

Chemical Analysis Report

NW-DIST-2020-09-03-01

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

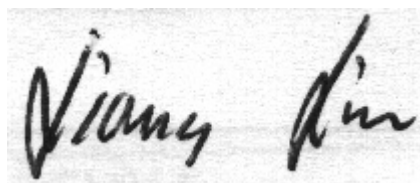
Event Description: **Highway 4 Run**
Request ID: **RQ-2020-08-24-20**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 Government Center
Suite 208
Pensacola, FL 32502-5794
Attn: Cheryl Bunch

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 23-SEP-2020 16:37

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

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: Big Escambia Creek Downstream of Fannie Rd Collection Date/Time: 09/02/2020 09:55

Field ID: G4NW0421

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2194022	EPA 180.1 Rev. 2.0	Turbidity	8.2		NTU	P386931	
	EPA 300.0 Rev. 2.1	Chloride	3.6		mg Cl/L	P387637	
		Sulfate	0.81		mg SO4/L	P387639	
		Color (true)	73		PCU	P386935	
	SM 2320 B-2011	Total Alkalinity	3.4		mg CaCO3/L	P387119	
	SM 2540 C-2011	TDS	39		mg/L	P387215	
	SM 2540 D-2011	TSS	11		mg/L	P387164	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P387122	
2194023	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P387035	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29		mg N/L	P387099	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.27		mg N/L	P387074	
	EPA 365.1 Rev. 2.0	Total-P	0.022		mg P/L	P386974	MS
	SM 5310 B-2011	Organic Carbon	5.9		mg C/L	P387200	
2194024	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P386946	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Bear Creek @ Forest Rd. 0.7 Miles West of Bear Lake **Collection Date/Time: 09/02/2020 10:41**

Field ID: G4NW0380

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2194019	EPA 180.1 Rev. 2.0	Turbidity	2.8		NTU	P386931	
	EPA 300.0 Rev. 2.1	Chloride	2.7		mg Cl/L	P387637	
		Sulfate	0.43	I	mg SO4/L	P387639	
	SM 2120 B-2011	Color (true)	57	A	PCU	P386935	
	SM 2320 B-2011	Total Alkalinity	4.7		mg CaCO3/L	P387119	
	SM 2540 C-2011	TDS	31		mg/L	P387215	
	SM 2540 D-2011	TSS	2	I	mg/L	P387164	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P387122	
2194020	EPA 350.1 Rev. 2.0	Ammonia-N	0.006		mg N/L	P387035	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P387099	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	I	mg N/L	P387073	
	EPA 365.1 Rev. 2.0	Total-P	0.017		mg P/L	P386974	MS
	SM 5310 B-2011	Organic Carbon	5.8		mg C/L	P387200	
2194021	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P386946	
2194029	EPA 200.7 Rev. 4.4	Barium	10.9		ug/L	P386921	
		Calcium	1.94		mg/L	P386921	
		Iron	990		ug/L	P386921	
		Magnesium	0.80		mg/L	P386921	
		Potassium	0.30	U	mg/L	P386921	
		Sodium	1.9	I	mg/L	P386921	
		Zinc	5.0	U	ug/L	P386921	
	EPA 200.8 Rev. 5.4	Aluminum	65		ug/L	P386921	
		Antimony	0.050	U	ug/L	P386921	
		Arsenic	0.48		ug/L	P386921	
		Boron**	10.0		ug/L	P386921	
		Cadmium	0.020	U	ug/L	P386921	
		Chromium	0.40	U	ug/L	P386921	
		Copper	0.40	U	ug/L	P386921	
		Lead	0.20	U	ug/L	P386921	
		Nickel	0.50	U	ug/L	P386921	
		Selenium	0.20	U	ug/L	P386921	
		Silver	0.010	U	ug/L	P386921	
		Thallium	0.10	U	ug/L	P386921	
		Hardness	8.1		mg/L	P386921	
	SM 2340B						

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium are unavailable for one of two spiked samples because of high analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P386931

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386921

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: P386921

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: P387637

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387639

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387035

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: P387099

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387073

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387074

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386946

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

Reference Method: SM 2120 B-2011
Batch ID: P386935

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P387119

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

Reference Method: SM 2540 C-2011
Batch ID: P387215

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P387164

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-2011
Batch ID: P387122

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P387200

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: P386921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	107		P	85 - 115
Calcium	108		P	85 - 115
Iron	107		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	106		P	85 - 115
Sodium	109		P	85 - 115
Zinc	106		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	95.3		P	85 - 115
Antimony	104		P	85 - 115
Arsenic	99.7		P	85 - 115
Boron	94.6		P	85 - 115
Cadmium	99.0		P	85 - 115
Chromium	107		P	85 - 115
Copper	97.7		P	85 - 115
Lead	101		P	85 - 115
Nickel	98.7		P	85 - 115
Selenium	98.9		P	85 - 115
Silver	103		P	85 - 115
Thallium	102		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387637

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	93.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387639

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	93.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387035

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387099

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.4		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387073

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387074

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	99.0		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386974

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386946

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

Reference Method: SM 2120 B-2011
Batch ID: P386935

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	97.0		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P387119

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

Reference Method: SM 4500 F-C-2011
Batch ID: P387122

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.4		P	90 - 106

Reference Method: SM 5310 B-2011
Batch ID: P387200

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193868	Barium	107		P	75 - 125
2193868	Iron	106		P	75 - 125
2193868	Magnesium	105		P	75 - 125
2193868	Potassium	104		P	75 - 125
2193868	Sodium	104		P	75 - 125
2193868	Zinc	104		P	75 - 125
2193931	Barium	111	108	P/P	80 - 120
2193931	Calcium	110	106	P/P	80 - 120
2193931	Iron	109	109	P/P	80 - 120
2193931	Magnesium	108	107	P/P	80 - 120
2193931	Potassium	104	105	P/P	80 - 120
2193931	Sodium	100	98.5	P/P	80 - 120
2193931	Zinc	111	108	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193868	Aluminum	90.2		P	75 - 125
2193868	Antimony	106		P	75 - 125
2193868	Arsenic	99.1		P	75 - 125
2193868	Boron	95.9		P	75 - 125
2193868	Cadmium	103		P	75 - 125
2193868	Chromium	107		P	75 - 125
2193868	Copper	93.5		P	75 - 125
2193868	Lead	101		P	75 - 125
2193868	Nickel	94.1		P	75 - 125
2193868	Selenium	95.5		P	75 - 125
2193868	Silver	101		P	75 - 125
2193868	Thallium	105		P	75 - 125
2193931	Aluminum	95.9	96.5	P/P	80 - 120
2193931	Antimony	101	102	P/P	80 - 120
2193931	Arsenic	99.8	99.0	P/P	80 - 120
2193931	Boron	92.0	94.3	P/P	80 - 120
2193931	Cadmium	98.2	99.5	P/P	80 - 120
2193931	Chromium	106	107	P/P	80 - 120
2193931	Copper	99.1	100	P/P	80 - 120
2193931	Lead	100	103	P/P	80 - 120
2193931	Nickel	98.9	98.3	P/P	80 - 120
2193931	Selenium	98.9	97.6	P/P	80 - 120
2193931	Silver	101	102	P/P	80 - 120
2193931	Thallium	102	104	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387637

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193961	Chloride	96.2		P	90 - 110
2193993	Chloride	93.7		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387639

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193961	Sulfate	95.6		P	90 - 110
2193993	Sulfate	94.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387035

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194020	Ammonia-N	96.7	99.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194023	Kjeldahl Nitrogen	104	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387073

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193994	NO2NO3-N	92.8	93.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387074

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194023	NO2NO3-N	96.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386974

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2193720	Total-P	109	111	P/F	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386946

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194021	O-Phosphate-P	100	99.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P387122

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194066	Fluoride	97.3	97.9	P/P	94 - 107

Reference Method: SM 5310 B-2011
Batch ID: P387200

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2194023	Organic Carbon	95.1	96.8	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P386931

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193961	Turbidity	4.90	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P386921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193931	Barium	2.75	Spike	P	0 - 20
2193931	Calcium	2.31	Spike	P	0 - 20
2193931	Iron	0.430	Spike	P	0 - 20
2193931	Magnesium	0.768	Spike	P	0 - 20
2193931	Potassium	0.0377	Spike	P	0 - 20
2193931	Sodium	0.939	Spike	P	0 - 20
2193931	Zinc	2.55	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P386921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193931	Aluminum	0.463	Spike	P	0 - 20
2193931	Antimony	0.526	Spike	P	0 - 20
2193931	Arsenic	0.770	Spike	P	0 - 20
2193931	Boron	2.16	Spike	P	0 - 20
2193931	Cadmium	1.28	Spike	P	0 - 20
2193931	Chromium	0.711	Spike	P	0 - 20
2193931	Copper	1.09	Spike	P	0 - 20
2193931	Lead	2.35	Spike	P	0 - 20
2193931	Nickel	0.552	Spike	P	0 - 20
2193931	Selenium	1.39	Spike	P	0 - 20
2193931	Silver	0.856	Spike	P	0 - 20
2193931	Thallium	2.18	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P387637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193993	Chloride	0.413	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P387035

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194020	Ammonia-N	2.20	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P387099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194023	Kjeldahl Nitrogen	3.20	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387073

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193994	NO2NO3-N	0.501	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P387074

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194023	NO2NO3-N	0.216	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P386974

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2193720	Total-P	1.92	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P386946

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194021	O-Phosphate-P	0.601	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P386935

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194019	Color (true)	2.77	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P387119

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194066	Total Alkalinity	0.527	Sample	P	0 - 8.1

Reference Method: SM 2540 C-2011
Batch ID: P387215

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194055	TDS	0.506	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 2540 D-2011
Batch ID: P387164

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194055	TSS	2.44	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P387122

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194066	Fluoride	0.462	Spike	P	0 - 2.8

Reference Method: SM 5310 B-2011
Batch ID: P387200

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2194023	Organic Carbon	1.40	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: A100810

Included Lab Sample IDs: 2194019, 2194022

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

Reference Method: SM 2120 B-2011

Run ID: A100812

Included Lab Sample IDs: 2194019, 2194022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.3	98.3	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A100813

Included Lab Sample IDs: 2194021, 2194024

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	99.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A100836

Included Lab Sample IDs: 2194020, 2194023

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	101	96.8	P/P	90 - 110
Ammonia-N	96.8	96.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A100837

Included Lab Sample IDs: 2194029

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	105	105	P/P	90 - 110
Calcium	106	104	P/P	90 - 110
Iron	108	106	P/P	90 - 110
Magnesium	105	104	P/P	90 - 110
Potassium	104	103	P/P	90 - 110
Sodium	104	103	P/P	90 - 110
Zinc	105	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A100845

Included Lab Sample IDs: 2194020, 2194023

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	99.5	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A100870

Included Lab Sample IDs: 2194019, 2194022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.1	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-2011

Run ID: A100870

Included Lab Sample IDs: 2194019, 2194022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A100891

Included Lab Sample IDs: 2194020, 2194023

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.4	98.0	P/P	90 - 110
Kjeldahl Nitrogen	98.0	91.7	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A100906

Included Lab Sample IDs: 2194020, 2194023

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	94.6	93.8	P/P	90 - 110
Organic Carbon	94.9	93.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A100965

Included Lab Sample IDs: 2194029

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	94.8	97.3	P/P	90 - 110
Antimony	107	107	P/P	90 - 110
Arsenic	96.0	95.9	P/P	90 - 110
Boron	98.3	99.0	P/P	90 - 110
Cadmium	98.8	97.7	P/P	90 - 110
Chromium	102	103	P/P	90 - 110
Copper	95.8	94.1	P/P	90 - 110
Lead	99.5	98.3	P/P	90 - 110
Nickel	97.1	94.1	P/P	90 - 110
Selenium	97.3	96.9	P/P	90 - 110
Silver	103	102	P/P	90 - 110
Thallium	97.9	95.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A100971

Included Lab Sample IDs: 2194020, 2194023

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A100980

Included Lab Sample IDs: 2194019, 2194022

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	100	P/P	90 - 110
Sulfate	99.7	99.8	P/P	90 - 110

Quality Assurance Report

Calibration Verification

* 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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					4.90	
EPA 200.7 Rev. 4.4	Barium	107	111	108	107		2.75
	Calcium	108	110	106			2.31
	Iron	107	109	109	106		0.430
	Magnesium	106	108	107	105		0.768
	Potassium	106	104	105	104		0.0377
	Sodium	109	100	98.5	104		0.939
	Zinc	106	111	108	104		2.55
EPA 200.8 Rev. 5.4	Aluminum	95.3	95.9	96.5	90.2		0.463
	Antimony	104	106	101	102		0.526
	Arsenic	99.7	99.8	99.0	99.1		0.770
	Boron	94.6	92.0	94.3	95.9		2.16
	Cadmium	99.0	98.2	99.5	103		1.28
	Chromium	107	107	106	107		0.711
	Copper	97.7	99.1	100	93.5		1.09
	Lead	101	100	103	101		2.35
	Nickel	98.7	98.9	98.3	94.1		0.552
	Selenium	98.9	98.9	97.6	95.5		1.39
	Silver	103	101	102	101		0.856
	Thallium	102	102	104	105		2.18
EPA 300.0 Rev. 2.1	Chloride	93.6	93.7	96.2		0.413	
	Sulfate	93.6	94.2	95.6			
EPA 350.1 Rev. 2.0	Ammonia-N	98.3	96.7	99.1			2.20
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.4	104	108			3.20
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.0	92.8	93.2			0.501
	NO ₂ NO ₃ -N	99.0	96.5				0.216
EPA 365.1 Rev. 2.0	Total-P	105	109	111			1.92
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.1	100	99.6			0.601
SM 2120 B-2011	Color (true)	97.0				2.77	
SM 2320 B-2011	Total Alkalinity	101				0.527	
SM 2540 C-2011	TDS					0.506	
SM 2540 D-2011	TSS					2.44	
SM 4500 F-C-2011	Fluoride	98.4	97.3	97.9			0.462
SM 5310 B-2011	Organic Carbon	95.4	95.1	96.8			1.40

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2194019, 2194022
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2194029
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2194029
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2194019, 2194022
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2194019, 2194022
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2194020, 2194023
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2194020, 2194023
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2194020, 2194023
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2194020, 2194023
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2194021, 2194024
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2194019, 2194022
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2194019, 2194022

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2194029
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2194019, 2194022
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2194019, 2194022
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2194019, 2194022
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2194020, 2194023

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	09/03/2020			09/03/2020 14:41	Yen Ta	2194019, 2194022
EPA 200.7 Rev. 4.4	09/03/2020	09/03/2020 15:00	Elliott D. Healy	09/05/2020 00:30	Betina Topolski	2194029
EPA 200.8 Rev. 5.4	09/03/2020	09/03/2020 15:00	Elliott D. Healy	09/14/2020 17:52	Alexander Thompson	2194029
EPA 300.0 Rev. 2.1	09/03/2020			09/18/2020 17:14	Lipi Saha	2194019
	09/03/2020			09/18/2020 17:27	Lipi Saha	2194022
EPA 350.1 Rev. 2.0	09/03/2020			09/07/2020 14:06	Ping Hua	2194020
	09/03/2020			09/07/2020 14:21	Ping Hua	2194023
EPA 351.2 Rev. 2.0	09/03/2020	09/08/2020 12:50	David Boose	09/09/2020 11:24	Elliott Rodriguez	2194023
	09/03/2020	09/08/2020 12:50	David Boose	09/09/2020 11:45	Elliott Rodriguez	2194020
EPA 353.2 Rev. 2.0	09/03/2020			09/08/2020 11:22	Beverly Y. Sanders	2194020
	09/03/2020			09/08/2020 11:29	Beverly Y. Sanders	2194023
EPA 365.1 Rev. 2.0	09/03/2020	09/04/2020 11:45	Yen Ta	09/11/2020 14:59	Lipi Saha	2194020
	09/03/2020	09/04/2020 11:45	Yen Ta	09/11/2020 15:00	Lipi Saha	2194023
EPA 365.1 Rev. 2.0 dissolved	09/03/2020			09/03/2020 17:16	Virginia P. Brown	2194021
	09/03/2020			09/03/2020 17:20	Virginia P. Brown	2194024
SM 2120 B-2011	09/03/2020			09/03/2020 15:48	Benjamin T. Nordmann	2194019
	09/03/2020			09/03/2020 15:52	Benjamin T. Nordmann	2194022
SM 2320 B-2011	09/03/2020			09/04/2020 19:11	Dale L. Simmons	2194019
	09/03/2020			09/04/2020 19:21	Dale L. Simmons	2194022
SM 2340B	09/03/2020			09/05/2020 00:30	Betina Topolski	2194029
SM 2540 C-2011	09/03/2020			09/04/2020 16:59	Madeline Gruver	2194019, 2194022
SM 2540 D-2011	09/03/2020			09/04/2020 19:04	Madeline Gruver	2194019, 2194022
SM 4500 F-C-2011	09/03/2020			09/04/2020 19:11	Dale L. Simmons	2194019
	09/03/2020			09/04/2020 19:21	Dale L. Simmons	2194022
SM 5310 B-2011	09/03/2020			09/09/2020 23:49	David Boose	2194023
	09/03/2020			09/10/2020 03:56	David Boose	2194020