Chemical Analysis Report

NE-DIST-2017-12-20-02

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

Event Description: **Ocklawaha lakes**
Request ID: **RQ-2017-12-11-13**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Jacksonville, FL 32256-7577
Attn: Jeremy Parrish

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 12-JAN-2018 14:07

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 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: Pegram Lake Center **Collection Date/Time: 12/19/2017 10:25**

Field ID: G1NE0866 12192017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955302	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P337304	
	EPA 300.0 Rev. 2.1	Chloride	11	A	mg Cl/L	P337392	
		Sulfate	3.5	A	mg SO4/L	P337396	
	SM 2120 B	Color (true)	33	A	PCU	P337291	
	SM 2320 B-97	Total Alkalinity	2.5		mg CaCO3/L	P337489	
	SM 2540 C-97	TDS	43		mg/L	P337670	
	SM 2540 D-97	TSS	2	U	mg/L	P337674	
	SM 4500 F-C-97	Fluoride	0.041	I	mg F/L	P337492	
1955304	EPA 350.1 Rev. 2.0	Ammonia-N	0.020		mg N/L	P337699	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.54		mg N/L	P337401	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.009	I	mg N/L	P337406	
	EPA 365.1 Rev. 2.0	Total-P	0.009		mg P/L	P337415	
	SM 5310 B-00	Organic Carbon	8.4		mg C/L	P337547	
1955306	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P337299	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Hewitt Lake Center **Collection Date/Time: 12/19/2017 11:15**

Field ID: G1NE0865 12192017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955303	EPA 180.1 Rev. 2.0	Turbidity	0.55		NTU	P337304	
	EPA 300.0 Rev. 2.1	Chloride	9.2		mg Cl/L	P337392	
		Sulfate	8.2		mg SO4/L	P337396	
	SM 2120 B	Color (true)	9.9		PCU	P337291	
	SM 2320 B-97	Total Alkalinity	0.89	I	mg CaCO3/L	P337489	
	SM 2540 C-97	TDS	31		mg/L	P337670	
	SM 2540 D-97	TSS	3	I	mg/L	P337674	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P337492	
1955305	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P337699	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.19	I	mg N/L	P337401	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P337406	
	EPA 365.1 Rev. 2.0	Total-P	0.008		mg P/L	P337415	
	SM 5310 B-00	Organic Carbon	2.6		mg C/L	P337547	
1955307	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P337299	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Penner Pond Center **Collection Date/Time: 12/19/2017 12:15**

Field ID: G1NE0864 12192017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955308	EPA 180.1 Rev. 2.0	Turbidity	1.4		NTU	P337304	
	EPA 300.0 Rev. 2.1	Chloride	4.6		mg Cl/L	P337392	
		Sulfate	0.32	I	mg SO4/L	P337396	

Field ID: G1NE0864 12192017 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955308	SM 2120 B	Color (true)	150		PCU	P337291	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P337489	
	SM 2540 C-97	TDS	33		mg/L	P337670	
	SM 2540 D-97	TSS	2	I	mg/L	P337674	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P337492	
1955310	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P337699	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P337403	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P337406	
	EPA 365.1 Rev. 2.0	Total-P	0.014		mg P/L	P337415	
	SM 5310 B-00	Organic Carbon	15		mg C/L	P337547	
1955312	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P337299	
1955329	EPA 200.7 Rev. 4.4	Calcium	0.90		mg/L	P337307	
		Iron	500		ug/L	P337307	
		Magnesium	0.69		mg/L	P337307	
		Potassium	0.31	I	mg/L	P337307	
		Sodium	2.6		mg/L	P337307	
		Zinc	5.0	U	ug/L	P337307	
	EPA 200.8 Rev. 5.4	Arsenic	0.25		ug/L	P337307	
		Cadmium	0.020	U	ug/L	P337307	
		Chromium	0.40	U	ug/L	P337307	
		Copper	0.20	U	ug/L	P337307	
		Lead	0.17	I	ug/L	P337307	
		Nickel	0.20	U	ug/L	P337307	
		Silver	0.010	U	ug/L	P337307	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and sodium are unavailable because of high analyte concentration in the QC sample.

Sample Location: FIELD BLANK 12192017 **Collection Date/Time: 12/19/2017 10:45**

Field ID: FIELD BLANK 12192017 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955309	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P337304	
	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P337392	
		Sulfate	0.20	U	mg SO4/L	P337396	
	SM 2120 B	Color (true)	2.5	U	PCU	P337291	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P337489	
	SM 2540 C-97	TDS	15	U	mg/L	P337669	
	SM 2540 D-97	TSS	2	U	mg/L	P337673	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P337492	
1955311	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P337699	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P337403	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P337406	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P337415	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P337547	

Field ID: FIELD BLANK 12192017 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1955313	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P337299	
1955330	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P337307	
		Iron	30	U	ug/L	P337307	
		Magnesium	0.040	U	mg/L	P337307	
		Potassium	0.30	U	mg/L	P337307	
		Sodium	0.50	U	mg/L	P337307	
		Zinc	5.0	U	ug/L	P337307	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P337307	
		Cadmium	0.020	U	ug/L	P337307	
		Chromium	0.40	U	ug/L	P337307	
		Copper	0.20	U	ug/L	P337307	
		Lead	0.050	U	ug/L	P337307	
		Nickel	0.20	U	ug/L	P337307	
		Silver	0.010	U	ug/L	P337307	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium and sodium are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P337304

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P337307

Component	Result	Code	Units
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: P337307

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337392

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337396

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337699

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337401

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337403

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337406

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337415

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P337299

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

Reference Method: SM 2120 B
Batch ID: P337291

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P337489

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

Reference Method: SM 2540 C-97
Batch ID: P337669

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P337670

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P337673

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P337674

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P337492

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P337547

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: P337307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	104		P	85 - 115
Magnesium	109		P	85 - 115
Potassium	102		P	85 - 115
Sodium	99.9		P	85 - 115
Zinc	101		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P337307

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	104		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	98.8		P	85 - 115
Copper	101		P	85 - 115
Lead	98.5		P	85 - 115
Nickel	101		P	85 - 115
Silver	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337392

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337396

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337699

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337401

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337403

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	99.9		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337406

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337415

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P337299

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

Reference Method: SM 2320 B-97
Batch ID: P337489

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P337492

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	94.2		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P337547

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.2		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P337307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955163	Iron	107	109	P/P	80 - 120
1955163	Magnesium	109	110	P/P	80 - 120
1955163	Potassium	101	103	P/P	80 - 120
1955163	Zinc	102	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P337307

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955163	Arsenic	100	102	P/P	80 - 120
1955163	Cadmium	99.1	100	P/P	80 - 120
1955163	Chromium	95.2	97.2	P/P	80 - 120
1955163	Copper	95.9	97.0	P/P	80 - 120
1955163	Lead	96.4	98.3	P/P	80 - 120
1955163	Nickel	96.6	97.6	P/P	80 - 120
1955163	Silver	99.6	99.9	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337392

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955267	Chloride	105		P	90 - 110
1955302	Chloride	103		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337396

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955267	Sulfate	101		P	90 - 110
1955302	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337699

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955261	Ammonia-N	99.9	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337401

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955187	Kjeldahl Nitrogen	99.5	97.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337403

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955339	Kjeldahl Nitrogen	104	98.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337406

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955100	NO2NO3-N	100		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337415

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955317	Total-P	97.1	98.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P337299

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955306	O-Phosphate-P	99.0	98.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P337492

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955487	Fluoride	94.9	96.1	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P337547

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1955183	Organic Carbon	95.3	96.9	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P337304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955338	Turbidity	1.09	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P337307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955163	Calcium	0.919	Spike	P	0 - 20
1955163	Iron	2.19	Spike	P	0 - 20
1955163	Magnesium	0.895	Spike	P	0 - 20
1955163	Potassium	0.998	Spike	P	0 - 20
1955163	Sodium	0.362	Spike	P	0 - 20
1955163	Zinc	0.0903	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P337307

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955163	Arsenic	1.27	Spike	P	0 - 20
1955163	Cadmium	1.37	Spike	P	0 - 20
1955163	Chromium	1.98	Spike	P	0 - 20
1955163	Copper	1.08	Spike	P	0 - 20
1955163	Lead	1.97	Spike	P	0 - 20
1955163	Nickel	1.03	Spike	P	0 - 20
1955163	Silver	0.274	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337392

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955302	Chloride	1.99	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P337396

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955302	Sulfate	2.91	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P337699

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955261	Ammonia-N	0.712	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337401

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955187	Kjeldahl Nitrogen	2.03	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P337403

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955339	Kjeldahl Nitrogen	4.00	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P337406

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955100	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P337415

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955317	Total-P	1.53	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P337299

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955306	O-Phosphate-P	0.0969	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P337291

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955302	Color (true)	2.09	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P337489

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955487	Total Alkalinity	0.353	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P337669

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955343	TDS	8.58	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P337670

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955404	TDS	0.727	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P337492

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955487	Fluoride	0.953	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P337547

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1955183	Organic Carbon	1.56	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.
Replicate spike precision may be reported when sample results are below quantifiable levels.

Quality Assurance Report
Calibration Verification

Reference Method: SM 2120 B
Run ID: A81043
Included Lab Sample IDs: 1955302, 1955303, 1955308, 1955309

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	85 - 115
Color (true)	102	99.5	P/P	85 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A81046
Included Lab Sample IDs: 1955306, 1955307, 1955312, 1955313

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	98.7	P/P	90 - 110
O-Phosphate-P	99.0	98.3	P/P	90 - 110
O-Phosphate-P	99.1	99.0	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A81048
Included Lab Sample IDs: 1955302, 1955303, 1955308, 1955309

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A81087
Included Lab Sample IDs: 1955302, 1955303, 1955308, 1955309

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	108	107	P/P	90 - 110
Sulfate	105	103	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A81092
Included Lab Sample IDs: 1955304, 1955305, 1955310, 1955311

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A81121
Included Lab Sample IDs: 1955304, 1955305, 1955310, 1955311

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A81123
Included Lab Sample IDs: 1955304, 1955305

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.9	105	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A81124
Included Lab Sample IDs: 1955304, 1955305, 1955310, 1955311

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.7	98.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A81127
Included Lab Sample IDs: 1955310, 1955311

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	105	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A81134
Included Lab Sample IDs: 1955302, 1955303, 1955308, 1955309

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	101	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A81134
Included Lab Sample IDs: 1955302, 1955303, 1955308, 1955309

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A81152
Included Lab Sample IDs: 1955329, 1955330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	97.7	99.3	P/P	90 - 110
Arsenic	99.1	97.7	P/P	90 - 110
Cadmium	95.5	96.4	P/P	90 - 110
Cadmium	96.1	95.5	P/P	90 - 110
Chromium	93.6	95.1	P/P	90 - 110
Chromium	95.4	93.6	P/P	90 - 110
Copper	97.4	99.9	P/P	90 - 110
Copper	98.9	97.4	P/P	90 - 110
Lead	96.1	97.1	P/P	90 - 110
Lead	97.1	98.3	P/P	90 - 110
Nickel	97.2	99.4	P/P	90 - 110
Nickel	98.8	97.2	P/P	90 - 110
Silver	104	104	P/P	90 - 110
Silver	104	105	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A81173
Included Lab Sample IDs: 1955329, 1955330

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	105	P/P	95 - 105
Calcium	105	109	P/P	90 - 110
Iron	103	105	P/P	95 - 105
Iron	105	107	P/P	90 - 110
Magnesium	104	106	P/P	95 - 105
Magnesium	106	108	P/P	90 - 110
Potassium	103	105	P/P	95 - 105
Potassium	105	106	P/P	90 - 110
Sodium	101	105	P/P	90 - 110
Sodium	98.7	101	P/P	95 - 105
Zinc	101	104	P/P	90 - 110
Zinc	101	101	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A81225
Included Lab Sample IDs: 1955304, 1955305, 1955310, 1955311

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	103	102	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery	Precision		
				LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity				1.09	

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 200.7 Rev. 4.4	Calcium	105					0.919
	Iron	104	107	109			2.19
	Magnesium	109	109	110			0.895
	Potassium	102	101	103			0.998
	Sodium	99.9					0.362
	Zinc	101	102	102			0.0903
EPA 200.8 Rev. 5.4	Arsenic	104	100	102			1.27
	Cadmium	103	99.1	100			1.37
	Chromium	98.8	95.2	97.2			1.98
	Copper	101	95.9	97.0			1.08
	Lead	98.5	96.4	98.3			1.97
	Nickel	101	96.6	97.6			1.03
	Silver	103	99.6	99.9			0.274
EPA 300.0 Rev. 2.1	Chloride	105	103	105		1.99	
	Sulfate	100	101	101		2.91	
EPA 350.1 Rev. 2.0	Ammonia-N	104	99.9	101			0.712
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	99.5	97.3			2.03
	Kjeldahl Nitrogen	99.9	104	98.4			4.00
EPA 353.2 Rev. 2.0	NO2NO3-N	104	100				0.0
EPA 365.1 Rev. 2.0	Total-P	100	97.1	98.7			1.53
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	99.0	98.9			0.0969
SM 2120 B	Color (true)					2.09	
SM 2320 B-97	Total Alkalinity	102				0.353	
SM 2540 C-97	TDS					8.58	
	TDS					0.727	
SM 4500 F-C-97	Fluoride	94.2	94.9	96.1			0.953
SM 5310 B-00	Organic Carbon	96.2	95.3	96.9			1.56

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1955302, 1955303, 1955308, 1955309
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1955329, 1955330
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1955329, 1955330
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1955302, 1955303, 1955308, 1955309
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1955302, 1955303, 1955308, 1955309
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1955304, 1955305, 1955310, 1955311
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1955304, 1955305, 1955310, 1955311
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1955304, 1955305, 1955310, 1955311
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1955304, 1955305, 1955310, 1955311
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1955306, 1955307, 1955312, 1955313
SM 2120 B / E31780	True Color measured at 450 nm	1955302, 1955303, 1955308, 1955309
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1955302, 1955303, 1955308, 1955309
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1955302, 1955303, 1955308, 1955309
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1955302, 1955303, 1955308, 1955309

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1955302, 1955303, 1955308, 1955309
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1955304, 1955305, 1955310, 1955311

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	12/20/2017			12/20/2017 16:23	DeAsia Armster	1955302, 1955303, 1955308, 1955309
EPA 200.7 Rev. 4.4	12/20/2017	12/20/2017	Elliott D. Healy	12/28/2017	Betina Topolski	1955329, 1955330
EPA 200.8 Rev. 5.4	12/20/2017	12/20/2017	Elliott D. Healy	12/26/2017	Nadine Brooks	1955329, 1955330
EPA 300.0 Rev. 2.1	12/20/2017			12/21/2017	Julia Storbeck	1955302, 1955303, 1955308, 1955309
EPA 350.1 Rev. 2.0	12/20/2017			12/29/2017	Sofia Elnemr	1955304, 1955305, 1955310, 1955311
EPA 351.2 Rev. 2.0	12/20/2017	12/22/2017	Adrian Shelby	12/26/2017	Joseph Suarez	1955304, 1955305, 1955310, 1955311
EPA 353.2 Rev. 2.0	12/20/2017			12/22/2017	Lipi Saha	1955304, 1955305, 1955310, 1955311
EPA 365.1 Rev. 2.0	12/20/2017	12/22/2017	Sima Feizi	12/26/2017	Lipi Saha	1955304, 1955305, 1955310, 1955311
EPA 365.1 Rev. 2.0 dissolved	12/20/2017			12/20/2017 15:30	Megan Treadwell	1955306
	12/20/2017			12/20/2017 15:43	Megan Treadwell	1955312
	12/20/2017			12/20/2017 15:44	Megan Treadwell	1955313
	12/20/2017			12/20/2017 15:55	Megan Treadwell	1955307
SM 2120 B	12/20/2017			12/20/2017 14:45	Tanya Welborn	1955302
	12/20/2017			12/20/2017 14:46	Tanya Welborn	1955303
	12/20/2017			12/20/2017 14:47	Tanya Welborn	1955309
	12/20/2017			12/20/2017 14:58	Tanya Welborn	1955308
SM 2320 B-97	12/20/2017			12/27/2017	Dale L. Simmons	1955302, 1955303, 1955308, 1955309
SM 2540 C-97	12/20/2017			12/25/2017	Yijie Li	1955302, 1955303, 1955308, 1955309
SM 2540 D-97	12/20/2017			12/25/2017	Yijie Li	1955302, 1955303, 1955308, 1955309
SM 4500 F-C-97	12/20/2017			12/27/2017	Dale L. Simmons	1955302, 1955303, 1955308, 1955309
SM 5310 B-00	12/20/2017			12/23/2017	Megan Treadwell	1955304, 1955305, 1955310, 1955311