Chemical Analysis Report

NW-DIST-2017-08-03-02

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

Event Description: **Baker Run West WBID 179 19 21 24C 271**
Request ID: **RQ-2017-08-21-14**
Customer: **NW-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
160 W Government St
Suite 208A
Pensacola, FL 32502-5794
Attn: Michael King

For additional information please contact
Colin Wright, Ph.D.
Liang-Tsair Lin, Ph.D.
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 24-AUG-2017 13:29

NON-CONFORMANCE REPORT INCLUDED

Case Narrative

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

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

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

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

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

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: BEAR CREEK @ A FOREST ROAD **Collection Date/Time: 08/02/2017 11:05**

Field ID: G4NW0380 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918778	EPA 180.1 Rev. 2.0	Turbidity	5.1		NTU	P329652	
	EPA 300.0 Rev. 2.1	Chloride	2.2		mg Cl/L	P329711	
		Sulfate	0.45	I	mg SO4/L	P329715	
	SM 2120 B	Color (true)	86		PCU	P329662	
	SM 2320 B-97	Total Alkalinity	6.1		mg CaCO3/L	P329762	
	SM 2540 C-97	TDS	21	I	mg/L	P330282	
	SM 2540 D-97	TSS	4	I	mg/L	P330064	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P329766	
1918782	EPA 350.1 Rev. 2.0	Ammonia-N	0.015		mg N/L	P329805	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.26		mg N/L	P329818	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.018		mg N/L	P329823	
	EPA 365.1 Rev. 2.0	Total-P	0.016		mg P/L	P329786	
	SM 5310 B-00	Organic Carbon	3.8		mg C/L	P329958	
1918786	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.005	I	mg P/L	P329647	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: SWEETWATER CREEK ABOVE SANDY LANDING RD **Collection Date/Time: 08/02/2017 11:30**

Field ID: G4NW0419 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918779	EPA 180.1 Rev. 2.0	Turbidity	2.3		NTU	P329652	
	EPA 300.0 Rev. 2.1	Chloride	2.5		mg Cl/L	P329711	
		Sulfate	0.73		mg SO4/L	P329715	
	SM 2120 B	Color (true)	51		PCU	P329662	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P329762	
	SM 2540 C-97	TDS	21	I	mg/L	P330282	
	SM 2540 D-97	TSS	2	I	mg/L	P330064	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P329766	
1918783	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	I	mg N/L	P329806	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.16	I	mg N/L	P329818	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.082		mg N/L	P329823	
	EPA 365.1 Rev. 2.0	Total-P	0.007		mg P/L	P329786	
	SM 5310 B-00	Organic Carbon	3.6		mg C/L	P329958	
1918787	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P329647	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: BIG JUNIPER CREEK ON PATH SOUTH OF INDIAN FORD RD **Collection Date/Time: 08/02/2017 12:10**

Field ID: G4NW0418 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918780	EPA 180.1 Rev. 2.0	Turbidity	2.1		NTU	P329652	
	EPA 300.0 Rev. 2.1	Chloride	2.7		mg Cl/L	P329711	
		Sulfate	0.75		mg SO4/L	P329715	
	SM 2120 B	Color (true)	38		PCU	P329662	
	SM 2320 B-97	Total Alkalinity	0.70	I	mg CaCO3/L	P329762	
	SM 2540 C-97	TDS	21	I	mg/L	P330282	
	SM 2540 D-97	TSS	2	U	mg/L	P330064	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P329766	
1918784	EPA 350.1 Rev. 2.0	Ammonia-N	0.004	I	mg N/L	P329806	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.17	I	mg N/L	P329818	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.11		mg N/L	P329823	
	EPA 365.1 Rev. 2.0	Total-P	0.005		mg P/L	P329786	
	SM 5310 B-00	Organic Carbon	3.1		mg C/L	P329958	
1918788	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P329647	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: ATES CREEK NE OF BRYANT BRIDGE **Collection Date/Time: 08/02/2017 12:50**

Field ID: G4NW0332 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918781	EPA 180.1 Rev. 2.0	Turbidity	2.4		NTU	P329652	
	EPA 300.0 Rev. 2.1	Chloride	3.5		mg Cl/L	P329711	
		Sulfate	0.63		mg SO4/L	P329715	
	SM 2120 B	Color (true)	37		PCU	P329662	
	SM 2320 B-97	Total Alkalinity	8.4		mg CaCO3/L	P329762	
	SM 2540 C-97	TDS	24	I	mg/L	P330282	
	SM 2540 D-97	TSS	2	IA	mg/L	P330064	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P329766	
1918785	EPA 350.1 Rev. 2.0	Ammonia-N	0.009		mg N/L	P329806	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.15	I	mg N/L	P329818	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.016		mg N/L	P329824	
	EPA 365.1 Rev. 2.0	Total-P	0.01		mg P/L	P329786	
	SM 5310 B-00	Organic Carbon	2.3		mg C/L	P329958	
1918789	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P329647	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: BLACKWATER RIVER ABOVE BRYANT BRIDGE BOAT RAMP **Collection Date/Time: 08/02/2017 13:00**

Field ID: G4NW0413 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1918775	EPA 180.1 Rev. 2.0	Turbidity	3.6		NTU	P329652	
	EPA 300.0 Rev. 2.1	Chloride	3.0		mg Cl/L	P329711	
		Sulfate	0.91		mg SO4/L	P329715	
	SM 2120 B	Color (true)	86	A	PCU	P329662	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P329762	
	SM 2540 C-97	TDS	33		mg/L	P330282	
	SM 2540 D-97	TSS	8	I	mg/L	P330064	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P329766	
1918776	EPA 350.1 Rev. 2.0	Ammonia-N	0.005	Y	mg N/L	P329805	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.29	Y	mg N/L	P329818	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.20	Y	mg N/L	P329823	
	EPA 365.1 Rev. 2.0	Total-P	0.008	Y	mg P/L	P329786	
	SM 5310 B-00	Organic Carbon	6.3	Y	mg C/L	P329958	
1918777	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P329647	
1918799	EPA 200.7 Rev. 4.4	Calcium	0.89		mg/L	P329860	
		Iron	750		ug/L	P329860	
		Magnesium	0.60		mg/L	P329860	
		Potassium	0.32	I	mg/L	P329860	
		Sodium	1.6	I	mg/L	P329860	
		Zinc	5.0	U	ug/L	P329860	
	EPA 200.8 Rev. 5.4	Arsenic	0.36		ug/L	P329860	
		Cadmium	0.020	U	ug/L	P329860	
		Chromium	0.40	U	ug/L	P329860	
		Copper	0.20	U	ug/L	P329860	
		Lead	0.24		ug/L	P329860	
		Nickel	0.49	I	ug/L	P329860	
		Silver	0.010	U	ug/L	P329860	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 350.1 Rev. 2.0: The sample was received unpreserved: pH > 2. Sample preserved in laboratory.
EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample. The sample was received unpreserved: pH > 2. Sample preserved in laboratory.
EPA 353.2 Rev. 2.0: NO2NO3-N: The sample was received unpreserved: pH > 2. Sample preserved in laboratory.
EPA 365.1 Rev. 2.0: Total-P: The sample was received unpreserved: pH > 2. Sample preserved in laboratory.
SM 5310 B-00: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample. The sample was received unpreserved: pH > 2. Sample preserved in laboratory.

Non-Conformance Report

NCR ID: 6584

Event(s)	Job(s)	Sample(s)	Test(s)
NW-DIST-2017-08-03-02	TLH-2017-08-03-62	1918776	
NW-DIST-2017-08-03-02	TLH-2017-08-03-65	1918799	

NCR Type: SHIPPING/RECEIVING **NCR Category: Preservation Not Intact**

Observation: Samples not preserved to pH < 2.

Non-Conformance Report

NCR ID: 6584

Event(s)	Job(s)	Sample(s)	Test(s)

Resolution: Nutients sample preserved in the laboratory with sulfuric acid.
Metals sample preserved in the laboratory with nitric acid 08/03/2017 at 11:59.

Authorized by/Date: John Watts 8/11/2017

The Non-Conformance Report details exceptions or problems encountered with the events/jobs/samples/test.
Please address questions to:

Chemistry	Colin Wright	(850) 245-8085
Biology	Cheryl Swanson	(850) 245-8177

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P329652

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P329860

Component	Result	Code	Units
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: P329860

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.20	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329711

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329715

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: P329805

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329806

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329818

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329823

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329824

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329786

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329647

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

Reference Method: SM 2120 B
Batch ID: P329662

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P329762

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2540 C-97
Batch ID: P330282

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P330064

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P329766

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P329958

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: P329860

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	109		P	85 - 115
Magnesium	104		P	85 - 115
Potassium	97.6		P	85 - 115
Sodium	97.8		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P329860

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	99.9		P	85 - 115
Chromium	97.3		P	85 - 115
Copper	95.4		P	85 - 115
Lead	95.4		P	85 - 115
Nickel	98.9		P	85 - 115
Silver	97.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329711

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329715

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329805

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329806

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	99.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329818

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.4		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329823

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329824

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329786

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	93.2		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329647

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

Reference Method: SM 2320 B-97
Batch ID: P329762

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P329766

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.8		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P329958

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	96.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P329860

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1919088	Calcium	107		P	80 - 120
1919088	Iron	109		P	80 - 120
1919088	Magnesium	105		P	80 - 120
1919088	Potassium	98.8		P	80 - 120
1919088	Sodium	98.9		P	80 - 120
1919088	Zinc	107		P	80 - 120
1919168	Calcium	105		P	80 - 120
1919168	Iron	106	106	P/P	80 - 120
1919168	Magnesium	105		P	80 - 120
1919168	Potassium	99.9		P	80 - 120
1919168	Sodium	100		P	80 - 120
1919168	Zinc	100	102	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P329860

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1919088	Arsenic	107		P	80 - 120
1919088	Cadmium	102		P	80 - 120
1919088	Chromium	94.8		P	80 - 120
1919088	Copper	96.5		P	80 - 120
1919088	Lead	99.1		P	80 - 120
1919088	Nickel	98.2		P	80 - 120
1919088	Silver	98.3		P	80 - 120
1919168	Arsenic	104	107	P/P	80 - 120
1919168	Cadmium	101	102	P/P	80 - 120
1919168	Chromium	95.2	97.7	P/P	80 - 120
1919168	Copper	95.5	98.0	P/P	80 - 120
1919168	Lead	96.6	99.6	P/P	80 - 120
1919168	Nickel	97.0	101	P/P	80 - 120
1919168	Silver	97.0	98.7	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329711

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

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329711

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918753	Chloride	101		P	90 - 110
1918779	Chloride	101		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329715

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918753	Sulfate	102		P	90 - 110
1918779	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329805

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918737	Ammonia-N	95.4	95.7	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329806

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918783	Ammonia-N	95.9	95.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329823

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918782	NO2NO3-N	104	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329824

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918785	NO2NO3-N	105	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329786

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918873	Total-P	95.7	97.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329647

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918787	O-Phosphate-P	97.6	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P329766

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1918188	Fluoride	100	99.6	P/P	91 - 105

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P329652

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918753	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P329860

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1919168	Calcium	0.0634	Spike	P	0 - 20
1919168	Iron	0.457	Spike	P	0 - 20
1919168	Magnesium	0.175	Spike	P	0 - 20
1919168	Potassium	0.203	Spike	P	0 - 20
1919168	Sodium	0.0434	Spike	P	0 - 20
1919168	Zinc	2.09	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P329860

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1919168	Arsenic	2.95	Spike	P	0 - 20
1919168	Cadmium	0.727	Spike	P	0 - 20
1919168	Chromium	2.58	Spike	P	0 - 20
1919168	Copper	2.51	Spike	P	0 - 20
1919168	Lead	3.05	Spike	P	0 - 20
1919168	Nickel	3.60	Spike	P	0 - 20
1919168	Silver	1.67	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P329711

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918753	Chloride	2.38	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329805

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918737	Ammonia-N	0.351	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P329806

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918783	Ammonia-N	0.100	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P329818

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918761	Kjeldahl Nitrogen	0.458	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329823

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918782	NO2NO3-N	0.443	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P329824

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918785	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P329786

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918873	Total-P	1.35	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P329647

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918787	O-Phosphate-P	3.42	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P329662

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918775	Color (true)	2.14	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P329762

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918188	Total Alkalinity	0.170	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P330282

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918872	TDS	4.23	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P329766

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918188	Fluoride	0.470	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P329958

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1918710	Organic Carbon	0.289	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: A78163
Included Lab Sample IDs: 1918775, 1918778, 1918779, 1918780, 1918781

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	101	96.8	P/P	90 - 110
Chloride	96.8	103	P/P	90 - 110
Sulfate	106	99.1	P/P	90 - 110
Sulfate	99.1	108	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A78169
Included Lab Sample IDs: 1918777, 1918786, 1918787, 1918788, 1918789

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	95.0	95.6	P/P	90 - 110
O-Phosphate-P	96.4	96.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A78170
Included Lab Sample IDs: 1918775, 1918778, 1918779, 1918780, 1918781

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	101	100	P/P	95 - 105

Reference Method: SM 2120 B
Run ID: A78173
Included Lab Sample IDs: 1918775, 1918778, 1918779, 1918780, 1918781

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	85 - 115

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A78219
Included Lab Sample IDs: 1918775, 1918778, 1918779, 1918780, 1918781

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

Reference Method: SM 4500 F-C-97
Run ID: A78219
Included Lab Sample IDs: 1918775, 1918778, 1918779, 1918780, 1918781

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

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A78241
Included Lab Sample IDs: 1918776, 1918782, 1918783, 1918784, 1918785

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

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A78248
Included Lab Sample IDs: 1918776, 1918782, 1918783, 1918784, 1918785

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A78249
Included Lab Sample IDs: 1918776, 1918782, 1918783, 1918784, 1918785

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

Reference Method: SM 5310 B-00
Run ID: A78301
Included Lab Sample IDs: 1918776, 1918782, 1918783, 1918784, 1918785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	98.2	99.4	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A78304
Included Lab Sample IDs: 1918799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	102	103	P/P	90 - 110
Iron	102	102	P/P	90 - 110
Magnesium	101	101	P/P	90 - 110
Potassium	95.2	95.8	P/P	90 - 110
Sodium	95.0	97.2	P/P	90 - 110
Zinc	103	99.7	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A78306
Included Lab Sample IDs: 1918776, 1918782, 1918783, 1918784, 1918785

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	98.8	104	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A78310
Included Lab Sample IDs: 1918799

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	101	P/P	90 - 110
Cadmium	100	102	P/P	90 - 110
Chromium	96.7	97.9	P/P	90 - 110
Copper	98.8	99.2	P/P	90 - 110
Lead	96.0	96.9	P/P	90 - 110
Nickel	99.4	100	P/P	90 - 110
Silver	96.5	97.4	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						0.0	
EPA 200.7 Rev. 4.4	Calcium	105	107	105				0.0634
	Iron	109	109	106	106			0.457
	Magnesium	104	105	105				0.175
	Potassium	97.6	98.8	99.9				0.203
	Sodium	97.8	98.9	100				0.0434
	Zinc	104	107	100	102			2.09
EPA 200.8 Rev. 5.4	Arsenic	101	107	104	107			2.95
	Cadmium	99.9	102	101	102			0.727
	Chromium	97.3	94.8	95.2	97.7			2.58
	Copper	95.4	96.5	95.5	98.0			2.51
	Lead	95.4	99.1	96.6	99.6			3.05
	Nickel	98.9	98.2	97.0	101			3.60
	Silver	97.0	98.3	97.0	98.7			1.67
EPA 300.0 Rev. 2.1	Chloride	104	101	101			2.38	
	Sulfate	107	102	103				
EPA 350.1 Rev. 2.0	Ammonia-N	100	95.4	95.7				0.351
	Ammonia-N	99.9	95.9	95.8				0.100
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.4						0.458
EPA 353.2 Rev. 2.0	NO2NO3-N	105	104	104				0.443
	NO2NO3-N	106	105	105				0.0
EPA 365.1 Rev. 2.0	Total-P	93.2	95.7	97.8				1.35
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	97.6	101				3.42
SM 2120 B	Color (true)						2.14	
SM 2320 B-97	Total Alkalinity	103					0.170	
SM 2540 C-97	TDS						4.23	

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
SM 4500 F-C-97	Fluoride	98.8	100	99.6			0.470
SM 5310 B-00	Organic Carbon	96.8					0.289

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1918775, 1918778, 1918779, 1918780, 1918781
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1918799
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1918799
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1918775, 1918778, 1918779, 1918780, 1918781
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1918775, 1918778, 1918779, 1918780, 1918781
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1918776, 1918782, 1918783, 1918784, 1918785
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1918776, 1918782, 1918783, 1918784, 1918785
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1918776, 1918782, 1918783, 1918784, 1918785
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1918776, 1918782, 1918783, 1918784, 1918785
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1918777, 1918786, 1918787, 1918788, 1918789
SM 2120 B / E31780	True Color measured at 450 nm	1918775, 1918778, 1918779, 1918780, 1918781
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1918775, 1918778, 1918779, 1918780, 1918781
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1918775, 1918778, 1918779, 1918780, 1918781
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1918775, 1918778, 1918779, 1918780, 1918781
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1918775, 1918778, 1918779, 1918780, 1918781
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1918776, 1918782, 1918783, 1918784, 1918785

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	08/03/2017			08/03/2017 16:20	DeAsia Armster	1918775, 1918778, 1918779, 1918780, 1918781
EPA 200.7 Rev. 4.4	08/03/2017	08/08/2017	Elliott D. Healy	08/09/2017	Betina Topolski	1918799
EPA 200.8 Rev. 5.4	08/03/2017	08/08/2017	Elliott D. Healy	08/09/2017	Nadine Brooks	1918799
EPA 300.0 Rev. 2.1	08/03/2017			08/04/2017	Julia Storbeck	1918775, 1918778, 1918779, 1918780, 1918781
EPA 350.1 Rev. 2.0	08/03/2017			08/07/2017	Sofia Elnemr	1918776, 1918782, 1918783, 1918784, 1918785
EPA 351.2 Rev. 2.0	08/03/2017	08/08/2017	Adrian Shelby	08/09/2017	Joseph Suarez	1918776, 1918782, 1918783, 1918784, 1918785
EPA 353.2 Rev. 2.0	08/03/2017			08/08/2017	Beverly Y. Sanders	1918776, 1918782, 1918783, 1918784, 1918785
EPA 365.1 Rev. 2.0	08/03/2017	08/07/2017	Sima Feizi	08/08/2017	Lipi Saha	1918776, 1918782, 1918783, 1918784, 1918785
EPA 365.1 Rev. 2.0 dissolved	08/03/2017			08/03/2017 14:56	Ping Hua	1918787
	08/03/2017			08/03/2017 15:17	Ping Hua	1918777
	08/03/2017			08/03/2017 15:18	Ping Hua	1918786
	08/03/2017			08/03/2017 15:19	Ping Hua	1918788, 1918789
SM 2120 B	08/03/2017			08/03/2017 15:27	Tanya Welborn	1918775, 1918778
	08/03/2017			08/03/2017 15:28	Tanya Welborn	1918779
	08/03/2017			08/03/2017 15:29	Tanya Welborn	1918780
	08/03/2017			08/03/2017 15:30	Tanya Welborn	1918781
SM 2320 B-97	08/03/2017			08/05/2017	Dale L. Simmons	1918775, 1918778, 1918779, 1918780, 1918781
SM 2540 C-97	08/03/2017			08/07/2017	DeAsia Armster	1918775, 1918778, 1918779, 1918780, 1918781
SM 2540 D-97	08/03/2017			08/07/2017	DeAsia Armster	1918775, 1918778, 1918779, 1918780, 1918781
SM 4500 F-C-97	08/03/2017			08/05/2017	Dale L. Simmons	1918775, 1918778, 1918779, 1918780, 1918781
SM 5310 B-00	08/03/2017			08/08/2017	Ping Hua	1918776, 1918782, 1918783, 1918784, 1918785