

Chemical Analysis Report

WQAP-2016-04-20-03

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

Event Description: **Killearn Chain of Lakes Outlet, Alford Arm Tributary, Lake Arrowhead and Ochlock**
Request ID: **RQ-2016-04-18-18**
Customer: **WQAP**
Project ID: **SMP**

Send Reports to:
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2600 Blair Stone Rd
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Date Certified: 13-MAY-2016 16:15



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: ALFORD ARM TRIBUTARY AT BUCK LAKE RD. Collection Date/Time: 04/20/2016 10:20

Field ID: G1WA0017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1791335	EPA 180.1 Rev. 2.0	Turbidity	2.1		NTU	P302760	
	EPA 300.0 Rev. 2.1	Chloride	3.6		mg Cl/L	P303240	
	SM 2120 B	Color (true)	110		PCU	P302667	
	SM 2320 B-97	Total Alkalinity	5.9		mg CaCO3/L	P302971	
	SM 2540 C-97	TDS	39		mg/L	P303357	
	SM 2540 D-97	TSS	2	I	mg/L	P303217	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P302975	
1791338	EPA 350.1 Rev. 2.0	Ammonia-N	0.018		mg N/L	P303498	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.56		mg N/L	P303941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303521	
	EPA 365.1 Rev. 2.0	Total-P	0.067		mg P/L	P303236	
	SM 5310 B-00	Organic Carbon	11		mg C/L	P303348	
1791341	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.030		mg P/L	P302713	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: KILLEARN CHAIN OF LAKES OUTLET AT VELDA DAIRY RD. ACROSS FROM MINT HILL CT.

Collection Date/Time: 04/20/2016 13:10

Field ID: G1WA0015

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1791336	EPA 180.1 Rev. 2.0	Turbidity	2.8		NTU	P302760	
	EPA 300.0 Rev. 2.1	Chloride	6.0		mg Cl/L	P303240	
	SM 2120 B	Color (true)	48		PCU	P302667	
	SM 2320 B-97	Total Alkalinity	8.0		mg CaCO3/L	P302971	
	SM 2540 C-97	TDS	32		mg/L	P303357	
	SM 2540 D-97	TSS	3	I	mg/L	P303217	
	SM 4500 F-C-97	Fluoride	0.038	I	mg F/L	P302975	
1791339	EPA 350.1 Rev. 2.0	Ammonia-N	0.011		mg N/L	P303498	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.34		mg N/L	P303941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.006	I	mg N/L	P303521	
	EPA 365.1 Rev. 2.0	Total-P	0.053		mg P/L	P303236	
	SM 5310 B-00	Organic Carbon	4.5		mg C/L	P303348	
1791342	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P302713	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: LAKE ARROWHEAD AT BOAT DOCK AT TURTLE CRK LN NEAR OUTLET

Collection Date/Time: 04/20/2016 14:10

Field ID: G1WA0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1791337	EPA 180.1 Rev. 2.0	Turbidity	17		NTU	P302760	
	EPA 300.0 Rev. 2.1	Chloride	3.9		mg Cl/L	P303240	
	SM 2120 B	Color (true)	32	A	PCU	P302784	

Field ID: G1WA0004

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1791337	SM 2320 B-97	Total Alkalinity	27		mg CaCO3/L	P302971	
	SM 2540 C-97	TDS	56		mg/L	P303358	
	SM 2540 D-97	TSS	11		mg/L	P303218	
	SM 4500 F-C-97	Fluoride	0.043	I	mg F/L	P302975	
1791340	EPA 350.1 Rev. 2.0	Ammonia-N	0.005		mg N/L	P303498	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.66		mg N/L	P303941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P303521	
	EPA 365.1 Rev. 2.0	Total-P	0.056		mg P/L	P303315	
	SM 5310 B-00	Organic Carbon	4.6		mg C/L	P303348	
1791343	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P302713	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

Sample Location: OCHLOCKONEE RIVER UPSTREAM OF SR 12 Collection Date/Time: 04/20/2016 15:05

Field ID: G1WA0038

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1791329	EPA 180.1 Rev. 2.0	Turbidity	13	A	NTU	P302760	
	EPA 300.0 Rev. 2.1	Chloride	8.2		mg Cl/L	P303240	
	SM 2120 B	Color (true)	150		PCU	P302667	
	SM 2320 B-97	Total Alkalinity	15		mg CaCO3/L	P302971	
	SM 2540 C-97	TDS	72		mg/L	P303357	
	SM 2540 D-97	TSS	7	I	mg/L	P303217	
	SM 4500 F-C-97	Fluoride	0.091	I	mg F/L	P302975	
1791331	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P303495	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.65		mg N/L	P303941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P303166	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P303236	
	SM 5310 B-00	Organic Carbon	10		mg C/L	P303348	
1791333	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.064		mg P/L	P302712	
1791350	EPA 200.7 Rev. 4.4	Calcium	5.66		mg/L	P302883	
		Iron	2.42E+03		ug/L	P302883	
		Magnesium	3.03		mg/L	P302883	
		Potassium	2.5		mg/L	P302883	
		Sodium	5.2		mg/L	P302883	
		Zinc	5.0	U	ug/L	P302883	
	EPA 200.8 Rev. 5.4	Arsenic	1.28		ug/L	P302883	
		Cadmium	0.020	U	ug/L	P302883	
		Chromium	1.29		ug/L	P303426	
		Copper	0.81		ug/L	P303426	
		Lead	0.80		ug/L	P302883	
		Nickel	0.61		ug/L	P303426	
		Silver	0.0050	U	ug/L	P303426	

Field ID: G1WA0038

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
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Ref. Method and Comment:

SM 2540 C-97: The reported result is consistent with the laboratory conductivity, 75 umhos/cm.

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The lead result was confirmed on 05/04/2016.

Sample Location: OCHLOCKONEE RIVER 350M UPSTREAM OF SR 12 Collection Date/Time: 04/20/2016 15:30

Field ID: G1WA0042

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
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1791330	EPA 180.1 Rev. 2.0	Turbidity	13	A	NTU	P302753	
	EPA 300.0 Rev. 2.1	Chloride	8.2		mg Cl/L	P303240	
	SM 2120 B	Color (true)	110		PCU	P302784	
	SM 2320 B-97	Total Alkalinity	15		mg CaCO3/L	P302971	
	SM 2540 C-97	TDS	71		mg/L	P303357	
	SM 2540 D-97	TSS	8	I	mg/L	P303217	
	SM 4500 F-C-97	Fluoride	0.092	I	mg F/L	P302975	
1791332	EPA 350.1 Rev. 2.0	Ammonia-N	0.078		mg N/L	P303498	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.71		mg N/L	P303941	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.36		mg N/L	P303521	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P303236	
	SM 5310 B-00	Organic Carbon	10		mg C/L	P303348	
1791334	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.064		mg P/L	P302713	
1791351	EPA 200.7 Rev. 4.4	Calcium	5.58		mg/L	P302883	
		Iron	2.39E+03		ug/L	P302883	
		Magnesium	3.03		mg/L	P302883	
		Potassium	2.5		mg/L	P302883	
		Sodium	5.1		mg/L	P302883	
		Zinc	5.0	U	ug/L	P302883	
	EPA 200.8 Rev. 5.4	Arsenic	1.25		ug/L	P302883	
		Cadmium	0.020	U	ug/L	P302883	
		Chromium	1.28		ug/L	P303426	
		Copper	0.82		ug/L	P303426	
		Lead	0.81		ug/L	P302883	
		Nickel	0.60		ug/L	P303426	
		Silver	0.0050	U	ug/L	P303426	

Ref. Method and Comment:

SM 2540 D-97: The precision data is unavailable due to the low analyte concentration in the QC sample.

EPA 200.8 Rev. 5.4: The lead result was confirmed on 05/04/2016.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P302753

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P302760

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302883

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: P302883

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Lead	0.050	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P303426

Component	Result	Code	Units
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303240

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303495

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303498

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303941

Component	Result	Code	Units
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Quality Assurance Report Method Blank Results

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303941

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303166

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303521

Component	Result	Code	Units
NO ₂ NO ₃ -N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303236

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303315

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302712

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302713

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

Reference Method: SM 2120 B
Batch ID: P302667

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P302784

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2320 B-97
Batch ID: P302971

Component	Result	Code	Units
Total Alkalinity	0.65	U	mg CaCO ₃ /L

Reference Method: SM 2540 C-97
Batch ID: P303357

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P303358

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303217

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P303218

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P302975

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P303348

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: P302883

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	108		P	85 - 115
Magnesium	105		P	85 - 115
Potassium	106		P	85 - 115
Sodium	106		P	85 - 115
Zinc	101		P	85 - 115

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302883

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	93.8		P	85 - 115
Cadmium	96.2		P	85 - 115
Lead	96.7		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P303426

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chromium	96.8		P	85 - 115
Copper	95.8		P	85 - 115
Nickel	97.2		P	85 - 115
Silver	96.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303240

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.8		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303495

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303498

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303941

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	98.7		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303166

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	104		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303521

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO ₂ NO ₃ -N	102		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303236

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303315

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.6		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302712

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302713

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

Reference Method: SM 2320 B-97
Batch ID: P302971

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	97.7		P	95 - 105

Reference Method: SM 4500 F-C-97
Batch ID: P302975

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.1		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P303348

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	99.4		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302883

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791725	Calcium	103		P	80 - 120
1791725	Iron	102	104	P/P	80 - 120
1791725	Magnesium	103		P	80 - 120
1791725	Potassium	107		P	80 - 120
1791725	Sodium	106		P	80 - 120
1791725	Zinc	101	98.9	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302883

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791735	Calcium	105		P	80 - 120
1791735	Iron	105		P	80 - 120
1791735	Magnesium	104		P	80 - 120
1791735	Potassium	100		P	80 - 120
1791735	Sodium	107		P	80 - 120
1791735	Zinc	101		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302883

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791725	Arsenic	97.4	98.0	P/P	80 - 120
1791725	Cadmium	100	100	P/P	80 - 120
1791725	Lead	100	101	P/P	80 - 120
1791735	Arsenic	96.2		P	80 - 120
1791735	Cadmium	99.4		P	80 - 120
1791735	Lead	98.8		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P303426

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791723	Chromium	93.7	92.9	P/P	80 - 120
1791723	Copper	93.1	92.0	P/P	80 - 120
1791723	Nickel	95.6	94.5	P/P	80 - 120
1791723	Silver	95.2	95.0	P/P	80 - 120
1791733	Chromium	95.5		P	80 - 120
1791733	Copper	93.7		P	80 - 120
1791733	Nickel	94.8		P	80 - 120
1791733	Silver	95.9		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303240

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791143	Chloride	99.2		P	90 - 110
1791183	Chloride	97.2		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303495

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791185	Ammonia-N	103	101	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303498

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791339	Ammonia-N	103	105	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303941

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791338	Kjeldahl Nitrogen	96.0	99.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303166

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791185	NO2NO3-N	100	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303521

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791332	NO2NO3-N	98.5		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303236

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791151	Total-P	97.4	97.7	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303315

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791340	Total-P	103	99.3	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302712

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791333	O-Phosphate-P	98.8	99.6	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302713

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791435	O-Phosphate-P	99.9	101	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P302975

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791467	Fluoride	97.9	98.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P303348

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1791148	Organic Carbon	99.5	99.9	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P302753

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791330	Turbidity	5.53	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P302760

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791329	Turbidity	3.72	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P302883

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791725	Calcium	0.0611	Spike	P	0 - 20
1791725	Iron	1.29	Spike	P	0 - 20
1791725	Magnesium	0.831	Spike	P	0 - 20
1791725	Potassium	0.780	Spike	P	0 - 20
1791725	Sodium	0.580	Spike	P	0 - 20
1791725	Zinc	1.61	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P302883

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791725	Arsenic	0.599	Spike	P	0 - 20
1791725	Cadmium	0.399	Spike	P	0 - 20
1791725	Lead	0.370	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P303426

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791723	Chromium	0.768	Spike	P	0 - 20
1791723	Copper	1.12	Spike	P	0 - 20
1791723	Nickel	1.16	Spike	P	0 - 20
1791723	Silver	0.270	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P303240

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791183	Chloride	0.147	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303495

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791185	Ammonia-N	1.36	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P303498

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791339	Ammonia-N	1.95	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P303941

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791338	Kjeldahl Nitrogen	2.42	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303166

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791185	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P303521

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791332	NO2NO3-N	3.10	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303236

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791151	Total-P	0.359	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P303315

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791340	Total-P	3.19	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791333	O-Phosphate-P	0.489	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P302713

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791435	O-Phosphate-P	1.19	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P302667

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791337	Color (true)	4.63	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P302784

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791337	Color (true)	0.101	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P302971

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791467	Total Alkalinity	0.882	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P303357

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791071	TDS	3.19	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P303358

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1790566	TDS	5.44	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P302975

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791467	Fluoride	0.483	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P303348

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1791148	Organic Carbon	0.358	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: A69006

Included Lab Sample IDs: 1791329, 1791335, 1791336

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	96.8	98.4	P/P	90 - 115
Color (true)	99.9	96.8	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A69022

Included Lab Sample IDs: 1791333, 1791334, 1791341, 1791342, 1791343

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	99.3	100	P/P	90 - 110
O-Phosphate-P	99.6	98.6	P/P	90 - 110

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A69033

Included Lab Sample IDs: 1791330

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

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A69035

Included Lab Sample IDs: 1791329, 1791335, 1791336, 1791337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	99.0	100	P/P	95 - 105

Reference Method: SM 2120 B

Run ID: A69040

Included Lab Sample IDs: 1791330, 1791337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	101	98.4	P/P	90 - 115

Reference Method: SM 2320 B-97

Run ID: A69103

Included Lab Sample IDs: 1791329, 1791330, 1791335, 1791336, 1791337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	96.8	99.5	P/P	90 - 110
Total Alkalinity	99.5	95.6	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 4500 F-C-97

Run ID: A69103

Included Lab Sample IDs: 1791329, 1791330, 1791335, 1791336, 1791337

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	98.5	98.0	P/P	90 - 110
Fluoride	99.5	98.5	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A69113

Included Lab Sample IDs: 1791350, 1791351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	101	P/P	95 - 105
Iron	101	100	P/P	95 - 105
Magnesium	102	101	P/P	95 - 105
Potassium	100	100	P/P	95 - 105
Sodium	102	101	P/P	95 - 105
Zinc	100	99.0	P/P	95 - 105

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69123

Included Lab Sample IDs: 1791350, 1791351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.9	96.6	P/P	90 - 110
Cadmium	97.6	98.0	P/P	90 - 110
Lead	94.9	94.6	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A69144

Included Lab Sample IDs: 1791329, 1791330, 1791335, 1791336, 1791337

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69154

Included Lab Sample IDs: 1791331

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: A69195

Included Lab Sample IDs: 1791331, 1791332, 1791338, 1791339

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	105	P/P	90 - 110
Total-P	105	103	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: SM 5310 B-00

Run ID: A69211

Included Lab Sample IDs: 1791331, 1791332, 1791338, 1791339, 1791340

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	99.4	98.9	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A69238

Included Lab Sample IDs: 1791331, 1791332, 1791338, 1791339, 1791340

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A69246

Included Lab Sample IDs: 1791340

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

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A69271

Included Lab Sample IDs: 1791332, 1791338, 1791339, 1791340

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	99.5	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A69338

Included Lab Sample IDs: 1791350, 1791351

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chromium	96.9	95.6	P/P	90 - 110
Copper	98.4	97.8	P/P	90 - 110
Nickel	97.7	97.6	P/P	90 - 110
Silver	96.8	96.5	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A69442

Included Lab Sample IDs: 1791331, 1791332, 1791338, 1791339, 1791340

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	95.5	98.1	P/P	90 - 110
Kjeldahl Nitrogen	98.1	95.5	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					5.53	
	Turbidity					3.72	
EPA 200.7 Rev. 4.4	Calcium	105	103	105			0.0611
	Iron	108	102	104	105		1.29
	Magnesium	105	103	104			0.831
	Potassium	106	107	100			0.780
	Sodium	106	106	107			0.580
	Zinc	101	101	98.9	101		1.61
EPA 200.8 Rev. 5.4	Arsenic	93.8	97.4	98.0	96.2		0.599
	Cadmium	96.2	100	100	99.4		0.399
	Chromium	96.8	93.7	92.9	95.5		0.768
	Copper	95.8	93.1	92.0	93.7		1.12
	Lead	96.7	100	101	98.8		0.370
	Nickel	97.2	95.6	94.5	94.8		1.16
	Silver	96.0	95.2	95.0	95.9		0.270
EPA 300.0 Rev. 2.1	Chloride	98.8	97.2	99.2		0.147	
EPA 350.1 Rev. 2.0	Ammonia-N	102	103	101			1.36
	Ammonia-N	102	103	105			1.95
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	98.7	96.0	99.5			2.42
EPA 353.2 Rev. 2.0	NO2NO3-N	104	100	100			0.0
	NO2NO3-N	102	98.5				3.10
EPA 365.1 Rev. 2.0	Total-P	100	97.4	97.7			0.359
	Total-P	99.6	103	99.3			3.19
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	99.4	98.8	99.6			0.489
	O-Phosphate-P	102	99.9	101			1.19
SM 2120 B	Color (true)					4.63	
	Color (true)					0.101	
SM 2320 B-97	Total Alkalinity	97.7				0.882	
SM 2540 C-97	TDS					3.19	
	TDS					5.44	
SM 4500 F-C-97	Fluoride	95.1	97.9	98.7			0.483
SM 5310 B-00	Organic Carbon	99.4	99.5	99.9			0.358

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1791329, 1791330, 1791335, 1791336, 1791337
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1791350, 1791351
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1791350, 1791351
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1791329, 1791330, 1791335, 1791336, 1791337
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1791331, 1791332, 1791338, 1791339, 1791340
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1791331, 1791332, 1791338, 1791339, 1791340
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1791331, 1791332, 1791338, 1791339, 1791340
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1791331, 1791332, 1791338, 1791339, 1791340
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1791333, 1791334, 1791341, 1791342, 1791343

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
SM 2120 B / E31780	True Color measured at 450 nm	1791329, 1791330, 1791335, 1791336, 1791337
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1791329, 1791330, 1791335, 1791336, 1791337
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1791329, 1791330, 1791335, 1791336, 1791337
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1791329, 1791330, 1791335, 1791336, 1791337
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1791329, 1791330, 1791335, 1791336, 1791337
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1791331, 1791332, 1791338, 1791339, 1791340

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	04/20/2016			04/21/2016 15:04	Sima Feizi	1791329, 1791335, 1791336, 1791337
	04/20/2016			04/21/2016 15:48	Blanca Fach	1791330
EPA 200.7 Rev. 4.4	04/20/2016	04/25/2016	Elliott D. Healy	04/26/2016	Joshua Ayres	1791350, 1791351
EPA 200.8 Rev. 5.4	04/20/2016	04/25/2016	Elliott D. Healy	04/27/2016	Charles J. Peterson	1791350, 1791351
	04/20/2016	05/03/2016	Elliott D. Healy	05/06/2016	Charles J. Peterson	1791350, 1791351
EPA 300.0 Rev. 2.1	04/20/2016			04/29/2016	Elisa J Lutz	1791329, 1791330, 1791335, 1791336, 1791337
EPA 350.1 Rev. 2.0	04/20/2016			05/03/2016	Diana M. Turner	1791331, 1791332, 1791338, 1791339, 1791340
EPA 351.2 Rev. 2.0	04/20/2016	05/11/2016	Sofia Elnemr	05/12/2016	Christopher Armour	1791331, 1791332, 1791338, 1791339, 1791340
EPA 353.2 Rev. 2.0	04/20/2016			04/28/2016	Diana M. Turner	1791331
	04/20/2016			05/04/2016	Peter D. Kaus	1791332, 1791338, 1791339, 1791340
EPA 365.1 Rev. 2.0	04/20/2016	04/29/2016	Christopher Armour	05/02/2016	Lipi Saha	1791331, 1791332, 1791338, 1791339
	04/20/2016	05/02/2016	Vijayalakshmi Reddy	05/03/2016	Lipi Saha	1791340
EPA 365.1 Rev. 2.0 dissolved	04/20/2016			04/21/2016 13:20	Ping Hua	1791333
	04/20/2016			04/21/2016 13:48	Ping Hua	1791334
	04/20/2016			04/21/2016 13:49	Ping Hua	1791341, 1791342
	04/20/2016			04/21/2016 13:50	Ping Hua	1791343
SM 2120 B	04/20/2016			04/21/2016 08:53	Rochelle Y Jackson	1791335, 1791336
	04/20/2016			04/21/2016 09:06	Rochelle Y Jackson	1791329
	04/20/2016			04/21/2016 16:12	Chrisoulla Rakowski	1791337
	04/20/2016			04/21/2016 16:13	Chrisoulla Rakowski	1791330
SM 2320 B-97	04/20/2016			04/25/2016	Dale L. Simmons	1791329, 1791330, 1791335, 1791336, 1791337
SM 2540 C-97	04/20/2016			04/22/2016	Yijie Li	1791329, 1791330, 1791335, 1791336, 1791337
SM 2540 D-97	04/20/2016			04/22/2016	Yijie Li	1791329, 1791330, 1791335, 1791336, 1791337
SM 4500 F-C-97	04/20/2016			04/25/2016	Dale L. Simmons	1791329, 1791330, 1791335, 1791336, 1791337
SM 5310 B-00	04/20/2016			04/30/2016	Sofia Elnemr	1791331, 1791332, 1791338, 1791339, 1791340