

Chemical Analysis Report

NW-DIST-2021-07-29-01

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

Event Description: **Laurel Hill West Run**
Request ID: **RQ-2021-07-26-14**
Customer: **NW-DIST**
Project ID: **SMP**

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

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

Certified by: Liang Lin, Environmental Administrator

Date Certified: 24-AUG-2021 13:29

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: Deadfall Creek Upstream of Old River Rd.

Collection Date/Time: 07/28/2021 12:45

Field ID: G4NW0491

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2265835	EPA 180.1 Rev. 2.0	Turbidity	4.2		NTU	P401729	
	EPA 300.0 Rev. 2.1	Chloride	2.6		mg Cl/L	P402078	
		Sulfate	1.0		mg SO4/L	P402080	
		Color (true)	66		PCU	P401719	
	SM 2320 B-2011	Total Alkalinity	1.2	I	mg CaCO3/L	P401791	
	SM 2540 C-2011	TDS	29		mg/L	P402221	
	SM 2540 D-2011	TSS	6	I	mg/L	P402224	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P401793	
2265837	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P402182	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.35		mg N/L	P402524	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P401733	
	EPA 365.1 Rev. 2.0	Total-P	0.013		mg P/L	P402011	
	SM 5310 B-2011	Organic Carbon	7.8		mg C/L	P402468	
2265839	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P401711	

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: Deadfall Creek Upstream of Shockley Springs Rd. **Collection Date/Time: 07/28/2021 12:25**

Field ID: G4NW0490

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2265836	EPA 180.1 Rev. 2.0	Turbidity	3.6	A	NTU	P401730	
	EPA 300.0 Rev. 2.1	Chloride	2.5		mg Cl/L	P402078	
		Sulfate	1.0		mg SO4/L	P402080	
	SM 2120 B-2011	Color (true)	57	A	PCU	P401720	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P401791	
	SM 2540 C-2011	TDS	20	I	mg/L	P402221	
	SM 2540 D-2011	TSS	4	I	mg/L	P402224	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P401793	
2265838	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P402182	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.30		mg N/L	P402635	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.052		mg N/L	P401733	
	EPA 365.1 Rev. 2.0	Total-P	0.0097		mg P/L	P402012	
	SM 5310 B-2011	Organic Carbon	7.1		mg C/L	P402468	
2265840	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P401711	

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.

Sample Location: Oak Creek Below Tommy Steele Road

Collection Date/Time: 07/28/2021 11:05

Field ID: G4NW0395

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2265848	EPA 200.7 Rev. 4.4	Barium	25.1		ug/L	P401881	
		Calcium	1.47		mg/L	P402375	
		Iron	2.30E+03		ug/L	P401881	
		Magnesium	0.80		mg/L	P402375	
		Manganese	103		ug/L	P401881	
		Potassium	0.79	I	mg/L	P401881	
		Sodium	1.7	I	mg/L	P402375	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P402375	
		Aluminum	445		ug/L	P401881	
		Antimony	0.050	U	ug/L	P401881	
		Arsenic	0.71		ug/L	P401881	
		Beryllium	0.148		ug/L	P401881	
		Boron**	11.3		ug/L	P401881	
		Cadmium	0.020	U	ug/L	P401881	
		Chromium	0.63	I	ug/L	P401881	
		Copper	0.46	I	ug/L	P402243	
		Lead	0.78		ug/L	P402243	
		Nickel	1.4	I	ug/L	P401881	
		Selenium	0.20	U	ug/L	P401881	
		Silver	0.010	U	ug/L	P401881	
		Thallium	0.10	U	ug/L	P401881	
	SM 2340B	Hardness	7.0		mg/L	P402375	

Ref. Method and Comment:

EPA 200.8 Rev. 5.4: The beryllium and lead result was confirmed in the undigested sample on 08/05/2021.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P401729

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P401730

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P401881

Component	Result	Code	Units
Barium	1.0	U	ug/L
Iron	30	U	ug/L
Manganese	1.0	U	ug/L
Potassium	0.30	U	mg/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402375

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Magnesium	0.040	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: P401881

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
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 200.8 Rev. 5.4
Batch ID: P402243

Component	Result	Code	Units
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L

Quality Assurance Report Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402078

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402080

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402182

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402524

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402635

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401733

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402011

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402012

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401711

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

Quality Assurance Report

Method Blank Results

Reference Method: SM 2120 B-2011
Batch ID: P401719

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B-2011
Batch ID: P401720

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P401791

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-2011
Batch ID: P402221

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P402224

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P401793

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P402468

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: P401881

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	104		P	85 - 115
Iron	96.9		P	85 - 115
Manganese	98.1		P	85 - 115
Potassium	106		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P402375

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Magnesium	111		P	85 - 115
Sodium	103		P	85 - 115
Zinc	108		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P401881

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	107		P	85 - 115
Arsenic	102		P	85 - 115
Beryllium	103		P	85 - 115
Boron	104		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	100		P	85 - 115
Nickel	103		P	85 - 115
Selenium	99.0		P	85 - 115
Silver	102		P	85 - 115
Thallium	107		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P402243

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Copper	96.7		P	85 - 115
Lead	95.4		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402078

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P402080

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	96.6		P	90 - 110

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402182

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: P402524

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.8		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402635

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: P401733

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	108		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402011

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402012

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: P401711

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

Reference Method: SM 2120 B-2011
Batch ID: P401719

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

Reference Method: SM 2120 B-2011
Batch ID: P401720

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-2011
Batch ID: P401791

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P401793

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.5		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P402468

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.6		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P401881

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265970	Barium	111		P	80 - 120
2265970	Iron	107		P	80 - 120
2265970	Manganese	105		P	80 - 120
2265970	Potassium	110		P	80 - 120
2266597	Barium	106	105	P/P	80 - 120
2266597	Iron	96.1	99.8	P/P	80 - 120
2266597	Manganese	100	99.7	P/P	80 - 120
2266597	Potassium	102	105	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P402375

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265002	Calcium	104		P	80 - 120
2265002	Magnesium	107		P	80 - 120
2265002	Sodium	103		P	80 - 120
2265002	Zinc	108		P	80 - 120
2265969	Calcium	102		P	80 - 120
2265969	Magnesium	108	105	P/P	80 - 120
2265969	Sodium	103		P	80 - 120
2265969	Zinc	105	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P401881

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265970	Aluminum	118		P	80 - 120
2265970	Antimony	103		P	80 - 120
2265970	Arsenic	97.9		P	80 - 120
2265970	Beryllium	102		P	80 - 120
2265970	Boron	107		P	80 - 120
2265970	Cadmium	103		P	80 - 120
2265970	Chromium	102		P	80 - 120
2265970	Nickel	101		P	80 - 120
2265970	Selenium	95.3		P	80 - 120
2265970	Silver	103		P	80 - 120
2265970	Thallium	110		P	80 - 120
2266597	Aluminum	101	102	P/P	80 - 120
2266597	Antimony	104	106	P/P	80 - 120
2266597	Arsenic	97.3	98.3	P/P	80 - 120
2266597	Beryllium	98.5	98.3	P/P	80 - 120
2266597	Boron	103	105	P/P	80 - 120
2266597	Cadmium	100	102	P/P	80 - 120
2266597	Chromium	98.0	99.8	P/P	80 - 120
2266597	Nickel	97.8	99.3	P/P	80 - 120
2266597	Selenium	94.5	94.7	P/P	80 - 120
2266597	Silver	101	101	P/P	80 - 120
2266597	Thallium	108	108	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402243

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2264588	Copper	87.4		P	80 - 120
2264588	Lead	91.0		P	80 - 120
2265305	Copper	90.1	92.5	P/P	80 - 120
2265305	Lead	90.9	93.8	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402078

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265759	Chloride	98.7		P	90 - 110
2265947	Chloride	99.4		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402080

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265759	Sulfate	94.5		P	90 - 110
2265947	Sulfate	99.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402182

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265760	Ammonia-N	99.2	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402524

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265511	Kjeldahl Nitrogen	101	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401733

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265775	NO2NO3-N	106	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402011

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265120	Total-P	105	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402012

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2266213	Total-P	105	106	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P401711

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265840	O-Phosphate-P	99.4	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P401793

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2265774	Fluoride	99.6	98.9	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P402468

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2266214	Organic Carbon	98.6	99.0	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P401729

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265719	Turbidity	0.289	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P401730

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265836	Turbidity	2.47	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P401881

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2266597	Barium	0.563	Spike	P	0 - 20
2266597	Iron	3.11	Spike	P	0 - 20
2266597	Manganese	0.353	Spike	P	0 - 20
2266597	Potassium	3.04	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P402375

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265969	Calcium	2.53	Spike	P	0 - 20
2265969	Magnesium	2.13	Spike	P	0 - 20
2265969	Sodium	2.21	Spike	P	0 - 20
2265969	Zinc	2.48	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P401881

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2266597	Aluminum	1.19	Spike	P	0 - 20
2266597	Antimony	1.21	Spike	P	0 - 20
2266597	Arsenic	1.03	Spike	P	0 - 20
2266597	Beryllium	0.121	Spike	P	0 - 20
2266597	Boron	0.996	Spike	P	0 - 20
2266597	Cadmium	1.63	Spike	P	0 - 20
2266597	Chromium	1.78	Spike	P	0 - 20
2266597	Nickel	1.56	Spike	P	0 - 20
2266597	Selenium	0.304	Spike	P	0 - 20
2266597	Silver	0.635	Spike	P	0 - 20
2266597	Thallium	0.523	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402243

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
--------------------------	-----------	-----------	-------------------	-----------	----------------

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P402243

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265305	Copper	2.65	Spike	P	0 - 20
2265305	Lead	3.09	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402078

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265759	Chloride	0.114	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P402080

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265759	Sulfate	0.795	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P402182

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265760	Ammonia-N	0.149	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402524

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265511	Kjeldahl Nitrogen	2.08	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P402635

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265865	Kjeldahl Nitrogen	2.99	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P401733

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265775	NO2NO3-N	0.743	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P402011

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265120	Total-P	0.787	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P402012

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2266213	Total-P	0.464	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P401711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265840	O-Phosphate-P	0.910	Spike	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P401719

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265675	Color (true)	2.16	Sample	P	0 - 20

Reference Method: SM 2120 B-2011

Batch ID: P401720

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265836	Color (true)	2.39	Sample	P	0 - 20

Reference Method: SM 2320 B-2011

Batch ID: P401791

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265774	Total Alkalinity	0.925	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011

Batch ID: P402221

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265774	TDS	6.74	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011

Batch ID: P401793

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2265774	Fluoride	0.460	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011

Batch ID: P402468

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2266214	Organic Carbon	0.218	Spike	P	0 - 20

Quality Assurance Report Precision

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A106918

Included Lab Sample IDs: 2265839, 2265840

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.8	99.7	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A106921

Included Lab Sample IDs: 2265835, 2265836

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	99.8	P/P	90 - 115
Color (true)	99.8	101	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A106926

Included Lab Sample IDs: 2265835, 2265836

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106927

Included Lab Sample IDs: 2265837, 2265838

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	106	110	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A106969

Included Lab Sample IDs: 2265835, 2265836

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.4	102	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A106969

Included Lab Sample IDs: 2265835, 2265836

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

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A107025

Included Lab Sample IDs: 2265835, 2265836

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.7	100	P/P	90 - 110
Sulfate	99.2	100	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A107048

Included Lab Sample IDs: 2265848

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	104	104	P/P	90 - 110
Antimony	105	106	P/P	90 - 110
Arsenic	102	102	P/P	90 - 110
Beryllium	99.0	101	P/P	90 - 110
Boron	104	102	P/P	90 - 110
Cadmium	104	104	P/P	90 - 110
Chromium	100	100	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	96.8	97.0	P/P	90 - 110
Thallium	109	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A107092

Included Lab Sample IDs: 2265837, 2265838

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	97.5	P/P	90 - 110
Total-P	98.2	97.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A107121

Included Lab Sample IDs: 2265837, 2265838

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.2	98.7	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A107127

Included Lab Sample IDs: 2265848

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	105	105	P/P	90 - 110
Iron	95.0	94.5	P/P	90 - 110
Manganese	101	100	P/P	90 - 110
Potassium	105	105	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A107192

Included Lab Sample IDs: 2265848

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	93.4	91.6	P/P	90 - 110
Lead	95.1	93.8	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A107246

Included Lab Sample IDs: 2265837, 2265838

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.6	97.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A107254

Included Lab Sample IDs: 2265848

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	101	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Sodium	98.8	101	P/P	90 - 110
Zinc	100	99.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107302

Included Lab Sample IDs: 2265837

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	108	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107354

Included Lab Sample IDs: 2265838

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	104	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 SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					0.289	
	Turbidity					2.47	
EPA 200.7 Rev. 4.4	Barium	104	111	106	105		0.563
	Calcium	104	104	102			2.53
	Iron	96.9	107	96.1	99.8		3.11
	Magnesium	111	107	108	105		2.13
	Manganese	98.1	105	100	99.7		0.353
	Potassium	106	110	102	105		3.04
	Sodium	103	103	103			2.21
	Zinc	108	108	105	102		2.48
EPA 200.8 Rev. 5.4	Aluminum	103	101	102	118		1.19
	Antimony	107	104	106	103		1.21
	Arsenic	102	97.3	98.3	97.9		1.03
	Beryllium	103	98.5	98.3	102		0.121
	Boron	104	103	105	107		0.996
	Cadmium	103	100	102	103		1.63
	Chromium	100	98.0	99.8	102		1.78
	Copper	96.7	90.1	92.5	87.4		2.65
	Lead	95.4	90.9	93.8	91.0		3.09
	Nickel	103	97.8	99.3	101		1.56
	Selenium	99.0	94.5	94.7	95.3		0.304
	Silver	102	101	101	103		0.635
	Thallium	107	108	108	110		0.523
EPA 300.0 Rev. 2.1	Chloride	98.2	98.7	99.4		0.114	
	Sulfate	96.6	94.5	99.2		0.795	
EPA 350.1 Rev. 2.0	Ammonia-N	100	99.2	99.4			0.149
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.8	101	104			2.08
	Kjeldahl Nitrogen	106					2.99
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	108	106	107			0.743
EPA 365.1 Rev. 2.0	Total-P	105	105	106			0.787
	Total-P	106	105	106			0.464
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.0	99.4	98.5			0.910
SM 2120 B-2011	Color (true)	100				2.16	
	Color (true)	101				2.39	
SM 2320 B-2011	Total Alkalinity	101				0.925	
SM 2540 C-2011	TDS					6.74	
SM 4500 F-C-2011	Fluoride	98.5	99.6	98.9			0.460
SM 5310 B-2011	Organic Carbon	97.6	98.6	99.0			0.218

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2265835, 2265836
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2265848
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2265848
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2265835, 2265836
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2265835, 2265836
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2265837, 2265838
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2265837, 2265838
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2265837, 2265838
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2265837, 2265838

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2265839, 2265840
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2265835, 2265836
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2265835, 2265836
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2265848
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2265835, 2265836
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2265835, 2265836
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2265835, 2265836
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2265837, 2265838

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	07/29/2021			07/29/2021 16:09	Blanca Fach	2265835, 2265836
EPA 200.7 Rev. 4.4	07/29/2021	08/03/2021 13:50	Elliott D. Healy	08/09/2021 19:34	Josef B Mick	2265848
	07/29/2021	08/12/2021 14:40	Elliott D. Healy	08/13/2021 21:52	Josef B Mick	2265848
EPA 200.8 Rev. 5.4	07/29/2021	08/03/2021 13:50	Elliott D. Healy	08/05/2021 03:40	Alexander Thompson	2265848
	07/29/2021	08/10/2021 13:10	Elliott D. Healy	08/11/2021 14:37	Alexander Thompson	2265848
EPA 300.0 Rev. 2.1	07/29/2021			08/05/2021 22:55	Lipi Saha	2265835
	07/29/2021			08/05/2021 23:07	Lipi Saha	2265836
EPA 350.1 Rev. 2.0	07/29/2021			08/09/2021 13:42	Ping Hua	2265837
	07/29/2021			08/09/2021 13:43	Ping Hua	2265838
EPA 351.2 Rev. 2.0	07/29/2021	08/16/2021 13:00	Benjamin T. Nordmann	08/17/2021 10:00	Virginia P. Brown	2265837
	07/29/2021	08/18/2021 14:21	Benjamin T. Nordmann	08/19/2021 11:48	Virginia P. Brown	2265838
EPA 353.2 Rev. 2.0	07/29/2021			07/30/2021 09:34	Beverly Y. Sanders	2265837
	07/29/2021			07/30/2021 09:35	Beverly Y. Sanders	2265838
EPA 365.1 Rev. 2.0	07/29/2021	08/05/2021 15:45	Simonne.V. Calhoun	08/06/2021 12:40	Shengyu Ding	2265837
	07/29/2021	08/05/2021 15:45	Simonne.V. Calhoun	08/06/2021 12:48	Shengyu Ding	2265838
EPA 365.1 Rev. 2.0 dissolved	07/29/2021			07/29/2021 14:03	Lipi Saha	2265840
	07/29/2021			07/29/2021 14:09	Lipi Saha	2265839
SM 2120 B-2011	07/29/2021			07/29/2021 16:08	Sarah A Nixon	2265835
	07/29/2021			07/29/2021 16:13	Sarah A Nixon	2265836
SM 2320 B-2011	07/29/2021			07/30/2021 20:14	Dale L. Simmons	2265835
	07/29/2021			07/30/2021 20:22	Dale L. Simmons	2265836
SM 2340B	07/29/2021			08/13/2021 21:52	Josef B Mick	2265848
SM 2540 C-2011	07/29/2021			08/03/2021 14:36	Yijie Li	2265835, 2265836
SM 2540 D-2011	07/29/2021			08/03/2021 14:36	Yijie Li	2265835, 2265836
SM 4500 F-C-2011	07/29/2021			07/30/2021 20:14	Dale L. Simmons	2265835
	07/29/2021			07/30/2021 20:22	Dale L. Simmons	2265836
SM 5310 B-2011	07/29/2021			08/12/2021 03:52	Madeline Gruver	2265837
	07/29/2021			08/12/2021 04:07	Madeline Gruver	2265838