

Chemical Analysis Report

NE-DIST-2019-01-17-02

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

Event Description: **Nassau East Boat**
Request ID: **RQ-2019-01-14-28**
Customer: **NE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
8800 Baymeadows Way West
Suite 100
Jacksonville, FL 32256
Attn: Jeremy Parrish

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Liang Lin, Environmental Administrator

Date Certified: 11-FEB-2019 14:56

A handwritten signature in black ink, appearing to read "Liang Lin", is shown on a light-colored background.

Case Narrative

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

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

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

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

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited 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: THOMAS CR 4 MI BELOW CITY PRISON

Collection Date/Time: 01/16/2019 11:20

Field ID: 19020033

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2054930	EPA 180.1 Rev. 2.0	Turbidity	3.0		NTU	P357469	
	EPA 300.0	Bromide	0.078		mg Br/L	P358025	
	SM 2320 B-97	Total Alkalinity	17		mg CaCO3/L	P357950	
	SM 2540 D-97	TSS	2	I	mg/L	P357695	
	SM 4500 F-C-97	Fluoride	0.052	I	mg F/L	P357953	
2054932	EPA 350.1 Rev. 2.0	Ammonia-N	0.014		mg N/L	P357686	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P357529	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.016		mg N/L	P357732	
	EPA 365.1 Rev. 2.0	Total-P	0.16		mg P/L	P357540	
	SM 5310 B-00	Organic Carbon	30		mg C/L	P357592	
2054934	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.12		mg P/L	P357463	
2054979	EPA 200.7 Rev. 4.4	Iron	610		ug/L	P357479	
		Manganese	5.9		ug/L	P357479	
		Zinc	5.0	U	ug/L	P357479	
	EPA 200.8 Rev. 5.4	Aluminum	347		ug/L	P357479	
		Antimony	0.057	I	ug/L	P357479	
		Arsenic	0.51		ug/L	P357479	
		Cadmium	0.020	U	ug/L	P357479	
		Chromium	0.64	I	ug/L	P357479	
		Copper	0.40	U	ug/L	P357479	
		Lead	0.40	I	ug/L	P357479	
		Nickel	0.58	I	ug/L	P357479	
		Selenium	0.20	U	ug/L	P357479	
		Silver	0.010	U	ug/L	P357479	
		Thallium	0.10	U	ug/L	P357479	

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: THOMAS CR 6.0 MI BELOW CITY PRISON

Collection Date/Time: 01/16/2019 10:40

Field ID: G4NE0008

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2054931	EPA 180.1 Rev. 2.0	Turbidity	5.0		NTU	P357469	
	EPA 300.0	Bromide	0.14		mg Br/L	P358025	
	SM 2320 B-97	Total Alkalinity	22		mg CaCO3/L	P357950	
	SM 2540 D-97	TSS	6	I	mg/L	P357695	
	SM 4500 F-C-97	Fluoride	0.058	I	mg F/L	P357953	
2054933	EPA 350.1 Rev. 2.0	Ammonia-N	0.023		mg N/L	P357686	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P357529	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.024		mg N/L	P357732	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P357540	
	SM 5310 B-00	Organic Carbon	31		mg C/L	P357592	
2054935	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.15		mg P/L	P357463	
2054980	EPA 200.7 Rev. 4.4	Iron	840		ug/L	P357479	
		Manganese	11.2		ug/L	P357479	
		Zinc	5.0	U	ug/L	P357479	
	EPA 200.8 Rev. 5.4	Aluminum	416		ug/L	P357479	
		Antimony	0.061	I	ug/L	P357479	
		Arsenic	0.68		ug/L	P357479	
		Cadmium	0.020	U	ug/L	P357479	
		Chromium	0.82	I	ug/L	P357479	
		Copper	0.62	I	ug/L	P357479	
		Lead	0.50		ug/L	P357479	
		Nickel	0.72	I	ug/L	P357479	
		Selenium	0.20	U	ug/L	P357479	
		Silver	0.010	U	ug/L	P357479	
		Thallium	0.10	U	ug/L	P357479	

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: ALLIGATOR CR AT HOBBS LANDING

Collection Date/Time: 01/16/2019 13:35

Field ID: G4NE0280

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2054936	EPA 180.1 Rev. 2.0	Turbidity	4.1		NTU	P357469	
	EPA 300.0 Rev. 2.1	Chloride	44		mg Cl/L	P357606	
		Sulfate	13		mg SO4/L	P357608	
		Color (true)	310		PCU	P357474	
	SM 2320 B-97	Total Alkalinity	32		mg CaCO3/L	P357950	
	SM 2540 C-97	TDS	190	A	mg/L	P357675	
	SM 2540 D-97	TSS	3	IA	mg/L	P357695	
	SM 4500 F-C-97	Fluoride	0.074	I	mg F/L	P357953	
2054937	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P357686	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P357529	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.020		mg N/L	P357732	
	EPA 365.1 Rev. 2.0	Total-P	0.10		mg P/L	P357540	
	SM 5310 B-00	Organic Carbon	31		mg C/L	P357592	
2054938	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.066		mg P/L	P357463	
2054981	EPA 200.7 Rev. 4.4	Barium	19.0		ug/L	P357479	
		Calcium	13.4		mg/L	P357479	
		Iron	660		ug/L	P357479	
		Magnesium	6.87		mg/L	P357479	
		Potassium	2.9		mg/L	P357479	
		Sodium	27.3		mg/L	P357479	
		Zinc	5.0	U	ug/L	P357479	
		Aluminum	352		ug/L	P357479	
	EPA 200.8 Rev. 5.4	Antimony	0.064	I	ug/L	P357479	
		Arsenic	0.55		ug/L	P357479	
		Boron**	29.8		ug/L	P357479	
		Cadmium	0.020	U	ug/L	P357479	
		Chromium	0.74	I	ug/L	P357479	
		Copper	0.44	I	ug/L	P357479	
		Lead	0.37	I	ug/L	P357479	
		Nickel	0.63	I	ug/L	P357479	
		Selenium	0.20	U	ug/L	P357479	
		Silver	0.010	U	ug/L	P357479	
		Thallium	0.10	U	ug/L	P357479	

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: P357469

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P357479

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
Manganese	1.0	U	ug/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: P357479

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
Batch ID: P358025

Component	Result	Code	Units
Bromide	0.013	U	mg Br/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357606

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357608

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: P357686

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357529

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357732

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357540

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357463

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

Reference Method: SM 2120 B
Batch ID: P357474

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P357950

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

Reference Method: SM 2540 C-97
Batch ID: P357675

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P357695

Component	Result	Code	Units
TSS	2	U	mg/L

Quality Assurance Report

Method Blank Results

Reference Method: SM 4500 F-C-97
Batch ID: P357953

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P357592

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: P357479

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	102		P	85 - 115
Calcium	105		P	85 - 115
Iron	106		P	85 - 115
Magnesium	109		P	85 - 115
Manganese	103		P	85 - 115
Potassium	105		P	85 - 115
Sodium	105		P	85 - 115
Zinc	102		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P357479

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	101		P	85 - 115
Antimony	98.5		P	85 - 115
Arsenic	102		P	85 - 115
Boron	106		P	85 - 115
Cadmium	101		P	85 - 115
Chromium	98.9		P	85 - 115
Copper	99.4		P	85 - 115
Lead	98.4		P	85 - 115
Nickel	97.7		P	85 - 115
Selenium	101		P	85 - 115
Silver	103		P	85 - 115
Thallium	98.7		P	85 - 115

Reference Method: EPA 300.0
Batch ID: P358025

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357606

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357608

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357686

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357529

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: P357732

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: P357540

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357463

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

Reference Method: SM 2120 B
Batch ID: P357474

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

Reference Method: SM 2320 B-97
Batch ID: P357950

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	102		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P357953

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.9		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P357592

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	97.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P357479

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054962	Barium	99.3		P	80 - 120
2054962	Calcium	97.6		P	80 - 120
2054962	Iron	103		P	80 - 120
2054962	Magnesium	104		P	80 - 120
2054962	Manganese	101		P	80 - 120
2054962	Potassium	102		P	80 - 120
2054962	Sodium	108		P	80 - 120
2054962	Zinc	103		P	80 - 120
2055124	Barium	98.6	98.2	P/P	80 - 120
2055124	Calcium	102	103	P/P	80 - 120
2055124	Iron	103	104	P/P	80 - 120
2055124	Magnesium	106	105	P/P	80 - 120
2055124	Manganese	98.9	98.3	P/P	80 - 120
2055124	Potassium	104	104	P/P	80 - 120
2055124	Sodium	105		P	80 - 120
2055124	Zinc	101	100	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P357479

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054962	Aluminum	97.5		P	80 - 120
2054962	Antimony	96.5		P	80 - 120
2054962	Arsenic	101		P	80 - 120
2054962	Boron	99.8		P	80 - 120
2054962	Cadmium	98.7		P	80 - 120
2054962	Chromium	95.2		P	80 - 120
2054962	Copper	95.6		P	80 - 120
2054962	Lead	97.7		P	80 - 120
2054962	Nickel	96.5		P	80 - 120
2054962	Selenium	96.8		P	80 - 120
2054962	Silver	100		P	80 - 120
2054962	Thallium	103		P	80 - 120
2055124	Aluminum	99.1	101	P/P	80 - 120
2055124	Antimony	96.6	97.7	P/P	80 - 120
2055124	Arsenic	103	105	P/P	80 - 120
2055124	Boron	101	103	P/P	80 - 120
2055124	Cadmium	100	101	P/P	80 - 120
2055124	Chromium	98.6	99.5	P/P	80 - 120
2055124	Copper	96.4	98.4	P/P	80 - 120
2055124	Lead	97.0	98.7	P/P	80 - 120
2055124	Nickel	97.4	99.0	P/P	80 - 120
2055124	Selenium	102	103	P/P	80 - 120
2055124	Silver	103	104	P/P	80 - 120
2055124	Thallium	105	107	P/P	80 - 120

Reference Method: EPA 300.0
Batch ID: P358025

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054875	Bromide	107	92.9	P/P	90 - 110
2056871	Bromide	104	103	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357606

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054923	Chloride	98.5		P	90 - 110
2054993	Chloride	100		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357608

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054923	Sulfate	99.8		P	90 - 110
2054993	Sulfate	99.0		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357686

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054950	Ammonia-N	98.7	96.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357529

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054912	Kjeldahl Nitrogen	103	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357732

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054704	NO2NO3-N	97.9	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357540

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054924	Total-P	102	98.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357463

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054910	O-Phosphate-P	98.8	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P357953

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054944	Fluoride	95.2	96.5	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P357592

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2054865	Organic Carbon	97.6	97.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P357469

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054908	Turbidity	5.81	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P357479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2055124	Barium	0.448	Spike	P	0 - 20
2055124	Calcium	0.603	Spike	P	0 - 20
2055124	Iron	0.902	Spike	P	0 - 20
2055124	Magnesium	0.116	Spike	P	0 - 20
2055124	Manganese	0.557	Spike	P	0 - 20
2055124	Potassium	0.145	Spike	P	0 - 20
2055124	Sodium	0.847	Spike	P	0 - 20
2055124	Zinc	0.442	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P357479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2055124	Aluminum	1.43	Spike	P	0 - 20
2055124	Antimony	1.15	Spike	P	0 - 20
2055124	Arsenic	1.88	Spike	P	0 - 20
2055124	Boron	1.96	Spike	P	0 - 20
2055124	Cadmium	0.790	Spike	P	0 - 20
2055124	Chromium	0.943	Spike	P	0 - 20
2055124	Copper	1.95	Spike	P	0 - 20
2055124	Lead	1.72	Spike	P	0 - 20
2055124	Nickel	1.57	Spike	P	0 - 20
2055124	Selenium	1.01	Spike	P	0 - 20
2055124	Silver	1.13	Spike	P	0 - 20
2055124	Thallium	1.52	Spike	P	0 - 20

Reference Method: EPA 300.0
Batch ID: P358025

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054875	Bromide	14.1	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357606

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054923	Chloride	0.252	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P357608

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054923	Sulfate	0.265	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P357686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054950	Ammonia-N	1.56	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P357529

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054912	Kjeldahl Nitrogen	2.54	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P357732

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054704	NO2NO3-N	0.350	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P357540

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054924	Total-P	3.40	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P357463

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054910	O-Phosphate-P	2.50	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P357474

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054923	Color (true)	1.15	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P357950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054944	Total Alkalinity	0.961	Sample	P	0 - 1.6

Quality Assurance Report Precision

Reference Method: SM 2540 C-97
Batch ID: P357675

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054936	TDS	1.57	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P357953

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054944	Fluoride	0.986	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P357592

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2054865	Organic Carbon	0.0469	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: A88882

Included Lab Sample IDs: 2054934, 2054935, 2054938

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.4	98.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A88883

Included Lab Sample IDs: 2054930, 2054931, 2054936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A88884

Included Lab Sample IDs: 2054936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	103	104	P/P	90 - 115

Reference Method: SM 5310 B-00

Run ID: A88923

Included Lab Sample IDs: 2054932, 2054933, 2054937

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

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88925

Included Lab Sample IDs: 2054979, 2054980, 2054981

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	98.7	96.9	P/P	90 - 110
Calcium	97.5	95.9	P/P	90 - 110
Iron	99.5	97.6	P/P	90 - 110
Magnesium	98.9	97.0	P/P	90 - 110
Manganese	101	98.9	P/P	90 - 110
Potassium	95.0	93.7	P/P	90 - 110
Zinc	100	98.3	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A88931

Included Lab Sample IDs: 2054936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	104	105	P/P	90 - 110
Sulfate	103	104	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A88934

Included Lab Sample IDs: 2054981

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sodium	95.0	97.5	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A88936

Included Lab Sample IDs: 2054932, 2054933, 2054937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.0	97.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A88944

Included Lab Sample IDs: 2054932, 2054933, 2054937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	100	P/P	90 - 110
Total-P	99.9	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A88964

Included Lab Sample IDs: 2054932, 2054933, 2054937

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	100	99.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A88976

Included Lab Sample IDs: 2054932, 2054933, 2054937

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

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A88979

Included Lab Sample IDs: 2054979, 2054980, 2054981

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	102	102	P/P	90 - 110
Antimony	100	98.9	P/P	90 - 110
Arsenic	102	105	P/P	90 - 110
Boron	102	105	P/P	90 - 110
Cadmium	101	100	P/P	90 - 110
Chromium	101	102	P/P	90 - 110
Copper	101	101	P/P	90 - 110
Lead	102	102	P/P	90 - 110
Nickel	101	101	P/P	90 - 110
Selenium	102	105	P/P	90 - 110
Silver	105	104	P/P	90 - 110
Thallium	96.8	96.1	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A89058

Included Lab Sample IDs: 2054930, 2054931, 2054936

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.2	102	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A89058

Included Lab Sample IDs: 2054930, 2054931, 2054936

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

Reference Method: EPA 300.0

Run ID: A89080

Included Lab Sample IDs: 2054930, 2054931

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

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS				
EPA 180.1 Rev. 2.0	Turbidity					5.81	
EPA 200.7 Rev. 4.4	Barium	102	99.3	98.6	98.2		0.448
	Calcium	105	97.6	102	103		0.603
	Iron	106	103	103	104		0.902
	Magnesium	109	104	106	105		0.116
	Manganese	103	101	98.9	98.3		0.557
	Potassium	105	102	104	104		0.145
	Sodium	105	108	105			0.847
	Zinc	102	103	101	100		0.442
EPA 200.8 Rev. 5.4	Aluminum	101	97.5	99.1	101		1.43
	Antimony	98.5	96.5	96.6	97.7		1.15
	Arsenic	102	101	103	105		1.88
	Boron	106	99.8	101	103		1.96
	Cadmium	101	98.7	100	101		0.790
	Chromium	98.9	95.2	98.6	99.5		0.943
	Copper	99.4	95.6	96.4	98.4		1.95
	Lead	98.4	97.7	97.0	98.7		1.72
	Nickel	97.7	96.5	97.4	99.0		1.57
	Selenium	101	96.8	102	103		1.01
	Silver	103	100	103	104		1.13
	Thallium	98.7	103	105	107		1.52
EPA 300.0	Bromide	106	107	92.9	104		14.1
			103				
EPA 300.0 Rev. 2.1	Chloride	100	98.5	100		0.252	
	Sulfate	102	99.8	99.0		0.265	
EPA 350.1 Rev. 2.0	Ammonia-N	98.2	98.7	96.8			1.56
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	103	99.2			2.54
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	100	97.9	97.4			0.350
EPA 365.1 Rev. 2.0	Total-P	106	102	98.4			3.40
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	98.5	98.8	101			2.50
SM 2120 B	Color (true)	101				1.15	
SM 2320 B-97	Total Alkalinity	102				0.961	
SM 2540 C-97	TDS					1.57	
SM 4500 F-C-97	Fluoride	97.9	95.2	96.5			0.986
SM 5310 B-00	Organic Carbon	97.8	97.6	97.5			0.0469

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2054930, 2054931, 2054936
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2054979, 2054980, 2054981
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2054979, 2054980, 2054981
EPA 300.0 / E31780	Bromide in aqueous matrices	2054930, 2054931
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2054936
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2054936
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2054932, 2054933, 2054937
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2054932, 2054933, 2054937

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2054932, 2054933, 2054937
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2054932, 2054933, 2054937
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2054934, 2054935, 2054938
SM 2120 B / E31780	True Color measured at 450 nm	2054936
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2054930, 2054931, 2054936
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2054936
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2054930, 2054931, 2054936
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2054930, 2054931, 2054936
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2054932, 2054933, 2054937

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	01/17/2019			01/17/2019 16:08	Sima Feizi	2054930, 2054931, 2054936
EPA 200.7 Rev. 4.4	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/18/2019 16:34	Betina Topolski	2054979
	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/18/2019 16:42	Betina Topolski	2054980
	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/18/2019 16:48	Betina Topolski	2054981
	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/22/2019 12:07	Betina Topolski	2054981
EPA 200.8 Rev. 5.4	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/23/2019 19:45	Robert K Palmer	2054979
	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/23/2019 19:55	Robert K Palmer	2054980
	01/17/2019	01/17/2019 18:40	Elliott D. Healy	01/23/2019 20:05	Robert K Palmer	2054981
EPA 300.0	01/17/2019			01/29/2019 17:47	Lipi Saha	2054930
	01/17/2019			01/29/2019 18:04	Lipi Saha	2054931
EPA 300.0 Rev. 2.1	01/17/2019			01/19/2019 07:59	Lipi Saha	2054936
EPA 350.1 Rev. 2.0	01/17/2019			01/22/2019 11:38	Ping Hua	2054932
	01/17/2019			01/22/2019 11:39	Ping Hua	2054933
	01/17/2019			01/22/2019 11:41	Ping Hua	2054937
EPA 351.2 Rev. 2.0	01/17/2019	01/18/2019 11:15	Adrian Shelby	01/22/2019 12:09	Joseph Suarez	2054932
	01/17/2019	01/18/2019 11:15	Adrian Shelby	01/22/2019 12:11	Joseph Suarez	2054933
	01/17/2019	01/18/2019 11:15	Adrian Shelby	01/22/2019 12:12	Joseph Suarez	2054937
EPA 353.2 Rev. 2.0	01/17/2019			01/23/2019 10:18	Beverly Y. Sanders	2054932
	01/17/2019			01/23/2019 10:19	Beverly Y. Sanders	2054933
	01/17/2019			01/23/2019 10:20	Beverly Y. Sanders	2054937
EPA 365.1 Rev. 2.0	01/17/2019	01/18/2019 12:35	Sima Feizi	01/22/2019 14:59	Rosalyn Ballman	2054932
	01/17/2019	01/18/2019 12:35	Sima Feizi	01/22/2019 15:00	Rosalyn Ballman	2054933
	01/17/2019	01/18/2019 12:35	Sima Feizi	01/22/2019 15:04	Rosalyn Ballman	2054937
EPA 365.1 Rev. 2.0 dissolved	01/17/2019			01/17/2019 14:10	Jhamieka S. Greenwood	2054934, 2054935
	01/17/2019			01/17/2019 14:11	Jhamieka S. Greenwood	2054938
SM 2120 B	01/17/2019			01/17/2019 16:08	Chelsea Hernandez	2054936
SM 2320 B-97	01/17/2019			01/24/2019 05:45	Dale L. Simmons	2054930
	01/17/2019			01/24/2019 05:56	Dale L. Simmons	2054931
	01/17/2019			01/24/2019 06:08	Dale L. Simmons	2054936
SM 2540 C-97	01/17/2019			01/18/2019 20:10	Mariam Hanna	2054936
SM 2540 D-97	01/17/2019			01/18/2019 20:10	Mariam Hanna	2054930, 2054931, 2054936
SM 4500 F-C-97	01/17/2019			01/24/2019 05:45	Dale L. Simmons	2054930
	01/17/2019			01/24/2019 05:56	Dale L. Simmons	2054931
	01/17/2019			01/24/2019 06:08	Dale L. Simmons	2054936
SM 5310 B-00	01/17/2019			01/18/2019 19:13	Megan Treadwell	2054932
	01/17/2019			01/18/2019 19:26	Megan Treadwell	2054933
	01/17/2019			01/18/2019 20:02	Megan Treadwell	2054937