

Chemical Analysis Report

CEN-DIST-2020-02-10-02

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

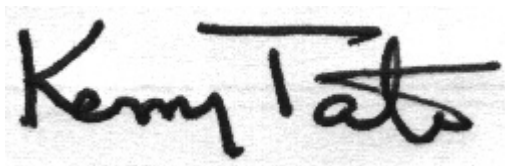
Event Description: **Long Branch**
Request ID: **RQ-2020-02-10-48**
Customer: **CEN-DIST**
Project ID: **BMAP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

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: Kerry Tate, Ph.D., Environmental Administrator

Date Certified: 03-MAR-2020 09:11

A handwritten signature in black ink that reads "Kerry Tate". The signature is written in a cursive, flowing style with a horizontal line above the first name.

NON-CONFORMANCE REPORT INCLUDED

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: Long Branch @ 0.7 mi DS of CR 13

Collection Date/Time: 02/06/2020 10:12

Field ID: G2CE0036

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2156154	EPA 180.1 Rev. 2.0	Turbidity	3.4	Q	NTU	P378688	
	EPA 300.0 Rev. 2.1	Chloride	27		mg Cl/L	P379491	
		Sulfate	34		mg SO4/L	P379494	
	SM 2120 B-2011	Color (true)	89	Q	PCU	P378701	
	SM 2320 B-2011	Total Alkalinity	74		mg CaCO3/L	P378832	
	SM 2540 C-2011	TDS	208	A	mg/L	P379102	
	SM 2540 D-2011	TSS	2	UA	mg/L	P378961	
	SM 4500 F-C-2011	Fluoride	0.090	I	mg F/L	P378833	
2156155	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P379060	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.48		mg N/L	P378851	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.10		mg N/L	P379426	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P379049	
	SM 5310 B-2011	Organic Carbon	14		mg C/L	P378967	
2156156	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.079	Q	mg P/L	P378694	
2156164	EPA 200.7 Rev. 4.4	Barium	24.6		ug/L	P378666	
		Calcium	43.8		mg/L	P378666	
		Iron	350		ug/L	P378666	
		Magnesium	2.62		mg/L	P378666	
		Potassium	1.4		mg/L	P378666	
		Sodium	15.7		mg/L	P378666	
		Zinc	5.0	U	ug/L	P378666	
	EPA 200.8 Rev. 5.4	Aluminum	85		ug/L	P378666	
		Antimony	0.15	I	ug/L	P378666	
		Arsenic	0.66		ug/L	P378666	
		Boron**	28.7		ug/L	P378666	
		Cadmium	0.020	U	ug/L	P378666	
		Chromium	0.40	U	ug/L	P378666	
		Copper	0.47	I	ug/L	P378666	
		Lead	0.20	U	ug/L	P378666	
		Nickel	0.50	U	ug/L	P378666	
		Selenium	0.26	I	ug/L	P378666	
		Silver	0.010	U	ug/L	P378666	
		Thallium	0.10	U	ug/L	P378666	

Ref. Method and Comment:

EPA 180.1 Rev. 2.0: The sample expired prior to receipt.

SM 2120 B-2011: The sample expired prior to receipt.

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

EPA 365.1 Rev. 2.0 dissolved: O-Phosphate-P: The sample expired prior to receipt.

Non-Conformance Report

NCR ID: 8169

Event(s)

CEN-DIST-2020-02-10-02

Job(s)

Sample(s)

Test(s)

NCR Type: SHIPPING/RECEIVING

NCR Category: Samples arrived late

Observation: Samples arrived three days late by FedEx, samples received within the acceptable temperature range.
Resolution: Customer contacted, email correspondence attached to sample submittal forms.
Biology and Chemistry supervisors were notified by email.
Samples will be qualified as appropriate.

Authorized by/Date: Joshua Ayres 2/19/2020

The Non-Conformance Report details exceptions or problems encountered with the events/jobs/samples/test.
Please address questions to:

Chemistry	Colin Wright	(850) 245-8085
Biology	Cheryl Swanson	(850) 245-8177

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P378688

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378666

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: P378666

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: P379491

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379494

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379060

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: P378851

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P379426

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P379049

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378694

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

Reference Method: SM 2120 B-2011
Batch ID: P378701

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-2011
Batch ID: P378832

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

Reference Method: SM 2540 C-2011
Batch ID: P379102

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P378961

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P378833

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P378967

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: P378666

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	104		P	85 - 115
Calcium	105		P	85 - 115
Iron	108		P	85 - 115
Magnesium	110		P	85 - 115
Potassium	106		P	85 - 115
Sodium	104		P	85 - 115
Zinc	103		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378666

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	106		P	85 - 115
Arsenic	103		P	85 - 115
Boron	102		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	98.2		P	85 - 115
Copper	101		P	85 - 115
Lead	98.6		P	85 - 115
Nickel	100		P	85 - 115
Selenium	101		P	85 - 115
Silver	104		P	85 - 115
Thallium	96.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379491

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379494

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379060

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378851

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P379426

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	101		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P379049

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: P378694

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

Reference Method: SM 2120 B-2011
Batch ID: P378701

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.5		P	85 - 115

Reference Method: SM 2320 B-2011
Batch ID: P378832

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

Reference Method: SM 4500 F-C-2011
Batch ID: P378833

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	96.8		P	92 - 103

Reference Method: SM 5310 B-2011
Batch ID: P378967

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.7		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378666

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156164	Barium	102		P	80 - 120
2156164	Calcium	105		P	80 - 120
2156164	Iron	105		P	80 - 120
2156164	Magnesium	104		P	80 - 120
2156164	Potassium	102		P	80 - 120
2156164	Sodium	104		P	80 - 120
2156164	Zinc	103		P	80 - 120
2156185	Barium	99.3	101	P/P	80 - 120
2156185	Calcium	96.5		P	80 - 120
2156185	Iron	103	104	P/P	80 - 120
2156185	Magnesium	100	102	P/P	80 - 120
2156185	Potassium	102	102	P/P	80 - 120
2156185	Sodium	101		P	80 - 120
2156185	Zinc	98.0	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378666

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156164	Aluminum	101		P	80 - 120
2156164	Antimony	107		P	80 - 120
2156164	Arsenic	108		P	80 - 120
2156164	Boron	102		P	80 - 120
2156164	Cadmium	104		P	80 - 120
2156164	Chromium	99.8		P	80 - 120
2156164	Copper	102		P	80 - 120
2156164	Lead	99.3		P	80 - 120
2156164	Nickel	100		P	80 - 120
2156164	Selenium	104		P	80 - 120
2156164	Silver	103		P	80 - 120
2156164	Thallium	96.5		P	80 - 120
2156185	Aluminum	98.4	101	P/P	80 - 120
2156185	Antimony	106	108	P/P	80 - 120
2156185	Arsenic	103	106	P/P	80 - 120
2156185	Boron	102	104	P/P	80 - 120
2156185	Cadmium	103	105	P/P	80 - 120
2156185	Chromium	97.6	99.9	P/P	80 - 120
2156185	Copper	99.4	102	P/P	80 - 120
2156185	Lead	97.6	98.5	P/P	80 - 120
2156185	Nickel	98.3	98.5	P/P	80 - 120
2156185	Selenium	101	103	P/P	80 - 120
2156185	Silver	103	104	P/P	80 - 120
2156185	Thallium	95.0	97.0	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379491

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2155348	Chloride	100		P	90 - 110
2156149	Chloride	104		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379494

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2155348	Sulfate	99.9		P	90 - 110
2156149	Sulfate	100		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156098	Ammonia-N	101	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378851

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156274	Kjeldahl Nitrogen	111	105	F/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P379426

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2155277	NO2NO3-N	98.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P379049

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156097	Total-P	108	107	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378694

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156069	O-Phosphate-P	95.7	97.7	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P378833

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156179	Fluoride	96.9	96.9	P/P	89 - 106

Reference Method: SM 5310 B-2011
Batch ID: P378967

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2156150	Organic Carbon	105	102	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P378688

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156267	Turbidity	12.8	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P378666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156185	Barium	2.13	Spike	P	0 - 20
2156185	Calcium	0.409	Spike	P	0 - 20
2156185	Iron	0.442	Spike	P	0 - 20
2156185	Magnesium	0.726	Spike	P	0 - 20
2156185	Potassium	0.000413	Spike	P	0 - 20
2156185	Sodium	0.131	Spike	P	0 - 20
2156185	Zinc	2.28	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P378666

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156185	Aluminum	2.72	Spike	P	0 - 20
2156185	Antimony	1.81	Spike	P	0 - 20
2156185	Arsenic	2.36	Spike	P	0 - 20
2156185	Boron	2.39	Spike	P	0 - 20
2156185	Cadmium	2.04	Spike	P	0 - 20
2156185	Chromium	2.25	Spike	P	0 - 20
2156185	Copper	2.51	Spike	P	0 - 20
2156185	Lead	0.946	Spike	P	0 - 20
2156185	Nickel	0.206	Spike	P	0 - 20
2156185	Selenium	1.58	Spike	P	0 - 20
2156185	Silver	1.17	Spike	P	0 - 20
2156185	Thallium	2.11	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379491

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2155348	Chloride	0.503	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P379494

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2155348	Sulfate	1.07	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P379060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156098	Ammonia-N	0.372	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P378851

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156274	Kjeldahl Nitrogen	3.73	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P379426

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2155277	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P379049

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156097	Total-P	0.987	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P378694

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156069	O-Phosphate-P	0.723	Spike	P	0 - 20

Reference Method: SM 2120 B-2011
Batch ID: P378701

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156268	Color (true)	4.78	Sample	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P378832

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156179	Total Alkalinity	0.433	Sample	P	0 - 2.8

Reference Method: SM 2540 C-2011
Batch ID: P379102

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156154	TDS	2.41	Sample	P	0 - 10

Quality Assurance Report Precision

Reference Method: SM 4500 F-C-2011
Batch ID: P378833

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156179	Fluoride	0.0	Spike	P	0 - 2.5

Reference Method: SM 5310 B-2011
Batch ID: P378967

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2156150	Organic Carbon	2.15	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: A97441

Included Lab Sample IDs: 2156154

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A97443

Included Lab Sample IDs: 2156156

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.1	97.8	P/P	90 - 110

Reference Method: SM 2120 B-2011

Run ID: A97448

Included Lab Sample IDs: 2156154

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A97493

Included Lab Sample IDs: 2156164

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

Reference Method: SM 2320 B-2011

Run ID: A97496

Included Lab Sample IDs: 2156154

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

Reference Method: SM 4500 F-C-2011

Run ID: A97496

Included Lab Sample IDs: 2156154

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.1	100	P/P	90 - 110

Reference Method: SM 5310 B-2011

Run ID: A97553

Included Lab Sample IDs: 2156155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.3	97.7	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A97563

Included Lab Sample IDs: 2156155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	105	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A97585

Included Lab Sample IDs: 2156155

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A97630

Included Lab Sample IDs: 2156155

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A97637

Included Lab Sample IDs: 2156164

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	101	101	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Arsenic	98.9	102	P/P	90 - 110
Boron	106	103	P/P	90 - 110
Cadmium	97.4	96.3	P/P	90 - 110
Chromium	95.4	100	P/P	90 - 110
Copper	96.6	101	P/P	90 - 110
Lead	96.2	92.6	P/P	90 - 110
Selenium	97.0	100	P/P	90 - 110
Silver	99.0	98.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A97638

Included Lab Sample IDs: 2156154

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	98.4	98.4	P/P	90 - 110
Sulfate	99.2	99.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A97713

Included Lab Sample IDs: 2156164

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Nickel	94.2	96.8	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A97741

Included Lab Sample IDs: 2156155

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	101	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A97747

Included Lab Sample IDs: 2156164

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	92.6	94.2	P/P	90 - 110

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

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

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery			MS % Recovery			Precision	
								LCS	SMP
EPA 180.1 Rev. 2.0	Turbidity								12.8
EPA 200.7 Rev. 4.4	Barium	104			102	99.3	101		2.13
	Calcium	105			105	96.5			0.409
	Iron	108			105	103	104		0.442
	Magnesium	110			104	100	102		0.726
	Potassium	106			102	102	102		0.0004
	Sodium	104			104	101			0.131
	Zinc	103			103	98.0	100		2.28
EPA 200.8 Rev. 5.4	Aluminum	102			98.4	101	101		2.72
	Antimony	106			106	108	107		1.81
	Arsenic	103			103	106	108		2.36
	Boron	102			102	104	102		2.39
	Cadmium	102			103	105	104		2.04
	Chromium	98.2			97.6	99.9	99.8		2.25
	Copper	101			99.4	102	102		2.51
	Lead	98.6			97.6	98.5	99.3		0.946
	Nickel	100			98.3	98.5	100		0.206
	Selenium	101			101	103	104		1.58
	Silver	104			103	104	103		1.17
	Thallium	96.8			95.0	97.0	96.5		2.11
EPA 300.0 Rev. 2.1	Chloride	99.2			100	104		0.503	
	Sulfate	99.8			99.9	100		1.07	
EPA 350.1 Rev. 2.0	Ammonia-N	102			101	102			0.372
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	104			111	105			3.73
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	101			98.2				0.0
EPA 365.1 Rev. 2.0	Total-P	106			108	107			0.987
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.6			95.7	97.7			0.723
SM 2120 B-2011	Color (true)	98.5						4.78	
SM 2320 B-2011	Total Alkalinity	101						0.433	
SM 2540 C-2011	TDS							2.41	
SM 4500 F-C-2011	Fluoride	96.8			96.9	96.9			0.0
SM 5310 B-2011	Organic Carbon	99.7			105	102			2.15

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2156154
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2156164
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2156164
EPA 300.0 Rev. 2.1	Chloride in aqueous matrices	2156154
EPA 300.0 Rev. 2.1	Sulfate in aqueous matrices	2156154
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2156155
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2156155
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2156155
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2156155
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2156156
SM 2120 B-2011	True Color measured at 450 nm (not valid for NPDES monitoring)	2156154
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2156154
SM 2540 C-2011	Total Dissolved Solids in aqueous matrices	2156154
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2156154

Reference Method Descriptions

Method	Description	<u>Associated Samples</u>
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2156154
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2156155

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	02/10/2020			02/11/2020 14:57	Yen Ta	2156154
EPA 200.7 Rev. 4.4	02/10/2020	02/11/2020 14:00	Elliott D. Healy	02/12/2020 17:38	Betina Topolski	2156164
EPA 200.8 Rev. 5.4	02/10/2020	02/11/2020 14:00	Elliott D. Healy	02/18/2020 23:18	Justin Cutchin	2156164
	02/10/2020	02/11/2020 14:00	Elliott D. Healy	02/21/2020 00:29	Justin Cutchin	2156164
	02/10/2020	02/11/2020 14:00	Elliott D. Healy	02/21/2020 19:49	Justin Cutchin	2156164
EPA 300.0 Rev. 2.1	02/10/2020			02/21/2020 00:48	Elliott Rodriguez	2156154
EPA 350.1 Rev. 2.0	02/10/2020			02/14/2020 13:21	Ping Hua	2156155
EPA 351.2 Rev. 2.0	02/10/2020	02/13/2020 10:45	Elliott Rodriguez	02/14/2020 15:05	Virginia P. Brown	2156155
EPA 353.2 Rev. 2.0	02/10/2020			02/20/2020 10:36	Beverly Y. Sanders	2156155
EPA 365.1 Rev. 2.0	02/10/2020	02/17/2020 17:00	Yen Ta	02/18/2020 17:58	Benjamin T. Nordmann	2156155
EPA 365.1 Rev. 2.0 dissolved	02/10/2020			02/11/2020 15:08	Carlos Miranda	2156156
SM 2120 B-2011	02/10/2020			02/11/2020 15:59	Madeline Funaro	2156154
SM 2320 B-2011	02/10/2020			02/12/2020 20:55	Dale L. Simmons	2156154
SM 2540 C-2011	02/10/2020			02/12/2020 17:00	Blanca Fach	2156154
SM 2540 D-2011	02/10/2020			02/12/2020 17:00	Blanca Fach	2156154
SM 4500 F-C-2011	02/10/2020			02/12/2020 20:55	Dale L. Simmons	2156154
SM 5310 B-2011	02/10/2020			02/13/2020 16:53	Lauren Lees	2156155