Chemical Analysis Report

SW-DIST-2019-09-10-02

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

Event Description: **Flint**
Request ID: **RQ-2019-09-09-10**
Customer: **SW-DIST**
Project ID: **SMP**

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Date Certified: 24-SEP-2019 13:40

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Metals and Nutrients.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

A - Value reported is the mean of two or more determinations.
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value and/or the analysis did not meet established quality control criteria.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Flint Creek @ US 301 **Collection Date/Time: 09/09/2019 09:30**

Field ID: G2SW0004 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2117281	EPA 180.1 Rev. 2.0	Turbidity	4.4		NTU	P370436	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P370545	
	SM 2120 B	Color (true)	170		PCU	P370439	
	SM 2320 B-97	Total Alkalinity	43		mg CaCO3/L	P370695	
	SM 2540 C-97	TDS	117		mg/L	P371059	
	SM 2540 D-97	TSS	8	I	mg/L	P370874	
	SM 4500 F-C-97	Fluoride	0.23		mg F/L	P370698	
2117282	EPA 350.1 Rev. 2.0	Ammonia-N	0.17		mg N/L	P370669	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P370725	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.084		mg N/L	P370465	
	EPA 365.1 Rev. 2.0	Total-P	0.53		mg P/L	P370562	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P370677	
2117283	EPA 300.0 Rev. 2.1 dissolved	Sulfate	5.4		mg SO4/L	P370546	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.41		mg P/L	P370433	
2117289	EPA 200.7 Rev. 4.4	Barium	5.6		ug/L	P370486	
		Calcium	18.6		mg/L	P370486	
		Iron	530		ug/L	P370486	
		Magnesium	2.95		mg/L	P370486	
		Potassium	3.7		mg/L	P370486	
		Sodium	10.8		mg/L	P370486	
		Zinc	5.0	U	ug/L	P370486	
	EPA 200.8 Rev. 5.4	Aluminum	174		ug/L	P370486	
		Antimony	0.11	I	ug/L	P370486	
		Arsenic	2.04		ug/L	P370486	
		Boron**	30.7		ug/L	P370486	
		Cadmium	0.020	U	ug/L	P370486	
		Chromium	0.88	I	ug/L	P370486	
		Copper	1.13		ug/L	P370486	
		Lead	0.29	I	ug/L	P370486	
		Nickel	0.63	I	ug/L	P370486	
		Selenium	0.20	U	ug/L	P370486	
		Silver	0.010	U	ug/L	P370486	
		Thallium	0.10	U	ug/L	P370486	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Flint Creek @ Knights Griffin Rd **Collection Date/Time: 09/09/2019 09:55**

Field ID: G2SW0066 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2117284	EPA 180.1 Rev. 2.0	Turbidity	5.5		NTU	P370436	
	EPA 300.0 Rev. 2.1	Chloride	17		mg Cl/L	P370545	
	SM 2120 B	Color (true)	170		PCU	P370439	
	SM 2320 B-97	Total Alkalinity	42		mg CaCO3/L	P370695	
	SM 2540 C-97	TDS	123		mg/L	P371059	
	SM 2540 D-97	TSS	9	I	mg/L	P370874	
	SM 4500 F-C-97	Fluoride	0.23		mg F/L	P370698	
2117285	EPA 350.1 Rev. 2.0	Ammonia-N	0.11		mg N/L	P370669	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P370725	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.041		mg N/L	P370465	
	EPA 365.1 Rev. 2.0	Total-P	0.54		mg P/L	P370562	
	SM 5310 B-00	Organic Carbon	21		mg C/L	P370677	
2117286	EPA 300.0 Rev. 2.1 dissolved	Sulfate	5.4		mg SO4/L	P370546	
	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.41		mg P/L	P370433	

Ref. Method and Comment:
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries 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: P370436

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P370486

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P370486

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P370545

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P370546

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370669

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: P370725

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370465

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370562

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P370433

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

Reference Method: SM 2120 B
Batch ID: P370439

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P370695

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

Reference Method: SM 2540 C-97
Batch ID: P371059

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P370874

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P370698

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-00
Batch ID: P370677

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: P370486

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	101		P	85 - 115
Calcium	108		P	85 - 115
Iron	106		P	85 - 115
Magnesium	111		P	85 - 115
Potassium	109		P	85 - 115
Sodium	112		P	85 - 115
Zinc	99.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P370486

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	103		P	85 - 115
Antimony	101		P	85 - 115
Arsenic	105		P	85 - 115
Boron	94.7		P	85 - 115
Cadmium	100		P	85 - 115
Chromium	105		P	85 - 115
Copper	103		P	85 - 115
Lead	104		P	85 - 115
Nickel	102		P	85 - 115
Selenium	102		P	85 - 115
Silver	106		P	85 - 115
Thallium	101		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P370545

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P370546

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370669

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	97.1		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370725

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370465

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370562

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	93.9		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P370433

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

Reference Method: SM 2120 B
Batch ID: P370439

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

Reference Method: SM 2320 B-97
Batch ID: P370695

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	104		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P370698

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.3		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P370677

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	104		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P370486

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117141	Barium	101	101	P/P	80 - 120
2117141	Calcium	106	108	P/P	80 - 120
2117141	Iron	104	107	P/P	80 - 120
2117141	Magnesium	109	111	P/P	80 - 120
2117141	Potassium	114	116	P/P	80 - 120
2117141	Sodium	105	106	P/P	80 - 120
2117141	Zinc	99.4	99.2	P/P	80 - 120
2117363	Barium	100		P	80 - 120
2117363	Calcium	92.0		P	80 - 120
2117363	Iron	108		P	80 - 120
2117363	Magnesium	94.6		P	80 - 120
2117363	Potassium	96.7		P	80 - 120
2117363	Sodium	96.9		P	80 - 120
2117363	Zinc	98.9		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P370486

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117141	Aluminum	102	103	P/P	80 - 120
2117141	Antimony	100	99.9	P/P	80 - 120
2117141	Arsenic	103	103	P/P	80 - 120
2117141	Boron	95.2	94.8	P/P	80 - 120
2117141	Cadmium	102	101	P/P	80 - 120
2117141	Chromium	106	102	P/P	80 - 120
2117141	Copper	104	104	P/P	80 - 120
2117141	Lead	104	105	P/P	80 - 120
2117141	Nickel	102	102	P/P	80 - 120
2117141	Selenium	102	102	P/P	80 - 120
2117141	Silver	107	104	P/P	80 - 120
2117141	Thallium	100	101	P/P	80 - 120
2117363	Aluminum	102		P	80 - 120
2117363	Antimony	102		P	80 - 120
2117363	Arsenic	104		P	80 - 120
2117363	Boron	95.8		P	80 - 120
2117363	Cadmium	103		P	80 - 120
2117363	Chromium	89.9		P	80 - 120
2117363	Copper	101		P	80 - 120
2117363	Lead	107		P	80 - 120
2117363	Nickel	102		P	80 - 120
2117363	Selenium	99.9		P	80 - 120
2117363	Silver	108		P	80 - 120
2117363	Thallium	105		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P370545

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2116911	Chloride	101	103	P/P	90 - 110
2117231	Chloride	101		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P370546

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2116619	Sulfate	99.9		P	90 - 110
2116853	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370669

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117232	Ammonia-N	99.4	94.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370725

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2118269	Kjeldahl Nitrogen	98.0	106	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370465

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117235	NO2NO3-N	102	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P370433

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117333	O-Phosphate-P	98.4	98.8	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P370698

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117328	Fluoride	99.1	98.5	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P370677

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2117305	Organic Carbon	106	108	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P370436

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117336	Turbidity	5.92	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P370486

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117141	Barium	0.516	Spike	P	0 - 20
2117141	Calcium	1.66	Spike	P	0 - 20
2117141	Iron	2.12	Spike	P	0 - 20
2117141	Magnesium	1.66	Spike	P	0 - 20
2117141	Potassium	1.48	Spike	P	0 - 20
2117141	Sodium	0.624	Spike	P	0 - 20
2117141	Zinc	0.219	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P370486

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117141	Aluminum	0.911	Spike	P	0 - 20
2117141	Antimony	0.429	Spike	P	0 - 20
2117141	Arsenic	0.00934	Spike	P	0 - 20
2117141	Boron	0.377	Spike	P	0 - 20
2117141	Cadmium	1.12	Spike	P	0 - 20
2117141	Chromium	4.28	Spike	P	0 - 20
2117141	Copper	0.277	Spike	P	0 - 20
2117141	Lead	0.367	Spike	P	0 - 20
2117141	Nickel	0.250	Spike	P	0 - 20
2117141	Selenium	0.300	Spike	P	0 - 20
2117141	Silver	3.01	Spike	P	0 - 20
2117141	Thallium	0.793	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P370545

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2116911	Chloride	1.10	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Batch ID: P370546

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2116619	Sulfate	0.166	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P370669

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117232	Ammonia-N	2.88	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P370725

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2118269	Kjeldahl Nitrogen	5.53	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P370465

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117235	NO2NO3-N	1.35	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P370562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117282	Total-P	0.0449	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P370433

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117333	O-Phosphate-P	0.406	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P370439

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117234	Color (true)	0.660	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P370695

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117328	Total Alkalinity	0.530	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P371059

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117234	TDS	3.60	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P370698

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117328	Fluoride	0.482	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P370677

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2117305	Organic Carbon	1.07	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: A94105
Included Lab Sample IDs: 2117283, 2117286

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A94106
Included Lab Sample IDs: 2117281, 2117284

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

Reference Method: SM 2120 B
Run ID: A94107
Included Lab Sample IDs: 2117281, 2117284

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A94120
Included Lab Sample IDs: 2117282, 2117285

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

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A94159
Included Lab Sample IDs: 2117281, 2117284

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

Reference Method: EPA 300.0 Rev. 2.1 dissolved
Run ID: A94159
Included Lab Sample IDs: 2117283, 2117286

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

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A94176
Included Lab Sample IDs: 2117289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	101	P/P	90 - 110
Calcium	102	100	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Magnesium	104	103	P/P	90 - 110
Potassium	102	103	P/P	90 - 110
Sodium	104	105	P/P	90 - 110
Zinc	99.6	98.3	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A94202
Included Lab Sample IDs: 2117282, 2117285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	100	97.9	P/P	90 - 110
Total-P	100	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A94214
Included Lab Sample IDs: 2117282, 2117285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	98.0	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A94219
Included Lab Sample IDs: 2117282, 2117285

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

Reference Method: SM 2320 B-97
Run ID: A94232
Included Lab Sample IDs: 2117281, 2117284

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	105	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A94232
Included Lab Sample IDs: 2117281, 2117284

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	101	99.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A94277
Included Lab Sample IDs: 2117282, 2117285

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	100	96.9	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A94323
Included Lab Sample IDs: 2117289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	102	P/P	90 - 110
Antimony	97.5	96.5	P/P	90 - 110
Arsenic	103	101	P/P	90 - 110
Cadmium	101	101	P/P	90 - 110
Copper	103	102	P/P	90 - 110
Lead	104	105	P/P	90 - 110
Nickel	102	102	P/P	90 - 110
Selenium	99.4	99.3	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A94323
Included Lab Sample IDs: 2117289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Thallium	95.0	94.8	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A94342
Included Lab Sample IDs: 2117289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Boron	93.4	94.6	P/P	90 - 110
Chromium	91.0	91.3	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A94372
Included Lab Sample IDs: 2117289

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	101	101	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						5.92	
EPA 200.7 Rev. 4.4	Barium	101	101	101	100			0.516
	Calcium	108	106	108	92.0			1.66
	Iron	106	104	107	108			2.12
	Magnesium	111	109	111	94.6			1.66
	Potassium	109	114	116	96.7			1.48
	Sodium	112	105	106	96.9			0.624
	Zinc	99.5	99.4	99.2	98.9			0.219
EPA 200.8 Rev. 5.4	Aluminum	103	102	103	102			0.911
	Antimony	101	100	99.9	102			0.429
	Arsenic	105	103	103	104			0.0093
	Boron	94.7	95.2	94.8	95.8			0.377
	Cadmium	100	102	101	103			1.12
	Chromium	105	89.9	106	102			4.28
	Copper	103	104	104	101			0.277
	Lead	104	104	105	107			0.367
	Nickel	102	102	102	102			0.250
	Selenium	102	102	102	99.9			0.300
	Silver	106	107	104	108			3.01
	Thallium	101	100	101	105			0.793
EPA 300.0 Rev. 2.1	Chloride	100	101	103	101			1.10
EPA 300.0 Rev. 2.1 dissolved	Sulfate	99.5	99.9	101			0.166	
EPA 350.1 Rev. 2.0	Ammonia-N	97.1	99.4	94.8				2.88
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	102	98.0	106				5.53
EPA 353.2 Rev. 2.0	NO2NO3-N	100	102	100				1.35
EPA 365.1 Rev. 2.0	Total-P	93.9						0.0449
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	98.4	98.8				0.406
SM 2120 B	Color (true)	101					0.660	
SM 2320 B-97	Total Alkalinity	104					0.530	
SM 2540 C-97	TDS						3.60	
SM 4500 F-C-97	Fluoride	98.3	99.1	98.5				0.482
SM 5310 B-00	Organic Carbon	104	106	108				1.07

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2117281, 2117284
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2117289
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2117289
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2117281, 2117284
EPA 300.0 Rev. 2.1 dissolved / E31780	Sulfate, dissolved, in filtered, aqueous matrices	2117283, 2117286
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2117282, 2117285
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2117282, 2117285
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2117282, 2117285
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2117282, 2117285

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2117283, 2117286
SM 2120 B / E31780	True Color measured at 450 nm	2117281, 2117284
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2117281, 2117284
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2117281, 2117284
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2117281, 2117284
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2117281, 2117284
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2117282, 2117285

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	09/10/2019			09/10/2019 16:59	Samantha Davila	2117281, 2117284
EPA 200.7 Rev. 4.4	09/10/2019	09/11/2019 14:55	Elliott D. Healy	09/12/2019 15:49	Alexander Thompson	2117289
EPA 200.8 Rev. 5.4	09/10/2019	09/11/2019 14:55	Elliott D. Healy	09/18/2019 01:11	Robert K Palmer	2117289
	09/10/2019	09/11/2019 14:55	Elliott D. Healy	09/18/2019 19:51	Robert K Palmer	2117289
	09/10/2019	09/11/2019 14:55	Elliott D. Healy	09/19/2019 22:41	Robert K Palmer	2117289
EPA 300.0 Rev. 2.1	09/10/2019			09/12/2019 02:16	Jhamieka S. Greenwood	2117281
	09/10/2019			09/12/2019 02:53	Jhamieka S. Greenwood	2117284
EPA 300.0 Rev. 2.1 dissolved	09/10/2019			09/11/2019 20:49	Jhamieka S. Greenwood	2117283
	09/10/2019			09/11/2019 21:01	Jhamieka S. Greenwood	2117286
EPA 350.1 Rev. 2.0	09/10/2019			09/13/2019 11:04	Ping Hua	2117282
	09/10/2019			09/13/2019 11:06	Ping Hua	2117285
EPA 351.2 Rev. 2.0	09/10/2019	09/16/2019 14:05	Sima Feizi	09/17/2019 13:43	Julia Storbeck	2117282
	09/10/2019	09/16/2019 14:05	Sima Feizi	09/17/2019 13:45	Julia Storbeck	2117285
EPA 353.2 Rev. 2.0	09/10/2019			09/11/2019 09:16	Beverly Y. Sanders	2117282
	09/10/2019			09/11/2019 09:17	Beverly Y. Sanders	2117285
EPA 365.1 Rev. 2.0	09/10/2019	09/12/2019 13:45	Lipi Saha	09/13/2019 13:28	Rosalyn Ballman	2117282
	09/10/2019	09/12/2019 13:45	Lipi Saha	09/13/2019 13:34	Rosalyn Ballman	2117285
EPA 365.1 Rev. 2.0 dissolved	09/10/2019			09/10/2019 16:25	Jhamieka S. Greenwood	2117283
	09/10/2019			09/10/2019 16:26	Jhamieka S. Greenwood	2117286
SM 2120 B	09/10/2019			09/10/2019 17:08	Madeline Funaro	2117281, 2117284
SM 2320 B-97	09/10/2019			09/14/2019 01:47	Dale L. Simmons	2117281
	09/10/2019			09/14/2019 01:59	Dale L. Simmons	2117284
SM 2540 C-97	09/10/2019			09/13/2019 15:21	Yijie Li	2117281, 2117284
SM 2540 D-97	09/10/2019			09/13/2019 15:21	Yijie Li	2117281, 2117284
SM 4500 F-C-97	09/10/2019			09/14/2019 01:47	Dale L. Simmons	2117281
	09/10/2019			09/14/2019 01:59	Dale L. Simmons	2117284
SM 5310 B-00	09/10/2019			09/13/2019 19:08	Madeline Funaro	2117282
	09/10/2019			09/13/2019 19:20	Madeline Funaro	2117285