Chemical Analysis Report

NW-DIST-2019-06-12-01

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

Event Description: **CHOCTAWHATCHEE NORTH RUN**
Request ID: **RQ-2019-06-10-28**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
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160 Government Center
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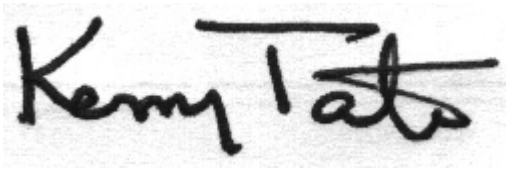
Date Certified: 08-JUL-2019 12:12



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: Choctawhatchee River South of Carlisle Lake **Collection Date/Time: 06/11/2019 10:50**

Field ID: G3NW0130 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2094531	EPA 180.1 Rev. 2.0	Turbidity	16		NTU	P365508	
	EPA 300.0 Rev. 2.1	Chloride	4.8		mg Cl/L	P365709	
		Sulfate	2.9		mg SO4/L	P365713	
	SM 2120 B	Color (true)	32	A	PCU	P365543	
	SM 2320 B-97	Total Alkalinity	48		mg CaCO3/L	P366007	
	SM 2540 C-97	TDS	69		mg/L	P365853	
	SM 2540 D-97	TSS	22		mg/L	P365841	
	SM 4500 F-C-97	Fluoride	0.049	I	mg F/L	P366010	
2094534	EPA 350.1 Rev. 2.0	Ammonia-N	0.039		mg N/L	P365766	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P366476	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.54		mg N/L	P365754	
	EPA 365.1 Rev. 2.0	Total-P	0.052		mg P/L	P365685	
	SM 5310 B-00	Organic Carbon	3.3		mg C/L	P365741	
2094537	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P365513	
2094546	EPA 200.7 Rev. 4.4	Barium	26.1		ug/L	P365602	
		Calcium	16.7		mg/L	P365602	
		Iron	1.21E+03		ug/L	P365602	
		Magnesium	2.86		mg/L	P365602	
		Potassium	1.2	I	mg/L	P365602	
		Sodium	3.9		mg/L	P365602	
		Zinc	5.0	U	ug/L	P365602	
	EPA 200.8 Rev. 5.4	Aluminum	533		ug/L	P365602	
		Antimony	0.050	U	ug/L	P365602	
		Arsenic	0.68		ug/L	P365602	
		Boron**	13.0		ug/L	P365602	
		Cadmium	0.020	U	ug/L	P365602	
		Chromium	1.2	I	ug/L	P365602	
		Copper	0.40	U	ug/L	P365602	
		Lead	0.46		ug/L	P365602	
		Nickel	0.51	I	ug/L	P365602	
		Selenium	0.20	U	ug/L	P365602	
		Silver	0.010	U	ug/L	P365602	
		Thallium	0.10	U	ug/L	P365602	

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: SISTER RIVER MOUTH **Collection Date/Time: 06/11/2019 12:10**

Field ID: G3NW0154 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2094532	EPA 180.1 Rev. 2.0	Turbidity	4.4		NTU	P365508	
	EPA 300.0 Rev. 2.1	Chloride	5.3		mg Cl/L	P365709	
		Sulfate	3.6		mg SO4/L	P365713	
	SM 2120 B	Color (true)	130		PCU	P365548	
	SM 2320 B-97	Total Alkalinity	20		mg CaCO3/L	P366007	
	SM 2540 C-97	TDS	59		mg/L	P365853	
	SM 2540 D-97	TSS	5	I	mg/L	P365841	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P366010	
2094535	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P365766	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.50		mg N/L	P366476	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.054		mg N/L	P365755	
	EPA 365.1 Rev. 2.0	Total-P	0.023		mg P/L	P365685	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P365741	
2094538	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P365513	
2094547	EPA 200.7 Rev. 4.4	Barium	14.8		ug/L	P365602	
		Calcium	8.43		mg/L	P365602	
		Iron	780		ug/L	P365602	
		Magnesium	1.51		mg/L	P365602	
		Potassium	0.72	I	mg/L	P365602	
		Sodium	3.6		mg/L	P365602	
		Zinc	5.0	U	ug/L	P365602	
	EPA 200.8 Rev. 5.4	Aluminum	224		ug/L	P365602	
		Antimony	0.050	U	ug/L	P365602	
		Arsenic	0.55		ug/L	P365602	
		Boron**	14.7		ug/L	P365602	
		Cadmium	0.020	U	ug/L	P365602	
		Chromium	0.49	I	ug/L	P365602	
		Copper	0.40	U	ug/L	P365602	
		Lead	0.21	I	ug/L	P365602	
		Nickel	0.50	U	ug/L	P365602	
		Selenium	0.20	U	ug/L	P365602	
		Silver	0.010	U	ug/L	P365602	
		Thallium	0.10	U	ug/L	P365602	

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: Choctawhatchee River upstream of Holmes Creek **Collection Date/Time: 06/11/2019 13:30**

Field ID: G3NW0129 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2094533	EPA 180.1 Rev. 2.0	Turbidity	13		NTU	P365508	
	EPA 300.0 Rev. 2.1	Chloride	4.2		mg Cl/L	P365709	
		Sulfate	4.3		mg SO4/L	P365713	
	SM 2120 B	Color (true)	62		PCU	P365543	
	SM 2320 B-97	Total Alkalinity	29		mg CaCO3/L	P366007	
	SM 2540 C-97	TDS	58		mg/L	P365853	
	SM 2540 D-97	TSS	14		mg/L	P365841	
	SM 4500 F-C-97	Fluoride	0.035	I	mg F/L	P366010	
2094536	EPA 350.1 Rev. 2.0	Ammonia-N	0.047		mg N/L	P365766	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P366476	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.30		mg N/L	P365755	
	EPA 365.1 Rev. 2.0	Total-P	0.037		mg P/L	P365685	
	SM 5310 B-00	Organic Carbon	5.9		mg C/L	P365741	
2094539	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.006	I	mg P/L	P365513	
2094548	EPA 200.7 Rev. 4.4	Barium	22.3		ug/L	P365602	
		Calcium	10.9		mg/L	P365602	
		Iron	900		ug/L	P365602	
		Magnesium	1.92		mg/L	P365602	
		Potassium	0.86	I	mg/L	P365602	
		Sodium	3.1		mg/L	P365602	
		Zinc	5.0	U	ug/L	P365602	
	EPA 200.8 Rev. 5.4	Aluminum	375		ug/L	P365602	
		Antimony	0.050	U	ug/L	P365602	
		Arsenic	0.51		ug/L	P365602	
		Boron**	11.7		ug/L	P365602	
		Cadmium	0.020	U	ug/L	P365602	
		Chromium	0.83	I	ug/L	P365602	
		Copper	0.40	U	ug/L	P365602	
		Lead	0.33	I	ug/L	P365602	
		Nickel	0.50	U	ug/L	P365602	
		Selenium	0.20	U	ug/L	P365602	
		Silver	0.010	U	ug/L	P365602	
		Thallium	0.10	U	ug/L	P365602	

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365508

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365602

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: P365602

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: P365709

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365713

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365766

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: P366476

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365754

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365755

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365685

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365513

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

Reference Method: SM 2120 B
Batch ID: P365543

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P365548

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P366007

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

Reference Method: SM 2540 C-97
Batch ID: P365853

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P365841

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P366010

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P365741

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: P365602

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	100		P	85 - 115
Calcium	102		P	85 - 115
Iron	104		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	104		P	85 - 115
Sodium	106		P	85 - 115
Zinc	94.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365602

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	98.0		P	85 - 115
Antimony	98.2		P	85 - 115
Arsenic	101		P	85 - 115
Boron	98.7		P	85 - 115
Cadmium	99.5		P	85 - 115
Chromium	97.5		P	85 - 115
Copper	98.1		P	85 - 115
Lead	93.2		P	85 - 115
Nickel	99.7		P	85 - 115
Selenium	99.2		P	85 - 115
Silver	98.4		P	85 - 115
Thallium	100		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365709

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	92.7		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365713

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	93.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365766

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366476

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	108		P	90 - 110

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365754

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	103		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365755

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: P365685

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365513

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	97.5		P	90 - 110

Reference Method: SM 2120 B
Batch ID: P365543

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	98.6		P	85 - 115

Reference Method: SM 2120 B
Batch ID: P365548

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Color (true)	99.2		P	85 - 115

Reference Method: SM 2320 B-97
Batch ID: P366007

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P366010

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.5		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P365741

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365602

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094589	Barium	100		P	80 - 120
2094589	Calcium	106		P	80 - 120
2094589	Iron	103		P	80 - 120
2094589	Magnesium	105		P	80 - 120
2094589	Potassium	105		P	80 - 120
2094589	Sodium	108		P	80 - 120
2094589	Zinc	95.5		P	80 - 120
2094637	Barium	99.8	99.2	P/P	80 - 120
2094637	Calcium	103		P	80 - 120
2094637	Iron	105	104	P/P	80 - 120
2094637	Magnesium	103	100	P/P	80 - 120
2094637	Potassium	104		P	80 - 120
2094637	Sodium	107		P	80 - 120
2094637	Zinc	96.9	94.9	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365602

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094589	Aluminum	98.6		P	80 - 120
2094589	Antimony	98.7		P	80 - 120
2094589	Arsenic	102		P	80 - 120
2094589	Boron	99.8		P	80 - 120
2094589	Cadmium	99.5		P	80 - 120
2094589	Chromium	101		P	80 - 120
2094589	Copper	101		P	80 - 120
2094589	Lead	94.4		P	80 - 120
2094589	Nickel	101		P	80 - 120
2094589	Selenium	100		P	80 - 120
2094589	Silver	98.9		P	80 - 120
2094589	Thallium	102		P	80 - 120
2094637	Aluminum	99.2	96.4	P/P	80 - 120
2094637	Antimony	101	99.0	P/P	80 - 120
2094637	Arsenic	102	100	P/P	80 - 120
2094637	Boron	100	97.1	P/P	80 - 120
2094637	Cadmium	102	99.8	P/P	80 - 120
2094637	Chromium	101	98.3	P/P	80 - 120
2094637	Copper	101	98.3	P/P	80 - 120
2094637	Lead	96.5	94.1	P/P	80 - 120
2094637	Nickel	101	98.6	P/P	80 - 120
2094637	Selenium	98.7	97.5	P/P	80 - 120
2094637	Silver	101	99.9	P/P	80 - 120
2094637	Thallium	105	103	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365709

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094491	Chloride	102		P	90 - 110
2094569	Chloride	103		P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365713

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094491	Sulfate	102		P	90 - 110
2094569	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365766

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094536	Ammonia-N	102	104	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366476

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094498	Kjeldahl Nitrogen	109	110	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365754

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094501	NO2NO3-N	100	102	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365755

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094535	NO2NO3-N	101	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365685

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094502	Total-P	102	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365513

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094539	O-Phosphate-P	95.3	96.2	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P366010

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094495	Fluoride	99.5	98.8	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P365741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2094497	Organic Carbon	102	102	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P365508

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094494	Turbidity	2.17	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P365602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094637	Barium	0.634	Spike	P	0 - 20
2094637	Calcium	0.940	Spike	P	0 - 20
2094637	Iron	1.20	Spike	P	0 - 20
2094637	Magnesium	1.10	Spike	P	0 - 20
2094637	Potassium	1.18	Spike	P	0 - 20
2094637	Sodium	0.602	Spike	P	0 - 20
2094637	Zinc	2.06	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P365602

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094637	Aluminum	2.78	Spike	P	0 - 20
2094637	Antimony	2.46	Spike	P	0 - 20
2094637	Arsenic	2.42	Spike	P	0 - 20
2094637	Boron	2.44	Spike	P	0 - 20
2094637	Cadmium	2.62	Spike	P	0 - 20
2094637	Chromium	2.90	Spike	P	0 - 20
2094637	Copper	2.86	Spike	P	0 - 20
2094637	Lead	2.55	Spike	P	0 - 20
2094637	Nickel	2.54	Spike	P	0 - 20
2094637	Selenium	1.30	Spike	P	0 - 20
2094637	Silver	0.684	Spike	P	0 - 20
2094637	Thallium	1.96	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365709

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094491	Chloride	0.0914	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P365713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094491	Sulfate	0.212	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P365766

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094536	Ammonia-N	0.951	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P366476

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094498	Kjeldahl Nitrogen	1.26	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365754

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094501	NO2NO3-N	1.48	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P365755

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094535	NO2NO3-N	0.781	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P365685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094502	Total-P	1.88	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P365513

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094539	O-Phosphate-P	0.883	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P365543

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094531	Color (true)	0.205	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P365548

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094494	Color (true)	0.887	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P366007

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094495	Total Alkalinity	0.644	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P365853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094495	TDS	7.12	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P366010

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094495	Fluoride	0.470	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P365741

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2094497	Organic Carbon	0.0981	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 300.0 Rev. 2.1
Run ID: A92026
Included Lab Sample IDs: 2094531, 2094532, 2094533

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	103	103	P/P	90 - 110
Sulfate	104	104	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A92052
Included Lab Sample IDs: 2094531, 2094532, 2094533

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	98.5	98.0	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A92053
Included Lab Sample IDs: 2094537, 2094538, 2094539

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.8	99.5	P/P	90 - 110
O-Phosphate-P	99.5	93.5	P/P	90 - 110
O-Phosphate-P	99.8	99.7	P/P	90 - 110

Reference Method: SM 2120 B
Run ID: A92065
Included Lab Sample IDs: 2094531, 2094533

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	99.4	99.1	P/P	90 - 115

Reference Method: SM 2120 B
Run ID: A92068
Included Lab Sample IDs: 2094532

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	98.8	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A92126
Included Lab Sample IDs: 2094546, 2094547, 2094548

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	100	101	P/P	90 - 110
Calcium	102	102	P/P	90 - 110
Iron	102	102	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	104	104	P/P	90 - 110
Sodium	106	105	P/P	90 - 110
Zinc	97.6	97.6	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A92136
Included Lab Sample IDs: 2094534, 2094535, 2094536

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

Quality Assurance Report
Calibration Verification

Reference Method: SM 5310 B-00
Run ID: A92136
Included Lab Sample IDs: 2094534, 2094535, 2094536

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A92141
Included Lab Sample IDs: 2094534, 2094535, 2094536

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	102	103	P/P	90 - 110
NO2NO3-N	103	100	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A92142
Included Lab Sample IDs: 2094534, 2094535, 2094536

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A92150
Included Lab Sample IDs: 2094534

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A92151
Included Lab Sample IDs: 2094535, 2094536

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	98.5	99.5	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A92153
Included Lab Sample IDs: 2094546, 2094547, 2094548

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.6	98.1	P/P	90 - 110
Antimony	96.3	97.3	P/P	90 - 110
Arsenic	102	101	P/P	90 - 110
Boron	99.8	99.2	P/P	90 - 110
Cadmium	99.0	99.5	P/P	90 - 110
Chromium	97.8	101	P/P	90 - 110
Copper	100	100	P/P	90 - 110
Lead	93.7	95.3	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Selenium	99.1	100	P/P	90 - 110
Silver	97.3	97.4	P/P	90 - 110
Thallium	95.4	96.9	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A92190
Included Lab Sample IDs: 2094546, 2094547, 2094548

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.5	99.2	P/P	90 - 110
Nickel	96.4	98.9	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A92228
Included Lab Sample IDs: 2094531, 2094532, 2094533

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

Reference Method: SM 4500 F-C-97
Run ID: A92228
Included Lab Sample IDs: 2094531, 2094532, 2094533

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A92264
Included Lab Sample IDs: 2094546

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A92486
Included Lab Sample IDs: 2094534, 2094535, 2094536

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.3	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						2.17	
EPA 200.7 Rev. 4.4	Barium	100	100	99.8	99.2			0.634
	Calcium	102	106	103				0.940
	Iron	104	103	105	104			1.20
	Magnesium	106	105	103	100			1.10
	Potassium	104	105	104				1.18
	Sodium	106	108	107				0.602
	Zinc	94.3	95.5	96.9	94.9			2.06
EPA 200.8 Rev. 5.4	Aluminum	98.0	98.6	99.2	96.4			2.78
	Antimony	98.2	98.7	101	99.0			2.46
	Arsenic	101	102	102	100			2.42
	Boron	98.7	99.8	100	97.1			2.44
	Cadmium	99.5	99.5	102	99.8			2.62
	Chromium	97.5	101	101	98.3			2.90
	Copper	98.1	101	101	98.3			2.86
	Lead	93.2	94.4	96.5	94.1			2.55
	Nickel	99.7	101	101	98.6			2.54
	Selenium	99.2	100	98.7	97.5			1.30
	Silver	98.4	98.9	101	99.9			0.684
	Thallium	100	102	105	103			1.96
EPA 300.0 Rev. 2.1	Chloride	92.7	102	103			0.0914	
	Sulfate	93.5	102	103			0.212	
EPA 350.1 Rev. 2.0	Ammonia-N	103	102	104				0.951
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	108	109	110				1.26
EPA 353.2 Rev. 2.0	NO2NO3-N	103	100	102				1.48
	NO2NO3-N	104	101	102				0.781
EPA 365.1 Rev. 2.0	Total-P	102	102	105				1.88
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	97.5	95.3	96.2				0.883
SM 2120 B	Color (true)	98.6					0.205	
	Color (true)	99.2					0.887	
SM 2320 B-97	Total Alkalinity	102					0.644	
SM 2540 C-97	TDS						7.12	
SM 4500 F-C-97	Fluoride	97.5	99.5	98.8				0.470
SM 5310 B-00	Organic Carbon	102	102	102				0.0981

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2094531, 2094532, 2094533
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2094546, 2094547, 2094548
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2094546, 2094547, 2094548
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2094531, 2094532, 2094533
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2094531, 2094532, 2094533
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2094534, 2094535, 2094536
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2094534, 2094535, 2094536
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2094534, 2094535, 2094536

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2094534, 2094535, 2094536
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2094537, 2094538, 2094539
SM 2120 B / E31780	True Color measured at 450 nm	2094531, 2094532, 2094533
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2094531, 2094532, 2094533
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2094531, 2094532, 2094533
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2094531, 2094532, 2094533
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2094531, 2094532, 2094533
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2094534, 2094535, 2094536

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	06/12/2019			06/12/2019 17:23	Julia Storbeck	2094531, 2094532, 2094533
EPA 200.7 Rev. 4.4	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/14/2019 18:12	Betina Topolski	2094546
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/14/2019 18:20	Betina Topolski	2094547
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/14/2019 18:27	Betina Topolski	2094548
EPA 200.8 Rev. 5.4	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/17/2019 18:32	Robert K Palmer	2094546
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/17/2019 18:42	Robert K Palmer	2094547
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/17/2019 18:51	Robert K Palmer	2094548
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/18/2019 22:28	Robert K Palmer	2094546
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/18/2019 22:38	Robert K Palmer	2094547
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/18/2019 22:48	Robert K Palmer	2094548
	06/12/2019	06/13/2019 16:20	Elliott D. Healy	06/21/2019 08:03	Robert K Palmer	2094546
EPA 300.0 Rev. 2.1	06/12/2019			06/15/2019 04:50	Lipi Saha	2094531
	06/12/2019			06/15/2019 05:02	Lipi Saha	2094532
	06/12/2019			06/15/2019 05:14	Lipi Saha	2094533
EPA 350.1 Rev. 2.0	06/12/2019			06/14/2019 17:14	Ping Hua	2094536
	06/12/2019			06/14/2019 17:30	Ping Hua	2094534
	06/12/2019			06/14/2019 17:32	Ping Hua	2094535
EPA 351.2 Rev. 2.0	06/12/2019	06/28/2019 12:45	Adrian Shelby	07/01/2019 14:23	Joseph Suarez	2094534
	06/12/2019	06/28/2019 12:45	Adrian Shelby	07/01/2019 14:25	Joseph Suarez	2094535
	06/12/2019	06/28/2019 12:45	Adrian Shelby	07/01/2019 14:26	Joseph Suarez	2094536
EPA 353.2 Rev. 2.0	06/12/2019			06/17/2019 10:49	Beverly Y. Sanders	2094534
	06/12/2019			06/17/2019 10:56	Beverly Y. Sanders	2094535
	06/12/2019			06/17/2019 11:02	Beverly Y. Sanders	2094536
EPA 365.1 Rev. 2.0	06/12/2019	06/14/2019 12:55	Sima Feizi	06/17/2019 13:48	Julia Storbeck	2094534
	06/12/2019	06/14/2019 12:55	Sima Feizi	06/17/2019 18:32	Julia Storbeck	2094535
	06/12/2019	06/14/2019 12:55	Sima Feizi	06/17/2019 18:33	Julia Storbeck	2094536
EPA 365.1 Rev. 2.0 dissolved	06/12/2019			06/12/2019 16:08	Jhamieka S. Greenwood	2094539
	06/12/2019			06/12/2019 16:52	Jhamieka S. Greenwood	2094537
	06/12/2019			06/12/2019 16:59	Jhamieka S. Greenwood	2094538
SM 2120 B	06/12/2019			06/12/2019 15:56	Mariam Hanna	2094531
	06/12/2019			06/12/2019 15:58	Mariam Hanna	2094533
	06/12/2019			06/12/2019 17:51	Mariam Hanna	2094532
SM 2320 B-97	06/12/2019			06/18/2019 23:19	Dale L. Simmons	2094531
	06/12/2019			06/18/2019 23:31	Dale L. Simmons	2094532
	06/12/2019			06/18/2019 23:43	Dale L. Simmons	2094533
SM 2540 C-97	06/12/2019			06/13/2019 15:55	Yijie Li	2094531, 2094532, 2094533
SM 2540 D-97	06/12/2019			06/13/2019 15:55	Yijie Li	2094531, 2094532, 2094533
SM 4500 F-C-97	06/12/2019			06/18/2019 23:19	Dale L. Simmons	2094531
	06/12/2019			06/18/2019 23:31	Dale L. Simmons	2094532
	06/12/2019			06/18/2019 23:43	Dale L. Simmons	2094533

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
SM 5310 B-00	06/12/2019			06/14/2019 04:05	Madeline Funaro	2094534
	06/12/2019			06/14/2019 04:18	Madeline Funaro	2094535
	06/12/2019			06/14/2019 04:54	Madeline Funaro	2094536