Chemical Analysis Report

CEN-DIST-2018-04-11-01

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

Event Description: **UnDrain X2**
Request ID: **RQ-2018-04-09-48**
Customer: **CEN-DIST**
Project ID: **SMP**

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Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 08-MAY-2018 14:06

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: Unnamed Drain @ Lake Live Oak Rd **Collection Date/Time: 04/10/2018 09:40**

Field ID: G2CE0168 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1983338	EPA 180.1 Rev. 2.0	Turbidity	1.2		NTU	P343260	
	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P343317	
		Sulfate	33		mg SO4/L	P343319	
	SM 2120 B	Color (true)	72		PCU	P343210	
	SM 2320 B-97	Total Alkalinity	162		mg CaCO3/L	P343950	
	SM 2540 C-97	TDS	421	A	mg/L	P343619	
	SM 2540 D-97	TSS	3	IA	mg/L	P343871	
	SM 4500 F-C-97	Fluoride	0.53		mg F/L	P343853	
1983340	EPA 350.1 Rev. 2.0	Ammonia-N	0.019		mg N/L	P343558	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.85		mg N/L	P343268	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.18		mg N/L	P343566	
	EPA 365.1 Rev. 2.0	Total-P	0.19		mg P/L	P343479	
	SM 5310 B-00	Organic Carbon	12		mg C/L	P343398	
1983342	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.16		mg P/L	P343217	
1983348	EPA 200.7 Rev. 4.4	Calcium	39.8		mg/L	P343304	
		Iron	110	I	ug/L	P343304	
		Magnesium	7.23		mg/L	P343304	
		Potassium	11.7		mg/L	P343304	
		Sodium	95.5		mg/L	P343304	
		Zinc	13	I	ug/L	P343304	
	EPA 200.8 Rev. 5.4	Arsenic	0.66		ug/L	P343304	
		Cadmium	0.020	U	ug/L	P343304	
		Chromium	0.83	I	ug/L	P343304	
		Copper	0.94		ug/L	P343304	
		Lead	0.12	I	ug/L	P343304	
		Nickel	1.34		ug/L	P343304	
		Silver	0.010	U	ug/L	P343304	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high 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.

Sample Location: Unnamed Drain @ Avalon Park Rd **Collection Date/Time: 04/10/2018 10:20**

Field ID: G2CE0169 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1983339	EPA 180.1 Rev. 2.0	Turbidity	2.9		NTU	P343260	
	EPA 300.0 Rev. 2.1	Chloride	120		mg Cl/L	P343317	
		Sulfate	34		mg SO4/L	P343319	
	SM 2120 B	Color (true)	74		PCU	P343210	
	SM 2320 B-97	Total Alkalinity	173		mg CaCO3/L	P343950	
	SM 2540 C-97	TDS	462	A	mg/L	P343620	
	SM 2540 D-97	TSS	8	IA	mg/L	P343872	
	SM 4500 F-C-97	Fluoride	0.56		mg F/L	P343853	
1983341	EPA 350.1 Rev. 2.0	Ammonia-N	0.016		mg N/L	P343558	

Field ID: G2CE0169 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1983341	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.1		mg N/L	P343268	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.18		mg N/L	P343566	
	EPA 365.1 Rev. 2.0	Total-P	0.21		mg P/L	P343479	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P343398	
1983343	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.18		mg P/L	P343217	
1983349	EPA 200.7 Rev. 4.4	Calcium	41.8		mg/L	P343304	
		Iron	180		ug/L	P343304	
		Magnesium	7.78		mg/L	P343304	
		Potassium	12.6		mg/L	P343304	
		Sodium	103		mg/L	P343304	
		Zinc	16	I	ug/L	P343304	
	EPA 200.8 Rev. 5.4	Arsenic	0.70		ug/L	P343304	
		Cadmium	0.020	U	ug/L	P343304	
		Chromium	0.90	I	ug/L	P344319	
		Copper	0.95		ug/L	P343304	
		Lead	0.18	I	ug/L	P343304	
		Nickel	1.27		ug/L	P344319	
		Silver	0.010	U	ug/L	P343304	

Ref. Method and Comment:
EPA 300.0 Rev. 2.1: Sulfate: Batch matrix spike recoveries for one of two spiked samples are unavailable because of high 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.

Quality Assurance Report
Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343260

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343304

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: P343304

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

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343304

Component	Result	Code	Units
Lead	0.050	U	ug/L
Nickel	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344319

Component	Result	Code	Units
Chromium	0.40	U	ug/L
Nickel	0.20	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343317

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343319

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343558

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343268

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343566

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343479

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343217

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2120 B
Batch ID: P343210

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P343950

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

Reference Method: SM 2540 C-97
Batch ID: P343619

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P343620

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P343871

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P343872

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P343853

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P343398

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: P343304

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343304

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	95.4		P	85 - 115
Iron	97.4		P	85 - 115
Magnesium	96.8		P	85 - 115
Potassium	96.7		P	85 - 115
Sodium	97.8		P	85 - 115
Zinc	92.5		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343304

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	100		P	85 - 115
Cadmium	96.3		P	85 - 115
Chromium	92.1		P	85 - 115
Copper	99.1		P	85 - 115
Lead	91.3		P	85 - 115
Nickel	102		P	85 - 115
Silver	95.0		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344319

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	95.6		P	85 - 115
Nickel	95.8		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343317

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343319

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343558

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.4		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343268

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343566

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: P343479

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343217

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

Reference Method: SM 2320 B-97
Batch ID: P343950

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	101		P	98 - 107

Reference Method: SM 4500 F-C-97
Batch ID: P343853

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.1		P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P343398

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	98.4		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983246	Calcium	97.2		P	80 - 120
1983246	Iron	96.8		P	80 - 120
1983246	Magnesium	98.1		P	80 - 120
1983246	Potassium	94.6		P	80 - 120
1983246	Sodium	99.1		P	80 - 120
1983246	Zinc	94.2		P	80 - 120
1983394	Calcium	96.7		P	80 - 120
1983394	Iron	95.6	96.9	P/P	80 - 120
1983394	Magnesium	97.8		P	80 - 120
1983394	Potassium	97.4		P	80 - 120
1983394	Sodium	97.3		P	80 - 120
1983394	Zinc	90.8	90.8	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343304

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983246	Arsenic	100		P	80 - 120
1983246	Cadmium	97.0		P	80 - 120
1983246	Chromium	92.4		P	80 - 120
1983246	Copper	98.1		P	80 - 120
1983246	Lead	92.3		P	80 - 120
1983246	Nickel	101		P	80 - 120
1983246	Silver	95.6		P	80 - 120
1983394	Arsenic	101	99.8	P/P	80 - 120
1983394	Cadmium	98.2	96.0	P/P	80 - 120
1983394	Chromium	92.5	92.2	P/P	80 - 120
1983394	Copper	96.3	95.6	P/P	80 - 120
1983394	Lead	92.8	92.2	P/P	80 - 120
1983394	Nickel	98.0	98.1	P/P	80 - 120
1983394	Silver	95.7	94.3	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344319

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1987474	Chromium	89.5	89.9	P/P	75 - 125
1987474	Nickel	90.6	91.4	P/P	75 - 125

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343317

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983315	Chloride	97.1		P	90 - 110
1983364	Chloride	97.6		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343319

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983315	Sulfate	95.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343558

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983322	Ammonia-N	94.4	95.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343268

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983365	Kjeldahl Nitrogen	105	90.4	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343566

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983321	NO2NO3-N	102	103	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343479

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983365	Total-P	99.9	99.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343217

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983334	O-Phosphate-P	99.9	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P343853

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983677	Fluoride	96.7	97.4	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P343398

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1983322	Organic Carbon	98.2	98.8	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P343260

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983315	Turbidity	6.37	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P343304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983394	Calcium	0.0135	Spike	P	0 - 20
1983394	Iron	1.25	Spike	P	0 - 20
1983394	Magnesium	0.177	Spike	P	0 - 20
1983394	Potassium	0.513	Spike	P	0 - 20
1983394	Sodium	1.12	Spike	P	0 - 20
1983394	Zinc	0.00947	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983394	Arsenic	0.759	Spike	P	0 - 20
1983394	Cadmium	2.24	Spike	P	0 - 20
1983394	Chromium	0.245	Spike	P	0 - 20
1983394	Copper	0.705	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P343304

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983394	Lead	0.678	Spike	P	0 - 20
1983394	Nickel	0.107	Spike	P	0 - 20
1983394	Silver	1.44	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P344319

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1987474	Chromium	0.349	Spike	P	0 - 20
1987474	Nickel	0.720	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343317

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983315	Chloride	0.186	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P343319

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983315	Sulfate	0.153	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P343558

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983322	Ammonia-N	0.614	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P343268

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983365	Kjeldahl Nitrogen	11.1	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P343566

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983321	NO2NO3-N	0.475	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P343479

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983365	Total-P	0.557	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P343217

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983334	O-Phosphate-P	0.300	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P343210

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983320	Color (true)	2.67	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P343950

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1984545	Total Alkalinity	0.310	Sample	P	0 - 1.6

Reference Method: SM 2540 C-97
Batch ID: P343619

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983338	TDS	2.38	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P343620

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983339	TDS	1.95	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P343853

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983677	Fluoride	0.473	Spike	P	0 - 3.5

Reference Method: SM 5310 B-00
Batch ID: P343398

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1983322	Organic Carbon	0.457	Spike	P	0 - 20

Quality Assurance Report
Precision

* 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: SM 2120 B
Run ID: A83166
Included Lab Sample IDs: 1983338, 1983339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	100	102	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A83167
Included Lab Sample IDs: 1983342, 1983343

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.6	99.5	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A83184
Included Lab Sample IDs: 1983338, 1983339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	99.0	P/P	95 - 105

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A83234
Included Lab Sample IDs: 1983338, 1983339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	99.7	101	P/P	90 - 110
Sulfate	99.6	101	P/P	90 - 110

Reference Method: SM 5310 B-00
Run ID: A83237
Included Lab Sample IDs: 1983340, 1983341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	97.6	97.1	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83239
Included Lab Sample IDs: 1983348, 1983349

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	101	97.9	P/P	90 - 110
Arsenic	103	101	P/P	90 - 110
Cadmium	97.2	98.4	P/P	90 - 110
Cadmium	98.4	96.7	P/P	90 - 110
Chromium	95.6	95.8	P/P	90 - 110
Copper	103	98.7	P/P	90 - 110
Copper	104	103	P/P	90 - 110
Lead	95.0	96.0	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83239
Included Lab Sample IDs: 1983348, 1983349

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Lead	96.0	94.1	P/P	90 - 110
Nickel	103	102	P/P	90 - 110
Silver	97.6	98.0	P/P	90 - 110
Silver	98.0	96.1	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A83243
Included Lab Sample IDs: 1983348, 1983349

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	94.5	92.2	P/P	90 - 110
Calcium	95.6	94.5	P/P	90 - 110
Iron	95.9	94.0	P/P	90 - 110
Iron	96.7	95.9	P/P	90 - 110
Magnesium	96.2	94.7	P/P	90 - 110
Magnesium	97.1	96.2	P/P	90 - 110
Potassium	96.4	94.2	P/P	90 - 110
Potassium	97.4	96.4	P/P	90 - 110
Sodium	96.9	93.6	P/P	90 - 110
Sodium	98.1	96.9	P/P	90 - 110
Zinc	96.1	98.0	P/P	90 - 110
Zinc	99.0	96.1	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A83263
Included Lab Sample IDs: 1983340, 1983341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	107	P/P	90 - 110
Kjeldahl Nitrogen	107	103	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A83285
Included Lab Sample IDs: 1983340, 1983341

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A83287
Included Lab Sample IDs: 1983340, 1983341

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83314
Included Lab Sample IDs: 1983340, 1983341

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A83314
Included Lab Sample IDs: 1983340, 1983341

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

Reference Method: SM 4500 F-C-97
Run ID: A83392
Included Lab Sample IDs: 1983338, 1983339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.0	98.6	P/P	90 - 110

Reference Method: SM 2320 B-97
Run ID: A83420
Included Lab Sample IDs: 1983338, 1983339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.6	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A83582
Included Lab Sample IDs: 1983349

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	97.2	98.6	P/P	90 - 110
Nickel	96.6	97.8	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						6.37	
EPA 200.7 Rev. 4.4	Calcium	95.4	97.2	96.7				0.0135
	Iron	97.4	96.8	95.6	96.9			1.25
	Magnesium	96.8	98.1	97.8				0.177
	Potassium	96.7	94.6	97.4				0.513
	Sodium	97.8	99.1	97.3				1.12
	Zinc	92.5	94.2	90.8	90.8			0.0094
EPA 200.8 Rev. 5.4	Arsenic	100	100	101	99.8			0.759
	Cadmium	96.3	97.0	98.2	96.0			2.24
	Chromium	92.1	92.4	92.5	92.2			0.245
	Chromium	95.6	89.5	89.9				0.349
	Copper	99.1	98.1	96.3	95.6			0.705
	Lead	91.3	92.3	92.8	92.2			0.678
	Nickel	102	101	98.0	98.1			0.107
	Nickel	95.8	90.6	91.4				0.720
	Silver	95.0	95.6	95.7	94.3			1.44

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 300.0 Rev. 2.1	Chloride	98.6	97.1	97.6		0.186	
	Sulfate	97.5	95.8			0.153	
EPA 350.1 Rev. 2.0	Ammonia-N	96.4	94.4	95.0			0.614
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	106	105	90.4			11.1
EPA 353.2 Rev. 2.0	NO2NO3-N	100	102	103			0.475
EPA 365.1 Rev. 2.0	Total-P	104	99.9	99.0			0.557
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	99.9	100			0.300
SM 2120 B	Color (true)					2.67	
SM 2320 B-97	Total Alkalinity	101				0.310	
SM 2540 C-97	TDS					2.38	
	TDS					1.95	
SM 4500 F-C-97	Fluoride	95.1	96.7	97.4			0.473
SM 5310 B-00	Organic Carbon	98.4	98.2	98.8			0.457

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1983338, 1983339
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1983348, 1983349
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1983348, 1983349
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1983338, 1983339
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1983338, 1983339
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1983340, 1983341
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1983340, 1983341
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1983340, 1983341
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1983340, 1983341
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1983342, 1983343
SM 2120 B / E31780	True Color measured at 450 nm	1983338, 1983339
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1983338, 1983339
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1983338, 1983339
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1983338, 1983339
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1983338, 1983339
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1983340, 1983341

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	04/11/2018			04/11/2018 17:57	William L. Brown IV	1983338, 1983339
EPA 200.7 Rev. 4.4	04/11/2018	04/12/2018 18:50	Elliott D. Healy	04/13/2018 20:52	Betina Topolski	1983348
	04/11/2018	04/12/2018 18:50	Elliott D. Healy	04/13/2018 21:24	Betina Topolski	1983349
EPA 200.8 Rev. 5.4	04/11/2018	04/12/2018 18:50	Elliott D. Healy	04/15/2018 04:40	Robert K Palmer	1983348
	04/11/2018	04/12/2018 18:50	Elliott D. Healy	04/15/2018 05:16	Robert K Palmer	1983349
	04/11/2018	04/30/2018 15:15	Elliott D. Healy	05/01/2018 18:58	Robert K Palmer	1983349
EPA 300.0 Rev. 2.1	04/11/2018			04/12/2018 20:56	Lipi Saha	1983338
	04/11/2018			04/12/2018 21:08	Lipi Saha	1983339
EPA 350.1 Rev. 2.0	04/11/2018			04/16/2018 14:35	Ping Hua	1983340
	04/11/2018			04/16/2018 14:46	Ping Hua	1983341
EPA 351.2 Rev. 2.0	04/11/2018	04/12/2018 09:00	Adrian Shelby	04/13/2018 15:45	Joseph Suarez	1983340
	04/11/2018	04/12/2018 09:00	Adrian Shelby	04/13/2018 15:50	Joseph Suarez	1983341
EPA 353.2 Rev. 2.0	04/11/2018			04/17/2018 12:50	Lauren Bottorf	1983340
	04/11/2018			04/17/2018 12:51	Lauren Bottorf	1983341
EPA 365.1 Rev. 2.0	04/11/2018	04/16/2018 13:16	Sima Feizi	04/18/2018 10:07	Beverly Y. Sanders	1983340
	04/11/2018	04/16/2018 13:16	Sima Feizi	04/18/2018 10:10	Beverly Y. Sanders	1983341
EPA 365.1 Rev. 2.0 dissolved	04/11/2018			04/11/2018 15:17	Megan Treadwell	1983342
	04/11/2018			04/11/2018 15:18	Megan Treadwell	1983343
SM 2120 B	04/11/2018			04/11/2018 15:52	Tanya Welborn	1983338
	04/11/2018			04/11/2018 15:53	Tanya Welborn	1983339
SM 2320 B-97	04/11/2018			04/23/2018 23:24	Dale L. Simmons	1983338
	04/11/2018			04/23/2018 23:34	Dale L. Simmons	1983339
SM 2540 C-97	04/11/2018			04/13/2018 15:23	Yijie Li	1983338, 1983339
SM 2540 D-97	04/11/2018			04/13/2018 15:23	Yijie Li	1983338, 1983339
SM 4500 F-C-97	04/11/2018			04/20/2018 21:09	Lauren Bottorf	1983338
	04/11/2018			04/20/2018 21:19	Lauren Bottorf	1983339
SM 5310 B-00	04/11/2018			04/13/2018 14:16	Julia Storbeck	1983340
	04/11/2018			04/13/2018 14:34	Julia Storbeck	1983341