Chemical Analysis Report

TLH-ROC-2019-04-09-02

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

Event Description: **Run 4**
Request ID: **RQ-2018-12-31-31**
Customer: **TLH-ROC**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
2600 Blair Stone Rd
Tallahassee, FL 32399
Attn: Michael Eckles

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator

Date Certified: 25-APR-2019 14:23

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: BROTHERS RIVER @ MOUTH **Collection Date/Time: 04/09/2019 10:50**

Field ID: G2TLHR0013 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2076783	EPA 180.1 Rev. 2.0	Turbidity	8.4		NTU	P361922	
	EPA 300.0 Rev. 2.1	Chloride	4.9		mg Cl/L	P362268	
		Sulfate	4.6		mg SO4/L	P362271	
	SM 2120 B	Color (true)	32		PCU	P361954	
	SM 2320 B-97	Total Alkalinity	40		mg CaCO3/L	P362174	RPD
	SM 2540 C-97	TDS	75		mg/L	P362517	
	SM 2540 D-97	TSS	7	I	mg/L	P362234	
	SM 4500 F-C-97	Fluoride	0.058	I	mg F/L	P362180	
2076785	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P362289	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.31		mg N/L	P362339	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.51		mg N/L	P362333	
	EPA 365.1 Rev. 2.0	Total-P	0.032		mg P/L	P362245	
	SM 5310 B-00	Organic Carbon	3.4		mg C/L	P362106	
2076787	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P361840	
2076791	EPA 200.7 Rev. 4.4	Barium	21.9		ug/L	P361914	
		Calcium	17.1		mg/L	P361914	
		Iron	870		ug/L	P362361	
		Magnesium	1.90		mg/L	P361914	
		Potassium	1.4		mg/L	P361914	
		Sodium	4.6		mg/L	P361914	
		Zinc	5.0	U	ug/L	P361914	
	EPA 200.8 Rev. 5.4	Aluminum	288		ug/L	P361914	
		Antimony	0.050	U	ug/L	P361914	
		Arsenic	0.44		ug/L	P361914	
		Boron**	14.6		ug/L	P361914	
		Cadmium	0.020	U	ug/L	P361914	
		Chromium	0.45	I	ug/L	P361914	
		Copper	0.66	I	ug/L	P361914	
		Lead	0.26	I	ug/L	P361914	
		Nickel	0.50	U	ug/L	P361914	
		Selenium	0.20	U	ug/L	P361914	
		Silver	0.010	U	ug/L	P361914	
		Thallium	0.10	U	ug/L	P361914	

Sample Location: APALACHICOLA RIVER 0.8 MILES UPSTREAM OWL CREEK **Collection Date/Time: 04/09/2019 12:00**

Field ID: G2TLHR0042 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2076784	EPA 180.1 Rev. 2.0	Turbidity	11	A	NTU	P361922	
	EPA 300.0 Rev. 2.1	Chloride	4.9		mg Cl/L	P362268	
		Sulfate	4.6		mg SO4/L	P362271	
	SM 2120 B	Color (true)	28	A	PCU	P361954	
	SM 2320 B-97	Total Alkalinity	39		mg CaCO3/L	P362174	RPD
	SM 2540 C-97	TDS	74		mg/L	P362517	
	SM 2540 D-97	TSS	11		mg/L	P362234	
	SM 4500 F-C-97	Fluoride	0.057	I	mg F/L	P362180	
2076786	EPA 350.1 Rev. 2.0	Ammonia-N	0.024		mg N/L	P362290	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.33		mg N/L	P362339	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.64		mg N/L	P362333	
	EPA 365.1 Rev. 2.0	Total-P	0.036		mg P/L	P362245	
	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P362106	
2076788	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	I	mg P/L	P361840	
2076792	EPA 200.7 Rev. 4.4	Barium	22.7		ug/L	P361914	
		Calcium	17.1		mg/L	P361914	
		Iron	920		ug/L	P361914	
		Magnesium	1.93		mg/L	P361914	
		Potassium	1.4		mg/L	P361914	
		Sodium	4.6		mg/L	P361914	
		Zinc	5.0	U	ug/L	P361914	
	EPA 200.8 Rev. 5.4	Aluminum	634		ug/L	P361914	
		Antimony	0.050	U	ug/L	P361914	
		Arsenic	0.45		ug/L	P361914	
		Boron**	13.7		ug/L	P361914	
		Cadmium	0.020	U	ug/L	P361914	
		Chromium	0.77	I	ug/L	P361914	
		Copper	0.80		ug/L	P361914	
		Lead	0.43		ug/L	P361914	
		Nickel	0.50	U	ug/L	P361914	
		Selenium	0.20	U	ug/L	P361914	
		Silver	0.010	U	ug/L	P361914	
		Thallium	0.10	U	ug/L	P361914	

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P361922

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P361914

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 200.7 Rev. 4.4
Batch ID: P362361

Component	Result	Code	Units
Iron	30	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P361914

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: P362268

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362271

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362289

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362290

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362339

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362333

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362245

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361840

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

Reference Method: SM 2120 B
Batch ID: P361954

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P362174

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

Reference Method: SM 2540 C-97
Batch ID: P362517

Component	Result	Code	Units
TDS	15	U	mg/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 D-97
Batch ID: P362234

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P362180

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P362106

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: P361914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.5		P	85 - 115
Calcium	100		P	85 - 115
Iron	102		P	85 - 115
Magnesium	99.1		P	85 - 115
Potassium	97.3		P	85 - 115
Sodium	96.6		P	85 - 115
Zinc	98.8		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362361

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Iron	105		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P361914

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	97.7		P	85 - 115
Arsenic	106		P	85 - 115
Boron	103		P	85 - 115
Cadmium	102		P	85 - 115
Chromium	92.2		P	85 - 115
Copper	105		P	85 - 115
Lead	100		P	85 - 115
Nickel	105		P	85 - 115
Selenium	101		P	85 - 115
Silver	98.7		P	85 - 115
Thallium	103		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362268

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362271

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362289

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362290

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362339

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362333

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: P362245

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361840

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

Reference Method: SM 2120 B
Batch ID: P361954

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

Reference Method: SM 2320 B-97
Batch ID: P362174

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P362180

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	102		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P362106

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.7		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P361914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076733	Barium	97.7	98.1	P/P	80 - 120
2076733	Calcium	97.7		P	80 - 120
2076733	Iron	103	102	P/P	80 - 120
2076733	Magnesium	98.1		P	80 - 120
2076733	Potassium	96.9	97.7	P/P	80 - 120
2076733	Sodium	98.7		P	80 - 120
2076733	Zinc	95.3	95.8	P/P	80 - 120
2076791	Barium	98.7		P	80 - 120
2076791	Calcium	101		P	80 - 120
2076791	Iron	106		P	80 - 120
2076791	Magnesium	102		P	80 - 120
2076791	Potassium	98.4		P	80 - 120
2076791	Sodium	102		P	80 - 120
2076791	Zinc	97.0		P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362361

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2078334	Iron	106		P	80 - 120
2078485	Iron	108	109	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P361914

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076733	Aluminum	95.6	95.7	P/P	80 - 120
2076733	Antimony	98.6	98.4	P/P	80 - 120
2076733	Arsenic	106	105	P/P	80 - 120
2076733	Boron	102	101	P/P	80 - 120
2076733	Cadmium	102	102	P/P	80 - 120
2076733	Chromium	89.6	89.4	P/P	80 - 120
2076733	Copper	99.2	99.7	P/P	80 - 120
2076733	Lead	99.4	99.4	P/P	80 - 120
2076733	Nickel	100	101	P/P	80 - 120
2076733	Selenium	101	100	P/P	80 - 120
2076733	Silver	96.4	96.9	P/P	80 - 120
2076733	Thallium	105	105	P/P	80 - 120
2076791	Aluminum	107		P	80 - 120
2076791	Antimony	95.4		P	80 - 120
2076791	Arsenic	103		P	80 - 120
2076791	Boron	99.9		P	80 - 120
2076791	Cadmium	100		P	80 - 120
2076791	Chromium	88.8		P	80 - 120
2076791	Copper	110		P	80 - 120
2076791	Lead	99.2		P	80 - 120
2076791	Nickel	103		P	80 - 120
2076791	Selenium	99.0		P	80 - 120
2076791	Silver	96.0		P	80 - 120
2076791	Thallium	102		P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076615	Chloride	104		P	90 - 110
2076713	Chloride	102		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362271

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076615	Sulfate	104		P	90 - 110
2076713	Sulfate	101		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362289

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076755	Ammonia-N	99.4	102	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362290

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076905	Ammonia-N	98.2	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362339

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076777	Kjeldahl Nitrogen	105	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362333

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076777	NO2NO3-N	98.5	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362245

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076882	Total-P	106	99.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361840

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076649	O-Phosphate-P	96.9	98.5	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P362180

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076647	Fluoride	103	102	P/P	89 - 106

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: SM 5310 B-00
Batch ID: P362106

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2076755	Organic Carbon	102	102	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P361922

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076784	Turbidity	1.79	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P361914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076733	Barium	0.398	Spike	P	0 - 20
2076733	Calcium	1.14	Spike	P	0 - 20
2076733	Iron	0.424	Spike	P	0 - 20
2076733	Magnesium	0.861	Spike	P	0 - 20
2076733	Potassium	0.677	Spike	P	0 - 20
2076733	Sodium	1.25	Spike	P	0 - 20
2076733	Zinc	0.529	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362361

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2078485	Iron	0.875	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P361914

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076733	Aluminum	0.131	Spike	P	0 - 20
2076733	Antimony	0.141	Spike	P	0 - 20
2076733	Arsenic	0.518	Spike	P	0 - 20
2076733	Boron	0.370	Spike	P	0 - 20
2076733	Cadmium	0.180	Spike	P	0 - 20
2076733	Chromium	0.241	Spike	P	0 - 20
2076733	Copper	0.513	Spike	P	0 - 20
2076733	Lead	0.0531	Spike	P	0 - 20
2076733	Nickel	0.524	Spike	P	0 - 20
2076733	Selenium	0.554	Spike	P	0 - 20
2076733	Silver	0.513	Spike	P	0 - 20
2076733	Thallium	0.279	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076615	Chloride	0.448	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362271

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076615	Sulfate	0.775	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362289

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076755	Ammonia-N	2.41	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362290

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076905	Ammonia-N	2.82	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362339

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076777	Kjeldahl Nitrogen	3.09	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362333

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076777	NO2NO3-N	0.259	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362245

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076882	Total-P	5.44	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P361840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076649	O-Phosphate-P	1.64	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P361954

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076784	Color (true)	1.64	Sample	P	0 - 20

Quality Assurance Report
Precision

Reference Method: SM 2320 B-97
Batch ID: P362174

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076647	Total Alkalinity	10.1	Sample	F	0 - 2.8

Reference Method: SM 2540 C-97
Batch ID: P362517

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076901	TDS	2.71	Sample	P	0 - 10

Reference Method: SM 2540 D-97
Batch ID: P362234

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076901	TSS	5.71	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P362180

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076647	Fluoride	0.509	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
Batch ID: P362106

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2076755	Organic Carbon	0.197	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: A90555
Included Lab Sample IDs: 2076787, 2076788

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	97.0	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A90588
Included Lab Sample IDs: 2076783, 2076784

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.5	98.5	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A90600
Included Lab Sample IDs: 2076783, 2076784

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	102	P/P	90 - 115

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A90641
Included Lab Sample IDs: 2076791, 2076792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	101	102	P/P	90 - 110
Calcium	99.6	102	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Potassium	98.3	100	P/P	90 - 110
Sodium	99.9	102	P/P	90 - 110
Zinc	100	101	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90651
Included Lab Sample IDs: 2076791, 2076792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	96.5	93.9	P/P	90 - 110
Aluminum	96.6	96.5	P/P	90 - 110
Antimony	96.6	96.7	P/P	90 - 110
Antimony	96.7	98.9	P/P	90 - 110
Arsenic	101	100	P/P	90 - 110
Arsenic	103	101	P/P	90 - 110
Boron	98.0	98.2	P/P	90 - 110
Boron	98.2	96.1	P/P	90 - 110
Cadmium	97.4	97.7	P/P	90 - 110
Cadmium	97.7	98.9	P/P	90 - 110
Copper	102	99.8	P/P	90 - 110
Copper	105	102	P/P	90 - 110
Lead	97.4	98.1	P/P	90 - 110
Lead	98.4	97.4	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Nickel	103	101	P/P	90 - 110
Selenium	98.0	95.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90651
Included Lab Sample IDs: 2076791, 2076792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	96.5	96.6	P/P	90 - 110
Silver	96.6	96.3	P/P	90 - 110
Thallium	97.7	97.9	P/P	90 - 110
Thallium	97.9	97.6	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90693
Included Lab Sample IDs: 2076791, 2076792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	92.5	90.2	P/P	90 - 110
Chromium	94.8	92.5	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A90701
Included Lab Sample IDs: 2076785, 2076786

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	100	99.0	P/P	90 - 110
Organic Carbon	99.0	101	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A90703
Included Lab Sample IDs: 2076783, 2076784

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	97.7	102	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A90703
Included Lab Sample IDs: 2076783, 2076784

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A90731
Included Lab Sample IDs: 2076792

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Selenium	98.4	99.3	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A90760
Included Lab Sample IDs: 2076783, 2076784

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A90764
Included Lab Sample IDs: 2076785, 2076786

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A90779
Included Lab Sample IDs: 2076785, 2076786

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.0	98.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A90798
Included Lab Sample IDs: 2076785, 2076786

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

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A90817
Included Lab Sample IDs: 2076785, 2076786

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	99.1	98.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A90895
Included Lab Sample IDs: 2076791

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

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

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision		
						LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity						1.79	
EPA 200.7 Rev. 4.4	Barium	99.5	97.7	98.1	98.7			0.398
	Calcium	100	97.7	101				1.14
	Iron	102	103	102	106			0.424
	Iron	105	106	108	109			0.875
	Magnesium	99.1	98.1	102				0.861
	Potassium	97.3	96.9	97.7	98.4			0.677
	Sodium	96.6	98.7	102				1.25
	Zinc	98.8	95.3	95.8	97.0			0.529
EPA 200.8 Rev. 5.4	Aluminum	101	95.6	95.7	107			0.131
	Antimony	97.7	98.6	98.4	95.4			0.141
	Arsenic	106	106	105	103			0.518
	Boron	103	102	101	99.9			0.370
	Cadmium	102	102	102	100			0.180
	Chromium	92.2	89.6	89.4	88.8			0.241
	Copper	105	99.2	99.7	110			0.513
	Lead	100	99.4	99.4	99.2			0.0531
	Nickel	105	100	101	103			0.524
	Selenium	101	101	100	99.0			0.554
	Silver	98.7	96.4	96.9	96.0			0.513
	Thallium	103	105	105	102			0.279
EPA 300.0 Rev. 2.1	Chloride	105	104	102			0.448	
	Sulfate	106	104	101			0.775	
EPA 350.1 Rev. 2.0	Ammonia-N	100	99.4	102				2.41
	Ammonia-N	100	98.2	101				2.82
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	105	101				3.09
EPA 353.2 Rev. 2.0	NO2NO3-N	100	98.5	99.0				0.259
EPA 365.1 Rev. 2.0	Total-P	109	106	99.7				5.44
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	96.9	98.5				1.64
SM 2120 B	Color (true)	102					1.64	
SM 2320 B-97	Total Alkalinity	101					10.1	
SM 2540 C-97	TDS						2.71	
SM 2540 D-97	TSS						5.71	
SM 4500 F-C-97	Fluoride	102	103	102				0.509
SM 5310 B-00	Organic Carbon	99.7	102	102				0.197

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2076783, 2076784
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2076791, 2076792
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2076791, 2076792
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2076783, 2076784
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2076783, 2076784
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2076785, 2076786
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2076785, 2076786
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2076785, 2076786

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	2076785, 2076786
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2076787, 2076788
SM 2120 B / E31780	True Color measured at 450 nm	2076783, 2076784
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	2076783, 2076784
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2076783, 2076784
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2076783, 2076784
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2076783, 2076784
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2076785, 2076786

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	04/09/2019			04/10/2019 17:05	Adrian Shelby	2076783, 2076784
EPA 200.7 Rev. 4.4	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/11/2019 15:34	Betina Topolski	2076791
	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/11/2019 15:47	Betina Topolski	2076792
	04/09/2019	04/17/2019 16:40	Elliott D. Healy	04/22/2019 12:44	Betina Topolski	2076791
EPA 200.8 Rev. 5.4	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/11/2019 22:12	Robert K Palmer	2076791
	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/11/2019 23:10	Robert K Palmer	2076792
	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/14/2019 22:28	Robert K Palmer	2076791
	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/14/2019 23:09	Robert K Palmer	2076792
	04/09/2019	04/10/2019 16:20	Elliott D. Healy	04/15/2019 15:00	Robert K Palmer	2076792
EPA 300.0 Rev. 2.1	04/09/2019			04/16/2019 05:40	Julia Storbeck	2076783
	04/09/2019			04/16/2019 05:52	Julia Storbeck	2076784
EPA 350.1 Rev. 2.0	04/09/2019			04/16/2019 12:30	Ping Hua	2076785
	04/09/2019			04/16/2019 12:40	Ping Hua	2076786
EPA 351.2 Rev. 2.0	04/09/2019	04/17/2019 12:45	Adrian Shelby	04/18/2019 12:07	Joseph Suarez	2076785
	04/09/2019	04/17/2019 12:45	Adrian Shelby	04/18/2019 12:08	Joseph Suarez	2076786
EPA 353.2 Rev. 2.0	04/09/2019			04/17/2019 11:05	Beverly Y. Sanders	2076785
	04/09/2019			04/17/2019 11:06	Beverly Y. Sanders	2076786
EPA 365.1 Rev. 2.0	04/09/2019	04/16/2019 13:55	Sima Feizi	04/17/2019 20:08	Rosalyn Ballman	2076785
	04/09/2019	04/16/2019 13:55	Sima Feizi	04/17/2019 20:09	Rosalyn Ballman	2076786
EPA 365.1 Rev. 2.0 dissolved	04/09/2019			04/09/2019 17:31	Julia Storbeck	2076787
	04/09/2019			04/09/2019 17:32	Julia Storbeck	2076788
SM 2120 B	04/09/2019			04/10/2019 15:52	Mariam Hanna	2076783
	04/09/2019			04/10/2019 15:54	Mariam Hanna	2076784
SM 2320 B-97	04/09/2019			04/13/2019 19:41	Dale L. Simmons	2076783
	04/09/2019			04/13/2019 19:57	Dale L. Simmons	2076784
SM 2540 C-97	04/09/2019			04/11/2019 16:14	Yijie Li	2076783, 2076784
SM 2540 D-97	04/09/2019			04/11/2019 16:14	Yijie Li	2076783, 2076784
SM 4500 F-C-97	04/09/2019			04/13/2019 19:41	Dale L. Simmons	2076783
	04/09/2019			04/13/2019 19:57	Dale L. Simmons	2076784
SM 5310 B-00	04/09/2019			04/12/2019 23:39	Julia Storbeck	2076786
	04/09/2019			04/13/2019 02:08	Julia Storbeck	2076785