Chemical Analysis Report

SW-DIST-2017-02-03-01

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

Event Description: **SMP RUN 4**
Request ID: **RQ-2017-01-30-39**
Customer: **SW-DIST**
Project ID: **SMP**

Send Reports to:
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13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926
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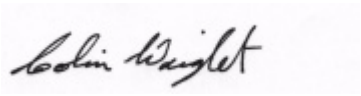
Certified by: Colin Wright, Program Administrator

Date Certified: 01-MAR-2017 13:25



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: PASADENA LAKE **Collection Date/Time: 02/02/2017 10:30**

Field ID: G5SW0119 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1869584	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P319285	
	EPA 300.0 Rev. 2.1	Chloride	62		mg Cl/L	P319795	
		Sulfate	8.7		mg SO4/L	P319797	
	SM 2120 B	Color (true)	55		PCU	P319288	
	SM 2320 B-97	Total Alkalinity	91		mg CaCO3/L	P319505	
	SM 2540 C-97	TDS	236		mg/L	P319593	
	SM 2540 D-97	TSS	26		mg/L	P319561	
	SM 4500 F-C-97	Fluoride	0.17		mg F/L	P319508	
1869587	EPA 350.1 Rev. 2.0	Ammonia-N	0.013		mg N/L	P319565	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.3		mg N/L	P319294	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P319736	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P319350	
	SM 5310 B-00	Organic Carbon	19		mg C/L	P319572	
1869590	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P319279	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: PINELLAS PARK DITCH # 5 **Collection Date/Time: 02/02/2017 11:10**

Field ID: G5SW0118 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1869585	EPA 180.1 Rev. 2.0	Turbidity	6.2	A	NTU	P319285	
	EPA 300.0 Rev. 2.1	Chloride	160		mg Cl/L	P319745	
		Sulfate	68		mg SO4/L	P319747	
	SM 2120 B	Color (true)	40		PCU	P319288	
	SM 2320 B-97	Total Alkalinity	214		mg CaCO3/L	P319770	
	SM 2540 C-97	TDS	638		mg/L	P319593	
	SM 2540 D-97	TSS	31		mg/L	P319561	
	SM 4500 F-C-97	Fluoride	0.31		mg F/L	P319772	
1869588	EPA 350.1 Rev. 2.0	Ammonia-N	0.021		mg N/L	P319565	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.94		mg N/L	P319456	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.01	I	mg N/L	P319736	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P319350	
	SM 5310 B-00	Organic Carbon	14		mg C/L	P319572	
1869591	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.011		mg P/L	P319279	

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: McKAY CREEK **Collection Date/Time: 02/02/2017 12:00**

Field ID: G5SW0126 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1869586	EPA 180.1 Rev. 2.0	Turbidity	1.3		NTU	P319285	
	EPA 300.0 Rev. 2.1	Chloride	92		mg Cl/L	P319745	

Field ID: G5SW0126 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1869586	EPA 300.0 Rev. 2.1	Sulfate	32		mg SO4/L	P319747	
	SM 2120 B	Color (true)	24		PCU	P319288	
	SM 2320 B-97	Total Alkalinity	125		mg CaCO3/L	P319769	
	SM 2540 C-97	TDS	353		mg/L	P319593	
	SM 2540 D-97	TSS	8	I	mg/L	P319561	
	SM 4500 F-C-97	Fluoride	0.31		mg F/L	P319569	
1869589	EPA 350.1 Rev. 2.0	Ammonia-N	0.032		mg N/L	P319565	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.57		mg N/L	P319456	MS
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.12		mg N/L	P319737	
	EPA 365.1 Rev. 2.0	Total-P	0.24		mg P/L	P319351	
	SM 5310 B-00	Organic Carbon	8.5		mg C/L	P319572	
1869592	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.20		mg P/L	P319286	

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: McKAY CREEK **Collection Date/Time: 02/02/2017 12:00**

Field ID: G5SW0126 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1869596	EPA 200.7 Rev. 4.4	Calcium	57.6		mg/L	P319410	
		Iron	120		ug/L	P319410	
		Magnesium	8.52		mg/L	P319410	
		Potassium	4.1		mg/L	P319410	
		Sodium	49.3		mg/L	P319410	
		Zinc	5.1	I	ug/L	P319410	
	EPA 200.8 Rev. 5.4	Arsenic	2.84		ug/L	P319410	
		Cadmium	0.034	I	ug/L	P319410	
		Chromium	0.55	I	ug/L	P319410	
		Copper	1.04		ug/L	P319410	
		Lead	0.80		ug/L	P319410	
		Nickel	0.67	I	ug/L	P319410	
		Silver	0.010	U	ug/L	P319410	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P319285

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319410

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319410

Component	Result	Code	Units
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: P319410

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: P319745

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319747

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319795

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319797

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319565

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319294

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319456

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319736

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319737

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319350

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319351

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319279

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319286

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

Reference Method: SM 2120 B
Batch ID: P319288

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P319505

Component	Result	Code	Units
Total Alkalinity	1.9	I	mg CaCO3/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P319769

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

Reference Method: SM 2320 B-97
Batch ID: P319770

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

Reference Method: SM 2540 C-97
Batch ID: P319593

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P319561

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P319508

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P319569

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P319772

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P319572

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: P319410

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319410

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	102		P	85 - 115
Iron	103		P	85 - 115
Magnesium	100		P	85 - 115
Potassium	98.1		P	85 - 115
Sodium	100		P	85 - 115
Zinc	98.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319410

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.1		P	85 - 115
Cadmium	89.7		P	85 - 115
Chromium	93.2		P	85 - 115
Copper	90.4		P	85 - 115
Lead	91.4		P	85 - 115
Nickel	92.7		P	85 - 115
Silver	92.9		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319745

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	95.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319747

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	95.0		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319795

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319797

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.9		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319565

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.1		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319294

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319456

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319736

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319737

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: P319350

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	92.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319351

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319279

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	103		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319286

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

Reference Method: SM 2320 B-97
Batch ID: P319505

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 2320 B-97
Batch ID: P319769

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 2320 B-97
Batch ID: P319770

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	103		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P319508

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.4		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P319569

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.1		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P319772

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	100		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P319572

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.1		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319410

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869370	Calcium	105		P	80 - 120
1869370	Iron	105		P	80 - 120
1869370	Magnesium	101		P	80 - 120
1869370	Potassium	97.9		P	80 - 120
1869370	Sodium	102		P	80 - 120
1869370	Zinc	97.8		P	80 - 120
1869777	Calcium	103		P	80 - 120
1869777	Iron	99.8	92.4	P/P	80 - 120
1869777	Magnesium	101		P	80 - 120
1869777	Potassium	93.1	86.4	P/P	80 - 120
1869777	Sodium	104		P	80 - 120
1869777	Zinc	95.4	87.9	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319410

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869370	Arsenic	98.1		P	80 - 120
1869370	Cadmium	94.0		P	80 - 120
1869370	Chromium	94.5		P	80 - 120
1869370	Copper	92.3		P	80 - 120
1869370	Lead	94.5		P	80 - 120
1869370	Nickel	93.5		P	80 - 120
1869370	Silver	95.5		P	80 - 120
1869777	Arsenic	95.8	97.0	P/P	80 - 120
1869777	Cadmium	93.8	93.5	P/P	80 - 120
1869777	Chromium	93.0	94.3	P/P	80 - 120
1869777	Copper	90.1	90.0	P/P	80 - 120
1869777	Lead	93.0	94.2	P/P	80 - 120
1869777	Nickel	90.8	92.6	P/P	80 - 120
1869777	Silver	94.6	96.5	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319745

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869768	Chloride	96.3		P	90 - 110
1870107	Chloride	95.2		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319747

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869768	Sulfate	93.6		P	90 - 110
1870107	Sulfate	92.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319795

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869285	Chloride	96.1		P	90 - 110
1869527	Chloride	96.5		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319797

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869285	Sulfate	92.8		P	90 - 110
1869527	Sulfate	95.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319565

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869529	Ammonia-N	99.3	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319294

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869334	Kjeldahl Nitrogen	96.1	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319456

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869772	Kjeldahl Nitrogen	112	111	F/F	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319736

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869502	NO2NO3-N	106	107	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319737

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869589	NO2NO3-N	106	106	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319350

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869334	Total-P	92.2	95.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319351

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869651	Total-P	96.0	96.2	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319279

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869653	O-Phosphate-P	99.3	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319286

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869503	O-Phosphate-P	99.4	99.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P319569

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869586	Fluoride	98.9	99.8	P/P	91 - 105

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P319772

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1870218	Fluoride	104	102	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P319572

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1869587	Organic Carbon	91.0	93.0	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P319285

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869585	Turbidity	4.00	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P319410

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869777	Calcium	5.67	Spike	P	0 - 20
1869777	Iron	7.04	Spike	P	0 - 20
1869777	Magnesium	6.45	Spike	P	0 - 20
1869777	Potassium	4.82	Spike	P	0 - 20
1869777	Sodium	6.41	Spike	P	0 - 20
1869777	Zinc	7.28	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P319410

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869777	Arsenic	1.20	Spike	P	0 - 20
1869777	Cadmium	0.268	Spike	P	0 - 20
1869777	Chromium	1.29	Spike	P	0 - 20
1869777	Copper	0.155	Spike	P	0 - 20
1869777	Lead	1.24	Spike	P	0 - 20
1869777	Nickel	1.87	Spike	P	0 - 20
1869777	Silver	1.92	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319745

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869768	Chloride	0.0768	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319747

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869768	Sulfate	0.245	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319795

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869527	Chloride	0.163	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P319797

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869527	Sulfate	2.86	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P319565

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869529	Ammonia-N	2.93	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319294

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869334	Kjeldahl Nitrogen	5.25	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P319456

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869772	Kjeldahl Nitrogen	0.842	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319736

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869502	NO2NO3-N	1.10	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P319737

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869589	NO2NO3-N	0.0	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319350

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869334	Total-P	2.51	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P319351

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869651	Total-P	0.128	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319279

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869653	O-Phosphate-P	0.930	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P319286

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869503	O-Phosphate-P	0.397	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P319288

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869495	Color (true)	0.492	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P319505

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869073	Total Alkalinity	0.321	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P319769

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869094	Total Alkalinity	0.125	Sample	P	0 - 4.8

Reference Method: SM 2320 B-97
Batch ID: P319770

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1870218	Total Alkalinity	0.0924	Sample	P	0 - 4.8

Quality Assurance Report
Precision

Reference Method: SM 2540 C-97
Batch ID: P319593

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869501	TDS	2.40	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P319508

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869073	Fluoride	0.947	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P319569

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869586	Fluoride	0.476	Spike	P	0 - 3.0

Reference Method: SM 4500 F-C-97
Batch ID: P319772

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1870218	Fluoride	1.48	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P319572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1869587	Organic Carbon	1.08	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: EPA 365.1 Rev. 2.0 dissolved
Run ID: A74270
Included Lab Sample IDs: 1869590, 1869591

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.9	99.8	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A74271
Included Lab Sample IDs: 1869584, 1869585, 1869586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	98.0	P/P	95 - 105

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A74272
Included Lab Sample IDs: 1869592

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	97.7	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A74273
Included Lab Sample IDs: 1869584, 1869585, 1869586

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A74307
Included Lab Sample IDs: 1869584, 1869585, 1869586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	97.7	101	P/P	90 - 110
Chloride	100	98.4	P/P	90 - 110
Sulfate	92.5	97.2	P/P	90 - 110
Sulfate	96.2	93.2	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A74315
Included Lab Sample IDs: 1869587

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.8	94.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A74336
Included Lab Sample IDs: 1869587, 1869589

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	96.7	P/P	90 - 110
Total-P	96.7	97.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A74347
Included Lab Sample IDs: 1869588

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	98.0	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A74348
Included Lab Sample IDs: 1869584

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-97
Run ID: A74348
Included Lab Sample IDs: 1869584

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A74361
Included Lab Sample IDs: 1869596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	98.7	99.1	P/P	90 - 110
Iron	99.0	98.0	P/P	90 - 110
Magnesium	98.4	97.6	P/P	90 - 110
Potassium	97.2	97.2	P/P	90 - 110
Sodium	97.9	98.7	P/P	90 - 110
Zinc	97.2	99.5	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A74364
Included Lab Sample IDs: 1869587, 1869588, 1869589

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A74365
Included Lab Sample IDs: 1869586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	99.1	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A74366
Included Lab Sample IDs: 1869587, 1869588, 1869589

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.6	97.7	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A74374
Included Lab Sample IDs: 1869588, 1869589

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	102	96.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A74386
Included Lab Sample IDs: 1869596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	106	104	P/P	90 - 110
Cadmium	101	102	P/P	90 - 110
Chromium	103	102	P/P	90 - 110
Copper	102	101	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A74386
Included Lab Sample IDs: 1869596

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	101	101	P/P	90 - 110
Nickel	104	102	P/P	90 - 110
Silver	107	108	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A74430
Included Lab Sample IDs: 1869587, 1869588, 1869589

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

Reference Method: SM 2320 B-97
Run ID: A74444
Included Lab Sample IDs: 1869585, 1869586

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	104	102	P/P	90 - 110
Total Alkalinity	104	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A74444
Included Lab Sample IDs: 1869585

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

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

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						4.00	
EPA 200.7 Rev. 4.4	Calcium	102	105	103				5.67
	Iron	103	105	99.8	92.4			7.04
	Magnesium	100	101	101				6.45
	Potassium	98.1	97.9	93.1	86.4			4.82
	Sodium	100	102	104				6.41
	Zinc	98.7	97.8	95.4	87.9			7.28
EPA 200.8 Rev. 5.4	Arsenic	93.1	98.1	95.8	97.0			1.20
	Cadmium	89.7	94.0	93.8	93.5			0.268
	Chromium	93.2	94.5	93.0	94.3			1.29
	Copper	90.4	92.3	90.1	90.0			0.155
	Lead	91.4	94.5	93.0	94.2			1.24
	Nickel	92.7	93.5	90.8	92.6			1.87
	Silver	92.9	95.5	94.6	96.5			1.92

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 300.0 Rev. 2.1	Chloride	95.9	96.3	95.2		0.0768	
	Chloride	98.3	96.5	96.1		0.163	
	Sulfate	95.0	93.6	92.9		0.245	
	Sulfate	94.9	95.6	92.8		2.86	
EPA 350.1 Rev. 2.0	Ammonia-N	99.1	99.3	103			2.93
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.1	96.1	102			5.25
	Kjeldahl Nitrogen	105	112	111			0.842
EPA 353.2 Rev. 2.0	NO2NO3-N	105	106	107			1.10
	NO2NO3-N	104	106	106			0.0
EPA 365.1 Rev. 2.0	Total-P	92.2	92.2	95.4			2.51
	Total-P	94.2	96.0	96.2			0.128
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.3	100			0.930
	O-Phosphate-P	102	99.4	99.9			0.397
SM 2120 B	Color (true)					0.492	
SM 2320 B-97	Total Alkalinity	103				0.321	
	Total Alkalinity	103				0.125	
	Total Alkalinity	103				0.0924	
SM 2540 C-97	TDS					2.40	
SM 4500 F-C-97	Fluoride	97.4					0.947
	Fluoride	97.1	98.9	99.8			0.476
	Fluoride	100	104	102			1.48
SM 5310 B-00	Organic Carbon	98.1	91.0	93.0			1.08

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1869584, 1869585, 1869586
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1869596
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1869596
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1869584, 1869585, 1869586
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1869584, 1869585, 1869586
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1869587, 1869588, 1869589
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1869587, 1869588, 1869589
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1869587, 1869588, 1869589
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1869587, 1869588, 1869589
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1869590, 1869591, 1869592
SM 2120 B / E31780	True Color measured at 450 nm	1869584, 1869585, 1869586
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1869584, 1869585, 1869586
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1869584, 1869585, 1869586
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1869584, 1869585, 1869586
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1869584, 1869585, 1869586
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1869587, 1869588, 1869589

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	02/03/2017			02/03/2017 16:38	Julie Michelle Frank	1869584, 1869585, 1869586
EPA 200.7 Rev. 4.4	02/03/2017	02/07/2017	Elliott D. Healy	02/08/2017	Joshua Ayres	1869596
EPA 200.8 Rev. 5.4	02/03/2017	02/07/2017	Elliott D. Healy	02/09/2017	Betina Topolski	1869596
EPA 300.0 Rev. 2.1	02/03/2017			02/09/2017	Ping Hua	1869584
	02/03/2017			02/10/2017	Ping Hua	1869585, 1869586
EPA 350.1 Rev. 2.0	02/03/2017			02/08/2017	Sofia Elnemr	1869587, 1869588, 1869589
EPA 351.2 Rev. 2.0	02/03/2017	02/06/2017	Adrian Shelby	02/07/2017	Joseph Suarez	1869587
	02/03/2017	02/08/2017	Adrian Shelby	02/09/2017	Joseph Suarez	1869588, 1869589
EPA 353.2 Rev. 2.0	02/03/2017			02/13/2017	Beverly Y. Sanders	1869587, 1869588, 1869589
EPA 365.1 Rev. 2.0	02/03/2017	02/06/2017	Vijayalakshmi Reddy	02/07/2017	Lipi Saha	1869587, 1869589
	02/03/2017	02/06/2017	Vijayalakshmi Reddy	02/08/2017	Lipi Saha	1869588
EPA 365.1 Rev. 2.0 dissolved	02/03/2017			02/03/2017 16:02	Julia Storbeck	1869590
	02/03/2017			02/03/2017 16:03	Julia Storbeck	1869591
	02/03/2017			02/03/2017 17:37	Julia Storbeck	1869592
SM 2120 B	02/03/2017			02/03/2017 17:41	Julie Michelle Frank	1869584
	02/03/2017			02/03/2017 17:42	Julie Michelle Frank	1869585
	02/03/2017			02/03/2017 17:43	Julie Michelle Frank	1869586
SM 2320 B-97	02/03/2017			02/08/2017	Dale L. Simmons	1869584
	02/03/2017			02/14/2017	Dale L. Simmons	1869585, 1869586
SM 2540 C-97	02/03/2017			02/06/2017	Christopher Armour	1869584, 1869585, 1869586
SM 2540 D-97	02/03/2017			02/06/2017	Christopher Armour	1869584, 1869585, 1869586
SM 4500 F-C-97	02/03/2017			02/08/2017	Dale L. Simmons	1869584
	02/03/2017			02/09/2017	Dale L. Simmons	1869586
	02/03/2017			02/14/2017	Dale L. Simmons	1869585
SM 5310 B-00	02/03/2017			02/08/2017	Julie Michelle Frank	1869587, 1869588, 1869589