

Chemical Analysis Report

CEN-DIST-2021-07-13-03

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

Event Description: **Cow Creek**
Request ID: **RQ-2021-07-12-55**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 05-AUG-2021 15:26

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: Cow Creek at Osteen Maytown Road (2952)

Collection Date/Time: 07/12/2021 10:50

Field ID: G2CE0086

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2261484	EPA 180.1 Rev. 2.0	Turbidity	1.7		NTU	P400904	
	EPA 300.0 Rev. 2.1	Chloride	16		mg Cl/L	P401188	
		Sulfate	0.77		mg SO4/L	P401191	
		Color (true)	450		PCU	P400893	
	SM 2320 B-2011	Total Alkalinity	14		mg CaCO3/L	P401021	RPD
	SM 2540 C-2011	TDS	141		mg/L	P401316	
	SM 2540 D-2011	TSS	2	U	mg/L	P401121	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P401024	
2261485	EPA 350.1 Rev. 2.0	Ammonia-N	0.030		mg N/L	P401325	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.3		mg N/L	P401714	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P400939	
	EPA 365.1 Rev. 2.0	Total-P	0.046		mg P/L	P400932	
	SM 5310 B-2011	Organic Carbon	41		mg C/L	P401309	
2261486	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P400866	
2261493	EPA 200.7 Rev. 4.4	Barium	10.2		ug/L	P400847	
		Calcium	12.0		mg/L	P400847	
		Iron	1.45E+03		ug/L	P400847	
		Magnesium	1.52		mg/L	P400847	
		Manganese	8.5		ug/L	P400847	
		Potassium	0.42	I	mg/L	P400847	
		Sodium	10		mg/L	P400847	
	EPA 200.8 Rev. 5.4	Zinc	8.4	I	ug/L	P400847	
		Aluminum	337		ug/L	P400847	
		Antimony	0.050	U	ug/L	P400847	
		Arsenic	0.97		ug/L	P400847	
		Beryllium	0.022	I	ug/L	P400847	
		Boron**	25.7		ug/L	P400847	
		Cadmium	0.020	U	ug/L	P400847	
		Chromium	0.85	I	ug/L	P400847	
		Copper	0.40	U	ug/L	P400847	
		Lead	0.59		ug/L	P400847	
		Nickel	0.52	I	ug/L	P400847	
		Selenium	0.20	I	ug/L	P400847	
		Silver	0.010	U	ug/L	P400847	
		Thallium	0.10	U	ug/L	P400847	
		Hardness	36.3		mg/L	P400847	

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: FB

Collection Date/Time: 07/12/2021 11:02

Field ID: FB_07122021

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2261487	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P400904	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P401188	
		Sulfate	0.20	U	mg SO4/L	P401191	
		Color (true)	2.5	U	PCU	P400893	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P401128	
	SM 2540 C-2011	TDS	15	U	mg/L	P401314	
	SM 2540 D-2011	TSS	2	U	mg/L	P401119	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P401131	
2261488	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P401325	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P401714	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P400999	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P400932	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P401309	
2261489	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P400866	
2261494	EPA 200.7 Rev. 4.4	Barium	1.0	U	ug/L	P400847	
		Calcium	0.075	U	mg/L	P400847	
		Iron	30	U	ug/L	P400847	
		Magnesium	0.040	U	mg/L	P400847	
		Manganese	1.0	U	ug/L	P400847	
		Potassium	0.30	U	mg/L	P400847	
		Sodium	0.50	U	mg/L	P400847	
		Zinc	5.0	U	ug/L	P400847	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P400847	
		Antimony	0.050	U	ug/L	P400847	
		Arsenic	0.050	U	ug/L	P400847	
		Beryllium	0.010	U	ug/L	P400847	
		Boron**	2.0	U	ug/L	P400847	
		Cadmium	0.020	U	ug/L	P400847	
		Chromium	0.40	U	ug/L	P400847	
		Copper	0.53	I	ug/L	P400847	
		Lead	0.20	U	ug/L	P400847	
		Nickel	0.50	U	ug/L	P400847	
		Selenium	0.20	U	ug/L	P400847	
		Silver	0.010	U	ug/L	P400847	
		Thallium	0.10	U	ug/L	P400847	

Ref. Method and Comment:

SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The copper result was confirmed in the undigested sample on 07/15/2021.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P400904

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P400847

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
Manganese	1.0	U	ug/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: P400847

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401188

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401191

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401325

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: P401714

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400939

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400999

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400932

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400866

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

Reference Method: SM 2120 B-2011
Batch ID: P400893

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P401021

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

Reference Method: SM 2320 B-2011
Batch ID: P401128

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

Reference Method: SM 2540 C-2011
Batch ID: P401314

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 2540 C-2011
Batch ID: P401316

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P401119

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P401121

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P401024

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P401131

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P401309

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: P400847

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	103		P	85 - 115
Calcium	106		P	85 - 115
Iron	109		P	85 - 115
Magnesium	112		P	85 - 115
Manganese	101		P	85 - 115
Potassium	103		P	85 - 115
Sodium	101		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P400847

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	108		P	85 - 115
Antimony	112		P	85 - 115
Arsenic	105		P	85 - 115
Beryllium	110		P	85 - 115
Boron	108		P	85 - 115
Cadmium	111		P	85 - 115
Chromium	103		P	85 - 115
Copper	96.7		P	85 - 115
Lead	104		P	85 - 115
Nickel	95.8		P	85 - 115
Selenium	112		P	85 - 115
Silver	104		P	85 - 115
Thallium	111		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401188

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401191

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401325

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401714

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	93.8		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400939

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	94.0		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400999

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400932

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: P400866

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

Reference Method: SM 2120 B-2011
Batch ID: P400893

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.8		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P401021

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	94 - 106

Reference Method: SM 2320 B-2011
Batch ID: P401128

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

Reference Method: SM 4500 F-C-2011
Batch ID: P401024

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P401131

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.6		P	93 - 104

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P401309

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.3		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P400847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261183	Barium	105		P	80 - 120
2261183	Calcium	109		P	80 - 120
2261183	Iron	108		P	80 - 120
2261183	Magnesium	111		P	80 - 120
2261183	Manganese	103		P	80 - 120
2261183	Potassium	102		P	80 - 120
2261183	Sodium	106		P	80 - 120
2261183	Zinc	106		P	80 - 120
2261511	Barium	107	107	P/P	80 - 120
2261511	Calcium	106		P	80 - 120
2261511	Iron	112	114	P/P	80 - 120
2261511	Magnesium	115	117	P/P	80 - 120
2261511	Manganese	106	106	P/P	80 - 120
2261511	Potassium	104	105	P/P	80 - 120
2261511	Sodium	102		P	80 - 120
2261511	Zinc	110	110	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P400847

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261183	Aluminum	107		P	80 - 120
2261183	Antimony	110		P	80 - 120
2261183	Arsenic	104		P	80 - 120
2261183	Beryllium	108		P	80 - 120
2261183	Boron	112		P	80 - 120
2261183	Cadmium	110		P	80 - 120
2261183	Chromium	103		P	80 - 120
2261183	Copper	96.0		P	80 - 120
2261183	Lead	106		P	80 - 120
2261183	Nickel	97.7		P	80 - 120
2261183	Selenium	109		P	80 - 120
2261183	Silver	103		P	80 - 120
2261183	Thallium	111		P	80 - 120
2261511	Aluminum	106	109	P/P	80 - 120
2261511	Antimony	115	118	P/P	80 - 120
2261511	Arsenic	106	108	P/P	80 - 120
2261511	Beryllium	114	115	P/P	80 - 120
2261511	Boron	109	110	P/P	80 - 120
2261511	Cadmium	111	112	P/P	80 - 120
2261511	Chromium	104	106	P/P	80 - 120
2261511	Copper	95.9	98.2	P/P	80 - 120
2261511	Lead	107	109	P/P	80 - 120
2261511	Nickel	96.1	97.4	P/P	80 - 120
2261511	Selenium	113	113	P/P	80 - 120
2261511	Silver	103	103	P/P	80 - 120
2261511	Thallium	112	115	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P401188

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401188

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261462	Chloride	97.1		P	90 - 110
2261547	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P401191

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261462	Sulfate	98.1		P	90 - 110
2261547	Sulfate	102		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401325

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261502	Ammonia-N	100	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400939

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261408	NO2NO3-N	92.0	92.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400999

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261501	NO2NO3-N	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400932

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261501	Total-P	101	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400866

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261503	O-Phosphate-P	97.0	98.2	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P401024

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2260932	Fluoride	95.7	98.0	P/P	92 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P401131

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261960	Fluoride	99.1	99.7	P/P	92 - 107

Quality Assurance Report

Matrix Spike Accuracy

Reference Method: SM 5310 B-2011
Batch ID: P401309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2261556	Organic Carbon	97.6	98.2	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P400904

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261406	Turbidity	0.786	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P400847

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261511	Barium	0.235	Spike	P	0 - 20
2261511	Calcium	1.01	Spike	P	0 - 20
2261511	Iron	1.47	Spike	P	0 - 20
2261511	Magnesium	1.33	Spike	P	0 - 20
2261511	Manganese	0.136	Spike	P	0 - 20
2261511	Potassium	0.0417	Spike	P	0 - 20
2261511	Sodium	0.386	Spike	P	0 - 20
2261511	Zinc	0.103	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P400847

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261511	Aluminum	3.03	Spike	P	0 - 20
2261511	Antimony	1.73	Spike	P	0 - 20
2261511	Arsenic	2.28	Spike	P	0 - 20
2261511	Beryllium	0.862	Spike	P	0 - 20
2261511	Boron	0.947	Spike	P	0 - 20
2261511	Cadmium	0.703	Spike	P	0 - 20
2261511	Chromium	1.93	Spike	P	0 - 20
2261511	Copper	2.32	Spike	P	0 - 20
2261511	Lead	1.81	Spike	P	0 - 20
2261511	Nickel	1.41	Spike	P	0 - 20
2261511	Selenium	0.440	Spike	P	0 - 20
2261511	Silver	0.256	Spike	P	0 - 20
2261511	Thallium	2.34	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P401188

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261462	Chloride	0.695	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P401191

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261462	Sulfate	1.03	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P401325

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261502	Ammonia-N	1.90	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P401714

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261463	Kjeldahl Nitrogen	0.540	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400939

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261408	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P400999

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261501	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P400932

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261501	Total-P	3.48	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P400866

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261503	O-Phosphate-P	1.23	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P400893

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261462	Color (true)	1.99	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P401021

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260932	Total Alkalinity	5.51	Sample	F	0 - 5.2

Quality Assurance Report Precision

Reference Method: SM 2320 B-2011
Batch ID: P401128

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261960	Total Alkalinity	1.37	Sample	P	0 - 5.2

Reference Method: SM 2540 C-2011
Batch ID: P401314

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261358	TDS	1.43	Sample	P	0 - 10

Reference Method: SM 2540 C-2011
Batch ID: P401316

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261458	TDS	6.17	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P401024

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2260932	Fluoride	1.90	Spike	P	0 - 2.1

Reference Method: SM 4500 F-C-2011
Batch ID: P401131

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261960	Fluoride	0.506	Spike	P	0 - 2.1

Reference Method: SM 5310 B-2011
Batch ID: P401309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2261556	Organic Carbon	0.479	Spike	P	0 - 20

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A106583

Included Lab Sample IDs: 2261486, 2261489

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.7	98.4	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A106593

Included Lab Sample IDs: 2261484, 2261487

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	101	P/P	90 - 115
Color (true)	99.5	100	P/P	90 - 115

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A106600

Included Lab Sample IDs: 2261484, 2261487

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106607

Included Lab Sample IDs: 2261485

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	95.0	94.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A106631

Included Lab Sample IDs: 2261488

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	104	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A106635

Included Lab Sample IDs: 2261485, 2261488

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

Reference Method: SM 2320 B-2011

Run ID: A106641

Included Lab Sample IDs: 2261484

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	104	P/P	90 - 110

Reference Method: SM 4500 F-C-2011

Run ID: A106641

Included Lab Sample IDs: 2261484

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	105	103	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106650

Included Lab Sample IDs: 2261493, 2261494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	99.8	P/P	90 - 110
Aluminum	99.8	101	P/P	90 - 110
Antimony	106	107	P/P	90 - 110
Antimony	107	107	P/P	90 - 110
Arsenic	96.9	96.1	P/P	90 - 110
Arsenic	98.2	96.9	P/P	90 - 110
Beryllium	96.5	96.1	P/P	90 - 110
Beryllium	97.5	96.5	P/P	90 - 110
Cadmium	102	103	P/P	90 - 110
Cadmium	103	103	P/P	90 - 110
Chromium	98.1	99.3	P/P	90 - 110
Chromium	99.3	98.4	P/P	90 - 110
Copper	93.0	90.7	P/P	90 - 110
Copper	94.7	93.0	P/P	90 - 110
Lead	99.1	99.9	P/P	90 - 110
Lead	99.9	100	P/P	90 - 110
Nickel	93.7	92.7	P/P	90 - 110
Selenium	101	100	P/P	90 - 110
Selenium	101	101	P/P	90 - 110
Silver	101	102	P/P	90 - 110
Silver	102	101	P/P	90 - 110
Thallium	97.6	96.5	P/P	90 - 110
Thallium	98.3	97.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A106671

Included Lab Sample IDs: 2261493, 2261494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	102	99.2	P/P	90 - 110
Boron	99.2	99.7	P/P	90 - 110
Nickel	94.2	92.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106672

Included Lab Sample IDs: 2261493

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	99.6	P/P	90 - 110

Reference Method: SM 2320 B-2011

Run ID: A106677

Included Lab Sample IDs: 2261487

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.5	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-2011

Run ID: A106677

Included Lab Sample IDs: 2261487

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	102	101	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A106703

Included Lab Sample IDs: 2261484, 2261487

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	101	P/P	90 - 110
Sulfate	101	101	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A106709

Included Lab Sample IDs: 2261493, 2261494

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	95 - 105
Calcium	100	102	P/P	95 - 105
Calcium	101	100	P/P	90 - 110
Iron	99.3	101	P/P	95 - 105
Iron	99.3	98.3	P/P	90 - 110
Magnesium	99.4	101	P/P	95 - 105
Magnesium	99.5	98.7	P/P	90 - 110
Manganese	100	100	P/P	95 - 105
Manganese	99.8	98.9	P/P	90 - 110
Potassium	97.4	98.9	P/P	95 - 105
Potassium	98.3	96.6	P/P	90 - 110
Sodium	96.4	95.2	P/P	90 - 110
Sodium	96.7	97.5	P/P	95 - 105
Zinc	101	101	P/P	90 - 110
Zinc	102	104	P/P	95 - 105

Reference Method: SM 5310 B-2011

Run ID: A106744

Included Lab Sample IDs: 2261485, 2261488

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.2	97.6	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A106749

Included Lab Sample IDs: 2261485, 2261488

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.5	98.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107023

Included Lab Sample IDs: 2261485, 2261488

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	92.8	99.0	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A107023

Included Lab Sample IDs: 2261485, 2261488

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.0	90.2	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			LCS	Precision SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						0.786	
EPA 200.7 Rev. 4.4	Barium	103	105	107	107			0.235
	Calcium	106	109	106				1.01
	Iron	109	108	112	114			1.47
	Magnesium	112	111	115	117			1.33
	Manganese	101	103	106	106			0.136
	Potassium	103	102	104	105			0.0417
	Sodium	101	106	102				0.386
	Zinc	105	106	110	110			0.103
EPA 200.8 Rev. 5.4	Aluminum	108	106	109	107			3.03
	Antimony	112	115	118	110			1.73
	Arsenic	105	106	108	104			2.28
	Beryllium	110	114	115	108			0.862
	Boron	108	109	110	112			0.947
	Cadmium	111	111	112	110			0.703
	Chromium	103	104	106	103			1.93
	Copper	96.7	95.9	98.2	96.0			2.32
	Lead	104	107	109	106			1.81
	Nickel	95.8	97.7	96.1	97.4			1.41
	Selenium	112	113	113	109			0.440
	Silver	104	103	103	103			0.256
	Thallium	111	112	115	111			2.34
EPA 300.0 Rev. 2.1	Chloride	102	97.1	101			0.695	
	Sulfate	102	98.1	102			1.03	
EPA 350.1 Rev. 2.0	Ammonia-N	101	100	102				1.90
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	93.8						0.540
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	94.0	92.0	92.0				0.0
	NO ₂ NO ₃ -N	102	103	103				0.0
EPA 365.1 Rev. 2.0	Total-P	105	101	105				3.48
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.0	98.2				1.23
SM 2120 B-2011	Color (true)	98.8					1.99	
SM 2320 B-2011	Total Alkalinity	103					5.51	
	Total Alkalinity	101					1.37	
SM 2540 C-2011	TDS						1.43	
	TDS						6.17	
SM 4500 F-C-2011	Fluoride	100	95.7	98.0				1.90
	Fluoride	97.6	99.1	99.7				0.506
SM 5310 B-2011	Organic Carbon	96.3	97.6	98.2				0.479

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2261484, 2261487
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2261493, 2261494
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2261493, 2261494
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2261484, 2261487
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2261484, 2261487
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2261485, 2261488
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2261485, 2261488
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2261485, 2261488
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2261485, 2261488

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	2261486, 2261489
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2261484, 2261487
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2261484, 2261487
SM 2340B	Hardness by calculation, in aqueous matrices, reported as mg/L CaCO ₃	2261493
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2261484, 2261487
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2261484, 2261487
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2261484, 2261487
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2261485, 2261488

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	07/13/2021			07/13/2021 16:23	Sarah A Nixon	2261484, 2261487
EPA 200.7 Rev. 4.4	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/16/2021 17:59	Josef B Mick	2261494
	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/16/2021 21:01	Josef B Mick	2261493
EPA 200.8 Rev. 5.4	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/15/2021 14:55	Alexander Thompson	2261494
	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/15/2021 17:28	Alexander Thompson	2261493
	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/16/2021 12:37	Alexander Thompson	2261494
	07/13/2021	07/13/2021 14:10	Elliott D. Healy	07/16/2021 14:21	Alexander Thompson	2261493
EPA 300.0 Rev. 2.1	07/13/2021			07/19/2021 20:38	Lipi Saha	2261484
	07/13/2021			07/19/2021 20:50	Lipi Saha	2261487
EPA 350.1 Rev. 2.0	07/13/2021			07/21/2021 14:23	Ping Hua	2261485
	07/13/2021			07/21/2021 14:25	Ping Hua	2261488
EPA 351.2 Rev. 2.0	07/13/2021	07/30/2021 10:15	Benjamin T. Nordmann	08/03/2021 09:56	Virginia P. Brown	2261485
	07/13/2021	07/30/2021 10:15	Benjamin T. Nordmann	08/03/2021 10:18	Virginia P. Brown	2261488
EPA 353.2 Rev. 2.0	07/13/2021			07/14/2021 10:29	Beverly Y. Sanders	2261485
	07/13/2021			07/15/2021 10:03	Beverly Y. Sanders	2261488
EPA 365.1 Rev. 2.0	07/13/2021	07/14/2021 13:05	Simonne.V. Calhoun	07/15/2021 12:21	Shengyu Ding	2261488
	07/13/2021	07/14/2021 13:05	Simonne.V. Calhoun	07/15/2021 12:22	Shengyu Ding	2261485
EPA 365.1 Rev. 2.0 dissolved	07/13/2021			07/13/2021 15:27	Ping Hua	2261486
	07/13/2021			07/13/2021 15:32	Ping Hua	2261489
SM 2120 B-2011	07/13/2021			07/13/2021 17:44	Sarah A Nixon	2261487
	07/13/2021			07/13/2021 18:13	Sarah A Nixon	2261484
SM 2320 B-2011	07/13/2021			07/15/2021 09:02	Dale L. Simmons	2261484
	07/13/2021			07/16/2021 01:12	Dale L. Simmons	2261487
SM 2340B	07/13/2021			07/16/2021 21:01	Josef B Mick	2261493
SM 2540 C-2011	07/13/2021			07/14/2021 14:33	Yijie Li	2261484, 2261487
SM 2540 D-2011	07/13/2021			07/14/2021 14:02	Yijie Li	2261484, 2261487
SM 4500 F-C-2011	07/13/2021			07/15/2021 09:02	Dale L. Simmons	2261484
	07/13/2021			07/16/2021 01:12	Dale L. Simmons	2261487
SM 5310 B-2011	07/13/2021			07/20/2021 21:10	Touraj Touran	2261485
	07/13/2021			07/20/2021 21:23	Touraj Touran	2261488