Chemical Analysis Report

NW-DIST-2020-03-04-01

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

Event Description: **Bay Walton County Run**
Request ID: **RQ-2020-03-02-32**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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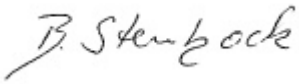
Certified by: Dr. rer. nat. Bettina Steinbock, Environmental Administrator Date Certified: 24-MAR-2020 16:24



Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Pine Log Creek upstream of Hwy 79 **Collection Date/Time: 03/03/2020 10:30**

Field ID: G3NW0153 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2161935	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P380053	
	EPA 300.0 Rev. 2.1	Chloride	2.9		mg Cl/L	P380343	
		Sulfate	1.1		mg SO4/L	P380345	
	SM 2120 B-2011	Color (true)	110		PCU	P380127	
	SM 2320 B-2011	Total Alkalinity	2.1	I	mg CaCO3/L	P380590	
	SM 2540 C-2011	TDS	26		mg/L	P380756	
	SM 2540 D-2011	TSS	2	U	mg/L	P380546	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P380681	
2161936	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P380606	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.36		mg N/L	P380182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.01	I	mg N/L	P380285	
	EPA 365.1 Rev. 2.0	Total-P	0.005		mg P/L	P380309	
	SM 5310 B-2011	Organic Carbon	9.6		mg C/L	P380170	
2161937	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380062	
2161957	EPA 200.7 Rev. 4.4	Barium	4.6		ug/L	P380202	
		Calcium	2.29		mg/L	P380202	
		Iron	180		ug/L	P380202	
		Magnesium	0.40		mg/L	P380202	
		Potassium	0.30	U	mg/L	P380202	
		Sodium	1.7	I	mg/L	P380202	
		Zinc	5.0	U	ug/L	P380202	
	EPA 200.8 Rev. 5.4	Aluminum	198		ug/L	P380202	
		Antimony	0.050	U	ug/L	P380202	
		Arsenic	0.19	I	ug/L	P380202	
		Boron**	7.2	I	ug/L	P380202	
		Cadmium	0.020	U	ug/L	P380202	
		Chromium	0.40	U	ug/L	P380202	
		Copper	0.40	U	ug/L	P380202	
		Lead	0.20	U	ug/L	P380202	
		Nickel	0.50	U	ug/L	P380202	
		Selenium	0.20	U	ug/L	P380202	
		Silver	0.010	U	ug/L	P380202	
		Thallium	0.10	U	ug/L	P380202	
	SM 2340B	Hardness	7.4		mg/L	P380202	

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: Little Black Creek upstream of Black Creek **Collection Date/Time: 03/03/2020 11:20**

Field ID: G3NW0200 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2161938	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P380053	
	EPA 300.0 Rev. 2.1	Chloride	3.2		mg Cl/L	P380343	
		Sulfate	0.99		mg SO4/L	P380345	
	SM 2120 B-2011	Color (true)	50		PCU	P380127	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P380590	
	SM 2540 C-2011	TDS	16	I	mg/L	P380756	
	SM 2540 D-2011	TSS	2	I	mg/L	P380546	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P380681	
2161940	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P380606	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.18	I	mg N/L	P380182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.054		mg N/L	P380285	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P380309	
	SM 5310 B-2011	Organic Carbon	4.7		mg C/L	P380170	
2161942	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380062	

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: Black Creek Upstream of Hwy 20 **Collection Date/Time: 03/03/2020 11:45**

Field ID: G3NW0148 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2161939	EPA 180.1 Rev. 2.0	Turbidity	3.8		NTU	P380053	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P380343	
		Sulfate	1.6		mg SO4/L	P380345	
	SM 2120 B-2011	Color (true)	86		PCU	P380127	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P380590	
	SM 2540 C-2011	TDS	18	I	mg/L	P380756	
	SM 2540 D-2011	TSS	2	I	mg/L	P380546	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P380681	
2161941	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P380606	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.27		mg N/L	P380182	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.042		mg N/L	P380286	
	EPA 365.1 Rev. 2.0	Total-P	0.005	I	mg P/L	P380309	
	SM 5310 B-2011	Organic Carbon	7.3		mg C/L	P380170	
2161943	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P380062	

Ref. Method and Comment:
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: P380053

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380202

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: P380202

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	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: P380343

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380345

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380606

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380182

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380285

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380286

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380309

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380062

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

Reference Method: SM 2120 B-2011
Batch ID: P380127

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P380590

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

Reference Method: SM 2540 C-2011
Batch ID: P380756

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P380546

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P380681

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P380170

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: P380202

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.2		P	85 - 115
Calcium	102		P	85 - 115
Iron	100		P	85 - 115
Magnesium	102		P	85 - 115
Potassium	98.7		P	85 - 115
Sodium	99.6		P	85 - 115
Zinc	99.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380202

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	94.4		P	85 - 115
Antimony	103		P	85 - 115
Arsenic	98.6		P	85 - 115
Boron	99.4		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	98.8		P	85 - 115
Copper	98.1		P	85 - 115
Lead	95.8		P	85 - 115
Nickel	96.3		P	85 - 115
Selenium	94.0		P	85 - 115
Silver	94.1		P	85 - 115
Thallium	99.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380343

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380345

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380606

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380182

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380285

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380286

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380309

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: P380062

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

Reference Method: SM 2120 B-2011
Batch ID: P380127

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.2		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P380590

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P380681

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.4		P	92 - 103

Reference Method: SM 5310 B-2011
Batch ID: P380170

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161902	Barium	103		P	80 - 120
2161902	Calcium	100		P	80 - 120
2161902	Iron	102		P	80 - 120
2161902	Magnesium	103		P	80 - 120
2161902	Potassium	105		P	80 - 120
2161902	Sodium	99.1		P	80 - 120
2161902	Zinc	104		P	80 - 120
2161957	Barium	102	102	P/P	80 - 120
2161957	Calcium	100	99.7	P/P	80 - 120
2161957	Iron	102	102	P/P	80 - 120
2161957	Magnesium	102	103	P/P	80 - 120
2161957	Potassium	101	101	P/P	80 - 120
2161957	Sodium	99.2	98.4	P/P	80 - 120
2161957	Zinc	101	101	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380202

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161902	Aluminum	95.0		P	80 - 120
2161902	Antimony	100		P	80 - 120
2161902	Arsenic	97.9		P	80 - 120
2161902	Boron	102		P	80 - 120
2161902	Cadmium	102		P	80 - 120
2161902	Chromium	97.9		P	80 - 120
2161902	Copper	93.0		P	80 - 120
2161902	Lead	96.3		P	80 - 120
2161902	Nickel	99.3		P	80 - 120
2161902	Selenium	86.9		P	80 - 120
2161902	Silver	92.2		P	80 - 120
2161902	Thallium	102		P	80 - 120
2161957	Aluminum	93.9	95.2	P/P	80 - 120
2161957	Antimony	103	103	P/P	80 - 120
2161957	Arsenic	96.6	96.3	P/P	80 - 120
2161957	Boron	102	101	P/P	80 - 120
2161957	Cadmium	103	101	P/P	80 - 120
2161957	Chromium	97.8	98.4	P/P	80 - 120
2161957	Copper	95.6	95.9	P/P	80 - 120
2161957	Lead	96.8	96.1	P/P	80 - 120
2161957	Nickel	96.2	95.1	P/P	80 - 120
2161957	Selenium	93.2	92.7	P/P	80 - 120
2161957	Silver	93.3	94.1	P/P	80 - 120
2161957	Thallium	101	100	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380343

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161843	Chloride	98.1		P	90 - 110
2161920	Chloride	97.4		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380345

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161843	Sulfate	99.6		P	90 - 110
2161920	Sulfate	98.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161940	Ammonia-N	98.9	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380182

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161967	Kjeldahl Nitrogen	105	97.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380285

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161888	NO2NO3-N	94.4	94.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380286

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161941	NO2NO3-N	96.4	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161936	Total-P	106	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380062

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161950	O-Phosphate-P	96.6	97.8	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P380681

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2162166	Fluoride	97.5	98.6	P/P	89 - 106

Reference Method: SM 5310 B-2011
Batch ID: P380170

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2161936	Organic Carbon	99.3	103	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P380053

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161966	Turbidity	8.89	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P380202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161957	Barium	0.0477	Spike	P	0 - 20
2161957	Calcium	0.189	Spike	P	0 - 20
2161957	Iron	0.0367	Spike	P	0 - 20
2161957	Magnesium	0.464	Spike	P	0 - 20
2161957	Potassium	0.406	Spike	P	0 - 20
2161957	Sodium	0.618	Spike	P	0 - 20
2161957	Zinc	0.276	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P380202

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161957	Aluminum	1.12	Spike	P	0 - 20
2161957	Antimony	0.301	Spike	P	0 - 20
2161957	Arsenic	0.311	Spike	P	0 - 20
2161957	Boron	1.74	Spike	P	0 - 20
2161957	Cadmium	1.39	Spike	P	0 - 20
2161957	Chromium	0.663	Spike	P	0 - 20
2161957	Copper	0.357	Spike	P	0 - 20
2161957	Lead	0.709	Spike	P	0 - 20
2161957	Nickel	1.20	Spike	P	0 - 20
2161957	Selenium	0.531	Spike	P	0 - 20
2161957	Silver	0.904	Spike	P	0 - 20
2161957	Thallium	0.455	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380343

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161920	Chloride	0.575	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P380345

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161920	Sulfate	0.615	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P380606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161940	Ammonia-N	1.66	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P380182

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161967	Kjeldahl Nitrogen	5.24	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380285

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161888	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P380286

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161941	NO2NO3-N	0.425	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P380309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161936	Total-P	1.09	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P380062

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161950	O-Phosphate-P	1.23	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P380127

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161966	Color (true)	1.43	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P380590

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2162559	Total Alkalinity	0.0108	Sample	P	0 - 2.8

Quality Assurance Report
Precision

Reference Method: SM 2540 C-2011
Batch ID: P380756

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161910	TDS	1.79	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P380681

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2162166	Fluoride	0.963	Spike	P	0 - 2.5

Reference Method: SM 5310 B-2011
Batch ID: P380170

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2161936	Organic Carbon	2.81	Spike	P	0 - 20

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A97995
Included Lab Sample IDs: 2161935, 2161938, 2161939

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.5	99.5	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A97998
Included Lab Sample IDs: 2161937, 2161942, 2161943

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.5	96.4	P/P	90 - 110

Reference Method: SM 2120 B-2011
Run ID: A98019
Included Lab Sample IDs: 2161935, 2161938, 2161939

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 115

Reference Method: SM 5310 B-2011
Run ID: A98030
Included Lab Sample IDs: 2161936, 2161940, 2161941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.6	98.5	P/P	90 - 110
Organic Carbon	99.4	99.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A98048
Included Lab Sample IDs: 2161957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	102	102	P/P	90 - 110
Calcium	101	100	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Magnesium	102	101	P/P	90 - 110
Potassium	102	102	P/P	90 - 110
Sodium	103	104	P/P	90 - 110
Zinc	99.1	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A98061
Included Lab Sample IDs: 2161936, 2161940, 2161941

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A98065
Included Lab Sample IDs: 2161936, 2161940, 2161941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	105	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98081
Included Lab Sample IDs: 2161957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	95.7	97.3	P/P	90 - 110
Arsenic	101	99.9	P/P	90 - 110
Boron	96.4	99.3	P/P	90 - 110
Chromium	97.9	97.2	P/P	90 - 110
Copper	99.1	97.5	P/P	90 - 110
Lead	97.5	97.0	P/P	90 - 110
Nickel	99.5	98.9	P/P	90 - 110
Selenium	96.8	96.4	P/P	90 - 110
Silver	90.9	92.2	P/P	90 - 110
Thallium	94.1	94.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A98096
Included Lab Sample IDs: 2161935, 2161938, 2161939

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.6	100	P/P	90 - 110
Sulfate	98.8	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A98139
Included Lab Sample IDs: 2161957

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Antimony	100	97.7	P/P	90 - 110
Cadmium	99.6	98.3	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A98174
Included Lab Sample IDs: 2161935, 2161938, 2161939

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.7	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A98179
Included Lab Sample IDs: 2161936, 2161940, 2161941

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A98185
Included Lab Sample IDs: 2161936, 2161940, 2161941

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.8	99.2	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-2011
Run ID: A98204
Included Lab Sample IDs: 2161935, 2161938, 2161939

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	97.6	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						8.89	
EPA 200.7 Rev. 4.4	Barium	99.2	103	102	102			0.0477
	Calcium	102	100	100	99.7			0.189
	Iron	100	102	102	102			0.0367
	Magnesium	102	103	102	103			0.464
	Potassium	98.7	105	101	101			0.406
	Sodium	99.6	99.1	99.2	98.4			0.618
	Zinc	99.8	104	101	101			0.276
EPA 200.8 Rev. 5.4	Aluminum	94.4	93.9	95.2	95.0			1.12
	Antimony	103	103	103	100			0.301
	Arsenic	98.6	96.6	96.3	97.9			0.311
	Boron	99.4	102	101	102			1.74
	Cadmium	101	103	101	102			1.39
	Chromium	98.8	97.8	98.4	97.9			0.663
	Copper	98.1	95.6	95.9	93.0			0.357
	Lead	95.8	96.8	96.1	96.3			0.709
	Nickel	96.3	96.2	95.1	99.3			1.20
	Selenium	94.0	93.2	92.7	86.9			0.531
	Silver	94.1	93.3	94.1	92.2			0.904
	Thallium	99.1	101	100	102			0.455
EPA 300.0 Rev. 2.1	Chloride	99.5	97.4	98.1			0.575	
	Sulfate	99.8	98.9	99.6			0.615	
EPA 350.1 Rev. 2.0	Ammonia-N	100	98.9	101				1.66
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	105	97.5				5.24
EPA 353.2 Rev. 2.0	NO2NO3-N	100	94.4	94.4				0.0
	NO2NO3-N	100	96.4	96.8				0.425
EPA 365.1 Rev. 2.0	Total-P	106	106	105				1.09
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.5	96.6	97.8				1.23
SM 2120 B-2011	Color (true)	99.2					1.43	
SM 2320 B-2011	Total Alkalinity	102					0.0108	
SM 2540 C-2011	TDS						1.79	
SM 4500 F-C-2011	Fluoride	96.4	97.5	98.6				0.963
SM 5310 B-2011	Organic Carbon	99.8	99.3	103				2.81

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2161935, 2161938, 2161939
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2161957
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2161957
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2161935, 2161938, 2161939
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2161935, 2161938, 2161939
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2161936, 2161940, 2161941
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2161936, 2161940, 2161941
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2161936, 2161940, 2161941
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2161936, 2161940, 2161941
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2161937, 2161942, 2161943
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2161935, 2161938, 2161939
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2161935, 2161938, 2161939
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO3	2161957

Reference Method Descriptions

Method	Description	Associated Samples
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2161935, 2161938, 2161939
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2161935, 2161938, 2161939
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2161935, 2161938, 2161939
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2161936, 2161940, 2161941

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	03/04/2020			03/04/2020 16:33	Yen Ta	2161935, 2161938, 2161939
EPA 200.7 Rev. 4.4	03/04/2020	03/05/2020 13:55	Elliott D. Healy	03/06/2020 19:07	Betina Topolski	2161957
EPA 200.8 Rev. 5.4	03/04/2020	03/05/2020 13:55	Elliott D. Healy	03/09/2020 16:26	Alexander Thompson	2161957
	03/04/2020	03/05/2020 13:55	Elliott D. Healy	03/10/2020 15:04	Justin Cutchin	2161957
EPA 300.0 Rev. 2.1	03/04/2020			03/10/2020 03:56	Lipi Saha	2161935
	03/04/2020			03/10/2020 04:08	Lipi Saha	2161938
	03/04/2020			03/10/2020 04:20	Lipi Saha	2161939
EPA 350.1 Rev. 2.0	03/04/2020			03/10/2020 12:08	Ping Hua	2161940
	03/04/2020			03/10/2020 12:19	Ping Hua	2161936
	03/04/2020			03/10/2020 12:26	Ping Hua	2161941
EPA 351.2 Rev. 2.0	03/04/2020	03/06/2020 12:12	Sima Feizi	03/09/2020 12:47	Jhamieka S. Greenwood	2161936
	03/04/2020	03/06/2020 12:12	Sima Feizi	03/09/2020 12:48	Jhamieka S. Greenwood	2161940
	03/04/2020	03/06/2020 12:12	Sima Feizi	03/09/2020 12:50	Jhamieka S. Greenwood	2161941
EPA 353.2 Rev. 2.0	03/04/2020			03/09/2020 10:17	Beverly Y. Sanders	2161936
	03/04/2020			03/09/2020 10:18	Beverly Y. Sanders	2161940
	03/04/2020			03/09/2020 10:25	Beverly Y. Sanders	2161941
EPA 365.1 Rev. 2.0	03/04/2020	03/09/2020 14:56	Yen Ta	03/12/2020 14:11	Benjamin T. Nordmann	2161936
	03/04/2020	03/09/2020 14:56	Yen Ta	03/12/2020 14:12	Benjamin T. Nordmann	2161940
	03/04/2020	03/09/2020 14:56	Yen Ta	03/12/2020 14:13	Benjamin T. Nordmann	2161941
EPA 365.1 Rev. 2.0 dissolved	03/04/2020			03/04/2020 16:00	Carlos Miranda	2161937, 2161942
	03/04/2020			03/04/2020 16:01	Carlos Miranda	2161943
SM 2120 B-2011	03/04/2020			03/04/2020 17:29		2161935, 2161938
	03/04/2020			03/04/2020 17:30		2161939
SM 2320 B-2011	03/04/2020			03/12/2020 06:19	Dale L. Simmons	2161935
	03/04/2020			03/12/2020 06:29	Dale L. Simmons	2161938
	03/04/2020			03/12/2020 06:40	Dale L. Simmons	2161939
SM 2340B	03/04/2020			03/06/2020 19:07	Betina Topolski	2161957
SM 2540 C-2011	03/04/2020			03/09/2020 15:13	Yijie Li	2161935, 2161938, 2161939
SM 2540 D-2011	03/04/2020			03/09/2020 15:13	Yijie Li	2161935, 2161938, 2161939
SM 4500 F-C-2011	03/04/2020			03/14/2020 02:46	Dale L. Simmons	2161935
	03/04/2020			03/14/2020 02:51	Dale L. Simmons	2161938
	03/04/2020			03/14/2020 02:56	Dale L. Simmons	2161939
SM 5310 B-2011	03/04/2020			03/05/2020 14:58	Lauren Lees	2161936
	03/04/2020			03/05/2020 15:50	Lauren Lees	2161940
	03/04/2020			03/05/2020 19:57	Lauren Lees	2161941