

Chemical Analysis Report

CEN-DIST-2017-10-27-01

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

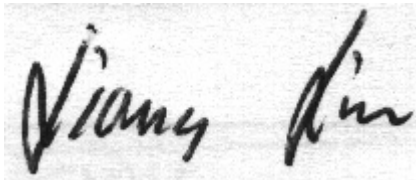
Event Description: **Rouse / Drawdy**
Request ID: **RQ-2017-07-24-33**
Customer: **CEN-DIST**
Project ID: **SMP**

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

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Certified by: Liang Lin, Environmental Administrator

Date Certified: 20-NOV-2017 11:11

A handwritten signature in black ink, appearing to read "Liang Lin", 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 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: Lake Rouse @ NW Corner of Lake

Collection Date/Time: 10/26/2017 11:26

Field ID: G2CE0100

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940654	EPA 180.1 Rev. 2.0	Turbidity	1.7	A	NTU	P334218	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P334680	
		Sulfate	6.0		mg SO4/L	P334683	
	SM 2120 B	Color (true)	120		PCU	P334222	
	SM 2320 B-97	Total Alkalinity	30		mg CaCO3/L	P334340	
	SM 2540 C-97	TDS	78		mg/L	P334824	
	SM 2540 D-97	TSS	2	I	mg/L	P334834	
	SM 4500 F-C-97	Fluoride	0.043	I	mg F/L	P334341	
1940658	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P334712	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.60		mg N/L	P334539	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P334637	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P334391	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P334774	
1940662	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P334212	
1940670	EPA 200.7 Rev. 4.4	Calcium	13.3		mg/L	P334444	
		Iron	95	I	ug/L	P334444	
		Magnesium	1.27		mg/L	P334444	
		Potassium	1.8		mg/L	P334444	
		Sodium	10.4		mg/L	P334444	
	EPA 200.8 Rev. 5.4	Zinc	5.0	U	ug/L	P334444	
		Arsenic	1.23		ug/L	P334444	
		Cadmium	0.020	U	ug/L	P334444	
		Chromium	0.40	U	ug/L	P334444	
		Copper	0.71	I	ug/L	P334444	
		Lead	0.11	I	ug/L	P334444	
		Nickel	0.21	I	ug/L	P334444	
		Silver	0.010	U	ug/L	P334444	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for lead are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Rouse @ NE Corner of Lake

Collection Date/Time: 10/26/2017 11:36

Field ID: G2CE0101

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940655	EPA 180.1 Rev. 2.0	Turbidity	1.6		NTU	P334218	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P334680	
		Sulfate	6.0		mg SO4/L	P334683	
	SM 2120 B	Color (true)	120		PCU	P334222	
	SM 2320 B-97	Total Alkalinity	30		mg CaCO3/L	P334340	
	SM 2540 C-97	TDS	88		mg/L	P334824	
	SM 2540 D-97	TSS	3	I	mg/L	P334834	
	SM 4500 F-C-97	Fluoride	0.042	I	mg F/L	P334341	

Field ID: G2CE0101

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940659	EPA 350.1 Rev. 2.0	Ammonia-N	0.055		mg N/L	P334712	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.59		mg N/L	P334539	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P334637	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P334391	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P334774	
1940663	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P334212	
1940671	EPA 200.7 Rev. 4.4	Calcium	13.3		mg/L	P334444	
		Iron	100	I	ug/L	P334444	
		Magnesium	1.29		mg/L	P334444	
		Potassium	1.8		mg/L	P334444	
		Sodium	10.5		mg/L	P334444	
		Zinc	5.0	U	ug/L	P334444	
	EPA 200.8 Rev. 5.4	Arsenic	1.21		ug/L	P334444	
		Cadmium	0.020	U	ug/L	P334444	
		Chromium	0.40	U	ug/L	P334444	
		Copper	0.70	I	ug/L	P334444	
		Lead	0.12	I	ug/L	P334444	
		Nickel	0.20	U	ug/L	P334444	
		Silver	0.010	U	ug/L	P334444	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for lead are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Rouse @ SE Corner of Lake

Collection Date/Time: 10/26/2017 11:44

Field ID: G2CE0102

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940656	EPA 180.1 Rev. 2.0	Turbidity	1.9		NTU	P334218	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P334680	
		Sulfate	5.9		mg SO4/L	P334683	
		Color (true)	120		PCU	P334222	
	SM 2320 B-97	Total Alkalinity	30		mg CaCO3/L	P334340	
	SM 2540 C-97	TDS	82		mg/L	P334824	
	SM 2540 D-97	TSS	2	I	mg/L	P334834	
	SM 4500 F-C-97	Fluoride	0.042	I	mg F/L	P334341	
1940660	EPA 350.1 Rev. 2.0	Ammonia-N	0.056		mg N/L	P334712	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.69		mg N/L	P334539	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.015		mg N/L	P334458	
	EPA 365.1 Rev. 2.0	Total-P	0.020		mg P/L	P334391	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P334774	
1940664	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P334212	
1940672	EPA 200.7 Rev. 4.4	Calcium	13.2		mg/L	P334444	
		Iron	99	I	ug/L	P334444	
		Magnesium	1.28		mg/L	P334444	

Field ID: G2CE0102

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940672	EPA 200.7 Rev. 4.4	Potassium	1.8		mg/L	P334444	
		Sodium	10.5		mg/L	P334444	
		Zinc	5.0	U	ug/L	P334444	
	EPA 200.8 Rev. 5.4	Arsenic	1.21		ug/L	P334444	
		Cadmium	0.020	U	ug/L	P334444	
		Chromium	0.40	U	ug/L	P334444	
		Copper	0.71	I	ug/L	P334444	
		Lead	0.11	I	ug/L	P334444	
		Nickel	0.20	U	ug/L	P334444	
		Silver	0.010	U	ug/L	P334444	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for lead are unavailable because of high analyte concentration in the QC sample.

Sample Location: Lake Rouse @ SW Corner of Lake

Collection Date/Time: 10/26/2017 11:55

Field ID: G2CE0103

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940657	EPA 180.1 Rev. 2.0	Turbidity	2.2		NTU	P334218	
	EPA 300.0 Rev. 2.1	Chloride	14		mg Cl/L	P334680	
		Sulfate	6.0		mg SO4/L	P334683	
		SM 2120 B	Color (true)	120		PCU	P334222
	SM 2320 B-97	Total Alkalinity	30		mg CaCO3/L	P334340	
	SM 2540 C-97	TDS	89		mg/L	P334824	
	SM 2540 D-97	TSS	3	I	mg/L	P334834	
	SM 4500 F-C-97	Fluoride	0.044	I	mg F/L	P334341	
1940661	EPA 350.1 Rev. 2.0	Ammonia-N	0.054		mg N/L	P334712	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.63		mg N/L	P334539	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.017		mg N/L	P334458	
	EPA 365.1 Rev. 2.0	Total-P	0.019		mg P/L	P334391	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P334774	
1940665	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P334212	
1940673	EPA 200.7 Rev. 4.4	Calcium	13.1		mg/L	P334444	
		Iron	99	I	ug/L	P334444	
		Magnesium	1.23		mg/L	P334444	
		Potassium	1.8		mg/L	P334444	
		Sodium	10.3		mg/L	P334444	
		Zinc	5.0	U	ug/L	P334444	
	EPA 200.8 Rev. 5.4	Arsenic	1.20		ug/L	P334444	
		Cadmium	0.020	U	ug/L	P334444	
		Chromium	0.40	U	ug/L	P334444	
		Copper	0.70	I	ug/L	P334444	
		Lead	0.12	I	ug/L	P334444	
		Nickel	0.20	U	ug/L	P334444	

Field ID: G2CE0103

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1940673	EPA 200.8 Rev. 5.4	Silver	0.010	U	ug/L	P334444	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: Chloride: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high analyte concentration in the QC sample.

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

EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for lead 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: P334218

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P334444

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: P334444

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

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P334680

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P334683

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P334712

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: P334539

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334458

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334637

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P334391

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P334212

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

Reference Method: SM 2120 B
Batch ID: P334222

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P334340

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

Reference Method: SM 2540 C-97
Batch ID: P334824

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P334834

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P334341

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P334774

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: P334444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	104		P	85 - 115
Iron	105		P	85 - 115
Magnesium	107		P	85 - 115
Potassium	99.3		P	85 - 115
Sodium	104		P	85 - 115
Zinc	99.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P334444

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	103		P	85 - 115
Chromium	100		P	85 - 115
Copper	95.5		P	85 - 115
Lead	99.1		P	85 - 115
Nickel	97.8		P	85 - 115
Silver	95.3		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334680

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334683

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P334712

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	98.4		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P334539

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: P334458

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	109		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334637

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P334391

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P334212

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	96.8		P	90 - 110

Reference Method: SM 2320 B-97
Batch ID: P334340

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

Reference Method: SM 4500 F-C-97
Batch ID: P334341

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P334774

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.3		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P334444

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

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P334444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940811	Calcium	105		P	80 - 120
1940811	Iron	101	98.7	P/P	80 - 120
1940811	Magnesium	103	102	P/P	80 - 120
1940811	Potassium	98.5	96.7	P/P	80 - 120
1940811	Sodium	104		P	80 - 120
1940811	Zinc	102	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P334444

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940811	Arsenic	98.6	101	P/P	80 - 120
1940811	Cadmium	102	102	P/P	80 - 120
1940811	Chromium	95.7	97.8	P/P	80 - 120
1940811	Copper	93.1	95.8	P/P	80 - 120
1940811	Nickel	94.3	96.7	P/P	80 - 120
1940811	Silver	94.8	94.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334680

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940637	Chloride	97.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334683

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940637	Sulfate	99.2		P	90 - 110
1940691	Sulfate	97.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P334712

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940638	Ammonia-N	103	107	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P334539

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940660	Kjeldahl Nitrogen	98.2	97.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334458

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940660	NO2NO3-N	107	107	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334637

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940468	NO2NO3-N	108	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P334391

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940759	Total-P	98.0	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P334212

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940760	O-Phosphate-P	94.3	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P334341

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940444	Fluoride	105	105	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P334774

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1940459	Organic Carbon	99.4	98.6	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P334218

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940654	Turbidity	4.08	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P334444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940811	Calcium	0.124	Spike	P	0 - 20
1940811	Iron	1.17	Spike	P	0 - 20
1940811	Magnesium	0.496	Spike	P	0 - 20
1940811	Potassium	1.10	Spike	P	0 - 20
1940811	Sodium	0.224	Spike	P	0 - 20
1940811	Zinc	1.13	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P334444

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940811	Arsenic	1.91	Spike	P	0 - 20
1940811	Cadmium	0.328	Spike	P	0 - 20
1940811	Chromium	2.16	Spike	P	0 - 20
1940811	Copper	2.72	Spike	P	0 - 20
1940811	Lead	0.937	Spike	P	0 - 20
1940811	Nickel	2.37	Spike	P	0 - 20
1940811	Silver	0.0383	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334680

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940637	Chloride	0.461	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P334683

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940637	Sulfate	0.428	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P334712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940638	Ammonia-N	3.35	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P334539

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940660	Kjeldahl Nitrogen	0.263	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334458

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940660	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P334637

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940468	NO2NO3-N	0.454	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P334391

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940759	Total-P	1.01	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P334212

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940760	O-Phosphate-P	4.12	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P334222

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940691	Color (true)	0.323	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P334340

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940444	Total Alkalinity	0.104	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P334824

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940678	TDS	3.04	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P334341

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940444	Fluoride	0.0	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P334774

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1940459	Organic Carbon	0.724	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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A79865

Included Lab Sample IDs: 1940662, 1940663, 1940664, 1940665

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.2	98.7	P/P	90 - 110
O-Phosphate-P	98.7	97.7	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A79866

Included Lab Sample IDs: 1940654, 1940655, 1940656, 1940657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A79867

Included Lab Sample IDs: 1940654, 1940655, 1940656, 1940657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	97.8	99.9	P/P	85 - 115

Reference Method: SM 2320 B-97

Run ID: A79910

Included Lab Sample IDs: 1940654, 1940655, 1940656, 1940657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.4	103	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A79910

Included Lab Sample IDs: 1940654, 1940655, 1940656, 1940657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.1	99.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A79946

Included Lab Sample IDs: 1940660, 1940661

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A79984

Included Lab Sample IDs: 1940658, 1940659

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A79996

Included Lab Sample IDs: 1940658, 1940659, 1940660, 1940661

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A80007

Included Lab Sample IDs: 1940670, 1940671, 1940672, 1940673

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	101	P/P	90 - 110
Calcium	102	100	P/P	95 - 105
Iron	101	101	P/P	95 - 105
Iron	101	101	P/P	90 - 110
Magnesium	101	101	P/P	95 - 105
Magnesium	101	101	P/P	90 - 110
Potassium	100	99.6	P/P	90 - 110
Potassium	99.0	100	P/P	95 - 105
Sodium	101	101	P/P	90 - 110
Sodium	101	101	P/P	95 - 105
Zinc	97.4	98.1	P/P	90 - 110
Zinc	98.2	97.4	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A80039

Included Lab Sample IDs: 1940654, 1940655, 1940656, 1940657

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	100	P/P	90 - 110
Sulfate	101	99.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A80044

Included Lab Sample IDs: 1940670, 1940671, 1940672, 1940673

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	103	104	P/P	90 - 110
Cadmium	103	102	P/P	90 - 110
Chromium	102	101	P/P	90 - 110
Copper	100	101	P/P	90 - 110
Lead	100	99.8	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Silver	95.6	94.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A80055

Included Lab Sample IDs: 1940658, 1940659, 1940660, 1940661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	99.3	98.6	P/P	90 - 110
Ammonia-N	99.4	99.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A80070

Included Lab Sample IDs: 1940658, 1940659, 1940660, 1940661

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

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A80078

Included Lab Sample IDs: 1940658, 1940659, 1940660, 1940661

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.3	99.8	P/P	90 - 110
Organic Carbon	99.8	99.5	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				4.08	
EPA 200.7 Rev. 4.4	Calcium	104	105			0.124
	Iron	105	101 98.7			1.17
	Magnesium	107	103 102			0.496
	Potassium	99.3	98.5 96.7			1.10
	Sodium	104	104			0.224
	Zinc	99.5	102 100			1.13
EPA 200.8 Rev. 5.4	Arsenic	101	98.6 101			1.91
	Cadmium	103	102 102			0.328
	Chromium	100	95.7 97.8			2.16
	Copper	95.5	93.1 95.8			2.72
	Lead	99.1				0.937
	Nickel	97.8	94.3 96.7			2.37
	Silver	95.3	94.8 94.7			0.0383
EPA 300.0 Rev. 2.1	Chloride	97.7	97.9		0.461	
	Sulfate	99.9	99.2 97.7		0.428	
EPA 350.1 Rev. 2.0	Ammonia-N	98.4	103 107			3.35
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.9	98.2 97.8			0.263
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	109	107 107			0.0
	NO ₂ NO ₃ -N	106	108 108			0.454
EPA 365.1 Rev. 2.0	Total-P	101	98.0 99.3			1.01
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	96.8	94.3 100			4.12
SM 2120 B	Color (true)				0.323	
SM 2320 B-97	Total Alkalinity	102			0.104	
SM 2540 C-97	TDS				3.04	
SM 4500 F-C-97	Fluoride	97.8	105 105			0.0
SM 5310 B-00	Organic Carbon	98.3	99.4 98.6			0.724

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1940654, 1940655, 1940656, 1940657
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1940670, 1940671, 1940672, 1940673
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1940670, 1940671, 1940672, 1940673

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1940654, 1940655, 1940656, 1940657
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1940654, 1940655, 1940656, 1940657
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1940658, 1940659, 1940660, 1940661
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1940658, 1940659, 1940660, 1940661
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1940658, 1940659, 1940660, 1940661
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1940658, 1940659, 1940660, 1940661
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1940662, 1940663, 1940664, 1940665
SM 2120 B / E31780	True Color measured at 450 nm	1940654, 1940655, 1940656, 1940657
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1940654, 1940655, 1940656, 1940657
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1940654, 1940655, 1940656, 1940657
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1940654, 1940655, 1940656, 1940657
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1940654, 1940655, 1940656, 1940657
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1940658, 1940659, 1940660, 1940661

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	10/27/2017			10/27/2017 17:19	Tanya Welborn	1940654, 1940655, 1940656, 1940657
EPA 200.7 Rev. 4.4	10/27/2017	10/31/2017	Elliott D. Healy	11/02/2017	Betina Topolski	1940670, 1940671, 1940672, 1940673
EPA 200.8 Rev. 5.4	10/27/2017	10/31/2017	Elliott D. Healy	11/05/2017	Robert K Palmer	1940670, 1940671, 1940672, 1940673
EPA 300.0 Rev. 2.1	10/27/2017			11/02/2017	Julia Storbeck	1940654, 1940655, 1940656, 1940657
EPA 350.1 Rev. 2.0	10/27/2017			11/03/2017	Sofia Elnemr	1940658, 1940659, 1940660, 1940661
EPA 351.2 Rev. 2.0	10/27/2017	11/02/2017	Adrian Shelby	11/03/2017	Joseph Suarez	1940658, 1940659, 1940660, 1940661
EPA 353.2 Rev. 2.0	10/27/2017			11/01/2017	Beverly Y. Sanders	1940660, 1940661
	10/27/2017			11/02/2017	Beverly Y. Sanders	1940658, 1940659
EPA 365.1 Rev. 2.0	10/27/2017	10/31/2017	Sima Feizi	11/02/2017	Lipi Saha	1940658, 1940659, 1940660, 1940661
EPA 365.1 Rev. 2.0 dissolved	10/27/2017			10/27/2017 15:03	Megan Treadwell	1940662
	10/27/2017			10/27/2017 15:08	Megan Treadwell	1940663
	10/27/2017			10/27/2017 15:09	Megan Treadwell	1940664
	10/27/2017			10/27/2017 15:10	Megan Treadwell	1940665
SM 2120 B	10/27/2017			10/27/2017 15:59	Tanya Welborn	1940654
	10/27/2017			10/27/2017 16:00	Tanya Welborn	1940655
	10/27/2017			10/27/2017 16:01	Tanya Welborn	1940656
	10/27/2017			10/27/2017 16:02	Tanya Welborn	1940657
SM 2320 B-97	10/27/2017			10/30/2017	Dale L. Simmons	1940654, 1940655, 1940656, 1940657
SM 2540 C-97	10/27/2017			11/01/2017	Yijie Li	1940654, 1940655, 1940656, 1940657
SM 2540 D-97	10/27/2017			11/01/2017	Yijie Li	1940654, 1940655, 1940656, 1940657
SM 4500 F-C-97	10/27/2017			10/30/2017	Dale L. Simmons	1940654, 1940655, 1940656, 1940657
SM 5310 B-00	10/27/2017			11/06/2017	Ping Hua	1940658, 1940659, 1940660, 1940661