P	0 - 20
2211329	Magnesium	0.736	Spike	P	0 - 20
2211329	Potassium	13.8	Spike	P	0 - 20
2211329	Sodium	15.0	Spike	P	0 - 20
2211329	Strontium	15.8	Spike	P	0 - 20
2211329	Tin	16.8	Spike	P	0 - 20
2211329	Titanium	12.6	Spike	P	0 - 20
2211329	Vanadium	13.3	Spike	P	0 - 20
2211329	Zinc	15.9	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P390843

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211329	Aluminum	1.89	Spike	P	0 - 20
2211329	Antimony	0.316	Spike	P	0 - 20
2211329	Arsenic	1.77	Spike	P	0 - 20
2211329	Beryllium	0.349	Spike	P	0 - 20
2211329	Boron	0.500	Spike	P	0 - 20
2211329	Cadmium	0.159	Spike	P	0 - 20
2211329	Chromium	0.418	Spike	P	0 - 20
2211329	Cobalt	0.716	Spike	P	0 - 20
2211329	Copper	1.15	Spike	P	0 - 20
2211329	Lead	1.12	Spike	P	0 - 20
2211329	Manganese	0.00130	Spike	P	0 - 20
2211329	Molybdenum	0.338	Spike	P	0 - 20
2211329	Nickel	0.749	Spike	P	0 - 20
2211329	Selenium	1.74	Spike	P	0 - 20
2211329	Silver	1.31	Spike	P	0 - 20
2211329	Thallium	2.41	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391016

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211680	Chloride	0.649	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P391017

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211680	Sulfate	0.178	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P391082

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211323	Ammonia-N	0.207	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P391117

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2210786	Kjeldahl Nitrogen	1.50	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P390960

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211307	NO2NO3-N	0.475	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390982

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211259	Total-P	2.11	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P390984

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211324	Total-P	0.679	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211264	O-Phosphate-P	1.13	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P390854

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211326	O-Phosphate-P	0.401	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2120 B-2011
Batch ID: P390920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211254	Color (true)	7.28	Sample	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P390921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211365	Color (true)	5.78	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P391089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211322	Total Alkalinity	1.20	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P391169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211322	TDS	4.04	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P390970

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211416	Fluoride	0.982	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P391060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2211260	Organic Carbon	0.419	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A102455
Included Lab Sample IDs: 2211321, 2211322

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	99.6	P/P	90 - 110
Sulfate	99.2	99.1	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A102471
Included Lab Sample IDs: 2211321, 2211322

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	102	102	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A102472
Included Lab Sample IDs: 2211325, 2211326

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	99.6	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A102494
Included Lab Sample IDs: 2211321, 2211322

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	102	P/P	85 - 115
Color (true)	103	102	P/P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A102504
Included Lab Sample IDs: 2211329, 2211330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Iron	99.1	102	P/P	90 - 110
Potassium	93.5	96.3	P/P	90 - 110
Sodium	98.6	98.8	P/P	90 - 110
Strontium	100	100	P/P	90 - 110
Tin	103	100	P/P	90 - 110
Titanium	101	101	P/P	90 - 110
Vanadium	99.1	98.4	P/P	90 - 110
Zinc	105	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A102515
Included Lab Sample IDs: 2211323, 2211324

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A102517
Included Lab Sample IDs: 2211329, 2211330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	97.5	P/P	95 - 105
Calcium	97.6	97.7	P/P	90 - 110
Magnesium	101	97.4	P/P	95 - 105
Magnesium	96.4	96.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A102518
Included Lab Sample IDs: 2211321, 2211322

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	100	P/P	90 - 110

Reference Method: SM 5310 B-2011
Run ID: A102548
Included Lab Sample IDs: 2211323, 2211324

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.3	98.8	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A102553
Included Lab Sample IDs: 2211323, 2211324

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	95.8	93.7	P/P	90 - 110
Ammonia-N	96.4	95.8	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A102561
Included Lab Sample IDs: 2211321, 2211322

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A102574
Included Lab Sample IDs: 2211323, 2211324

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.8	98.0	P/P	90 - 110
Total-P	98.0	97.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A102598
Included Lab Sample IDs: 2211323, 2211324

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.1	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102629
Included Lab Sample IDs: 2211329, 2211330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	97.5	100	P/P	90 - 110
Antimony	99.1	100	P/P	90 - 110
Arsenic	96.2	97.0	P/P	90 - 110
Arsenic	97.3	97.0	P/P	90 - 110
Boron	102	101	P/P	90 - 110
Boron	97.2	100	P/P	90 - 110
Cadmium	94.9	96.4	P/P	90 - 110
Cadmium	95.9	96.7	P/P	90 - 110
Chromium	101	102	P/P	90 - 110
Chromium	102	102	P/P	90 - 110
Cobalt	101	100	P/P	90 - 110
Cobalt	102	102	P/P	90 - 110
Copper	93.5	93.2	P/P	90 - 110
Copper	94.1	94.4	P/P	90 - 110
Lead	98.1	99.2	P/P	90 - 110
Lead	98.8	99.1	P/P	90 - 110
Manganese	93.1	94.2	P/P	90 - 110
Manganese	94.1	94.0	P/P	90 - 110
Molybdenum	99.1	99.5	P/P	90 - 110
Molybdenum	99.2	99.7	P/P	90 - 110
Nickel	93.4	93.0	P/P	90 - 110
Nickel	94.5	94.0	P/P	90 - 110
Selenium	95.9	97.2	P/P	90 - 110
Selenium	96.8	97.6	P/P	90 - 110
Silver	103	104	P/P	90 - 110
Silver	103	104	P/P	90 - 110
Thallium	101	101	P/P	90 - 110
Thallium	99.8	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A102654
Included Lab Sample IDs: 2211329, 2211330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	101	P/P	90 - 110
Aluminum	96.0	96.0	P/P	90 - 110
Beryllium	99.0	99.2	P/P	90 - 110
Beryllium	99.1	99.2	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						5.09	
EPA 200.7 Rev. 4.4	Barium	108	104	102	90.5			12.2
	Calcium	103	103	84.2				16.5
	Iron	107	105	103	88.5			15.6
	Magnesium	102	98.9	100	99.0			0.736
	Potassium	98.7	96.4	82.5				13.8
	Sodium	105	99.8	103	82.3			15.0
	Strontium	105	104	103	87.9			15.8
	Tin	111	105	105	88.7			16.8
	Titanium	105	102	101	88.6			12.6
	Vanadium	103	99.9	101	88.1			13.3
	Zinc	110	108	102	86.8			15.9
EPA 200.8 Rev. 5.4	Aluminum	99.9	102	100	103			1.89
	Antimony	104	105	105	104			0.316
	Arsenic	100	101	98.9	98.2			1.77
	Beryllium	104	102	103	104			0.349
	Boron	97.5	94.7	95.2	101			0.500
	Cadmium	98.1	98.0	98.1	97.2			0.159
	Chromium	103	101	102	102			0.418
	Cobalt	105	104	104	103			0.716
	Copper	98.8	95.7	94.6	96.0			1.15
	Lead	103	102	103	104			1.12
	Manganese	96.4	96.9	96.9	96.8			0.0013
	Molybdenum	101	104	104	100			0.338
	Nickel	98.4	96.9	96.2	95.7			0.749
	Selenium	99.3	96.7	96.9	98.4			1.74
	Silver	107	106	108	106			1.31
	Thallium	102	102	105	106			2.41
EPA 300.0 Rev. 2.1	Chloride	98.3	97.7	99.0			0.649	
	Sulfate	99.1	98.0	99.6			0.178	
EPA 350.1 Rev. 2.0	Ammonia-N	97.2	96.6	96.8				0.207
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106						1.50
EPA 353.2 Rev. 2.0	NO2NO3-N	101	97.0	97.5				0.475
EPA 365.1 Rev. 2.0	Total-P	106	103	106				2.11
	Total-P	102	105	104				0.679
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	98.6	99.8				1.13
	O-Phosphate-P	102	101	100				0.401
SM 2120 B-2011	Color (true)	99.0					7.28	
	Color (true)	98.6					5.78	
SM 2320 B-2011	Total Alkalinity	103					1.20	
SM 2540 C-2011	TDS						4.04	
SM 4500 F-C-2011	Fluoride	97.9	97.7	99.0				0.982
SM 5310 B-2011	Organic Carbon	98.2	98.4	98.9				0.419

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2211321, 2211322
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2211329, 2211330
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2211329, 2211330
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2211321, 2211322

Reference Method Descriptions

Method	Description	Associated Samples
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2211321, 2211322
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2211323, 2211324
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2211323, 2211324
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2211323, 2211324
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2211323, 2211324
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2211325, 2211326
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2211321, 2211322
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2211321, 2211322
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2211329, 2211330
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2211321, 2211322
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2211321, 2211322
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2211321, 2211322
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2211323, 2211324

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	12/07/2020			12/08/2020 16:15	Yen Ta	2211321, 2211322
EPA 200.7 Rev. 4.4	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/09/2020 15:47	Betina Topolski	2211329
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/09/2020 16:15	Betina Topolski	2211330
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/10/2020 09:45	Betina Topolski	2211329
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/10/2020 11:33	Betina Topolski	2211330
EPA 200.8 Rev. 5.4	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/16/2020 08:47	Alexander Thompson	2211329
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/16/2020 11:08	Alexander Thompson	2211330
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/17/2020 12:53	Alexander Thompson	2211329
	12/07/2020	12/08/2020 15:15	Elliott D. Healy	12/17/2020 14:19	Alexander Thompson	2211330
EPA 300.0 Rev. 2.1	12/07/2020			12/10/2020 18:03	Lipi Saha	2211321
	12/07/2020			12/10/2020 18:15	Lipi Saha	2211322
EPA 350.1 Rev. 2.0	12/07/2020			12/13/2020 16:27	Ping Hua	2211323
	12/07/2020			12/13/2020 16:38	Ping Hua	2211324
EPA 351.2 Rev. 2.0	12/07/2020	12/14/2020 13:26	Yen Ta	12/15/2020 14:27	Julia Storbeck	2211323
	12/07/2020	12/14/2020 13:26	Yen Ta	12/15/2020 14:28	Julia Storbeck	2211324
EPA 353.2 Rev. 2.0	12/07/2020			12/10/2020 11:00	Beverly Y. Sanders	2211323
	12/07/2020			12/10/2020 11:01	Beverly Y. Sanders	2211324
EPA 365.1 Rev. 2.0	12/07/2020	12/10/2020 12:58	Yen Ta	12/14/2020 14:18	Lipi Saha	2211323
	12/07/2020	12/10/2020 12:58	Yen Ta	12/14/2020 14:31	Lipi Saha	2211324
EPA 365.1 Rev. 2.0 dissolved	12/07/2020			12/08/2020 15:51	Samantha Davila	2211325
	12/07/2020			12/08/2020 15:54	Samantha Davila	2211326
SM 2120 B-2011	12/07/2020			12/08/2020 16:54	Benjamin T. Nordmann	2211321
	12/07/2020			12/08/2020 16:57	Benjamin T. Nordmann	2211322
SM 2320 B-2011	12/07/2020			12/11/2020 23:33	Dale L. Simmons	2211322
	12/07/2020			12/12/2020 02:02	Dale L. Simmons	2211321
SM 2340B	12/07/2020			12/10/2020 09:45	Betina Topolski	2211329
	12/07/2020			12/10/2020 11:33	Betina Topolski	2211330
SM 2540 C-2011	12/07/2020			12/09/2020 14:21	Yijie Li	2211321, 2211322
SM 2540 D-2011	12/07/2020			12/09/2020 14:21	Yijie Li	2211321, 2211322
SM 4500 F-C-2011	12/07/2020			12/09/2020 18:41	Dale L. Simmons	2211321
	12/07/2020			12/09/2020 18:54	Dale L. Simmons	2211322
SM 5310 B-2011	12/07/2020			12/10/2020 18:53	Madeline Gruver	2211323
	12/07/2020			12/10/2020 19:05	Madeline Gruver	2211324