

Chemical Analysis Report

CEN-DIST-2019-04-11-01

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

Event Description: **Puzzle Lk Drain / Ruth / Fox**
Request ID: **RQ-2019-03-18-34**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
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3319 Maguire Blvd., Suite 232
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Certified by: Colin Wright, Program Administrator

Date Certified: 02-MAY-2019 11:52

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

Case Narrative

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

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

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

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

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

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: Ruth Lake @ Center

Collection Date/Time: 04/10/2019 10:29

Field ID: G3CE0021

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2077639	EPA 180.1 Rev. 2.0	Turbidity	16	A	NTU	P362004	
	EPA 300.0 Rev. 2.1	Chloride	420		mg Cl/L	P362299	
		Sulfate	140		mg SO4/L	P362302	
	SM 2120 B	Color (true)	86		PCU	P362033	
	SM 2320 B-97	Total Alkalinity	77		mg CaCO3/L	P362570	
	SM 2540 C-97	TDS	992		mg/L	P362631	
	SM 2540 D-97	TSS	19		mg/L	P362206	
	SM 4500 F-C-97	Fluoride	0.17		mg F/L	P362575	
2077641	EPA 350.1 Rev. 2.0	Ammonia-N	0.052		mg N/L	P362562	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.5		mg N/L	P362480	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.10		mg N/L	P362494	
	EPA 365.1 Rev. 2.0	Total-P	0.084		mg P/L	P362351	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P362314	
2077643	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.018		mg P/L	P362019	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Saint Johns River @ 300m DS of Hatbill Park Ramp

Collection Date/Time: 04/10/2019 10:51

Field ID: G3CE0006

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2077636	EPA 180.1 Rev. 2.0	Turbidity	9.6		NTU	P362004	
	EPA 300.0 Rev. 2.1	Chloride	550		mg Cl/L	P362299	
		Sulfate	170		mg SO4/L	P362302	
	SM 2120 B	Color (true)	110		PCU	P362031	
	SM 2320 B-97	Total Alkalinity	64		mg CaCO3/L	P362570	
	SM 2540 C-97	TDS	1.24E+03		mg/L	P362631	
	SM 2540 D-97	TSS	8	I	mg/L	P362206	
	SM 4500 F-C-97	Fluoride	0.16		mg F/L	P362575	
2077637	EPA 350.1 Rev. 2.0	Ammonia-N	0.12		mg N/L	P362562	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.4		mg N/L	P362480	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.080		mg N/L	P362494	
	EPA 365.1 Rev. 2.0	Total-P	0.059		mg P/L	P362351	
	SM 5310 B-00	Organic Carbon	22		mg C/L	P362314	
2077638	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P362019	
2077649	EPA 200.7 Rev. 4.4	Barium	47.6		ug/L	P362169	
		Calcium	76.9		mg/L	P362169	
		Iron	640		ug/L	P362169	
		Magnesium	34.2		mg/L	P362169	
		Potassium	7.7		mg/L	P362169	
		Sodium	248		mg/L	P362169	
		Zinc	5.0	U	ug/L	P362169	
	EPA 200.8 Rev. 5.4	Aluminum	236		ug/L	P362169	
		Antimony	0.10	I	ug/L	P362169	
		Arsenic	0.73		ug/L	P362169	
		Boron**	91.6		ug/L	P362169	
		Cadmium	0.020	U	ug/L	P362169	
		Chromium	0.41	I	ug/L	P362169	
		Copper	0.64	I	ug/L	P362169	
		Lead	0.52		ug/L	P362169	
		Nickel	0.50	U	ug/L	P362169	
		Selenium	0.24	I	ug/L	P362169	
		Silver	0.010	U	ug/L	P362169	
		Thallium	0.10	U	ug/L	P362169	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Sample Location: Fox Lake @ Center of West Lobe

Collection Date/Time: 04/10/2019 11:52

Field ID: G3CE0022

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2077640	EPA 180.1 Rev. 2.0	Turbidity	2.2	A	NTU	P362005	
	EPA 300.0 Rev. 2.1	Chloride	230		mg Cl/L	P362299	
		Sulfate	38		mg SO4/L	P362302	
	SM 2120 B	Color (true)	240		PCU	P362031	
	SM 2320 B-97	Total Alkalinity	26		mg CaCO3/L	P362572	
	SM 2540 C-97	TDS	524	A	mg/L	P362631	
	SM 2540 D-97	TSS	2	UA	mg/L	P362206	
	SM 4500 F-C-97	Fluoride	0.048	I	mg F/L	P362577	
2077642	EPA 350.1 Rev. 2.0	Ammonia-N	0.055		mg N/L	P362562	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.2		mg N/L	P362480	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.055		mg N/L	P362494	
	EPA 365.1 Rev. 2.0	Total-P	0.044		mg P/L	P362351	
	SM 5310 B-00	Organic Carbon	27		mg C/L	P362314	
2077644	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.012		mg P/L	P362019	

Ref. Method and Comment:

SM 2540 D-97: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.

Quality Assurance Report Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P362004

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P362005

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362169

Component	Result	Code	Units
Barium	1.0	U	ug/L
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Potassium	0.30	U	mg/L
Sodium	0.50	U	mg/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362169

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Boron	2.0	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L
Thallium	0.10	U	ug/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362299

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362302

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: P362562

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362480

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362494

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362351

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362019

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

Reference Method: SM 2120 B
Batch ID: P362031

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P362033

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P362570

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

Reference Method: SM 2320 B-97
Batch ID: P362572

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: P362631

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P362206

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P362575

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P362314

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: P362169

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Barium	99.9		P	85 - 115
Calcium	93.1		P	85 - 115
Iron	97.0		P	85 - 115
Magnesium	98.5		P	85 - 115
Potassium	92.5		P	85 - 115
Sodium	89.8		P	85 - 115
Zinc	98.9		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362169

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	102		P	85 - 115
Antimony	87.4		P	85 - 115
Arsenic	90.7		P	85 - 115
Boron	101		P	85 - 115
Cadmium	90.3		P	85 - 115
Chromium	99.1		P	85 - 115
Copper	103		P	85 - 115
Lead	96.9		P	85 - 115
Nickel	104		P	85 - 115
Selenium	103		P	85 - 115
Silver	102		P	85 - 115
Thallium	107		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362299

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362302

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362562

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: P362480

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	97.2		P	90 - 110

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362494

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362351

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.8		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362019

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

Reference Method: SM 2120 B
Batch ID: P362031

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

Reference Method: SM 2120 B
Batch ID: P362033

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

Reference Method: SM 2320 B-97
Batch ID: P362570

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	98.0		P	98 - 106

Reference Method: SM 2320 B-97
Batch ID: P362572

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.7		P	98 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P362575

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.8		P	92 - 103

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	99.3		P	92 - 103

Quality Assurance Report

Laboratory Control Sample Accuracy

Reference Method: SM 5310 B-00
Batch ID: P362314

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

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077466	Barium	96.5	96.7	P/P	80 - 120
2077466	Calcium	92.2		P	80 - 120
2077466	Iron	95.7	97.7	P/P	80 - 120
2077466	Magnesium	93.7	97.6	P/P	80 - 120
2077466	Potassium	88.9	93.3	P/P	80 - 120
2077466	Sodium	91.2		P	80 - 120
2077466	Zinc	98.3	98.1	P/P	80 - 120
2077535	Barium	97.1		P	80 - 120
2077535	Calcium	92.6		P	80 - 120
2077535	Iron	96.0		P	80 - 120
2077535	Magnesium	93.7		P	80 - 120
2077535	Potassium	89.8		P	80 - 120
2077535	Sodium	93.5		P	80 - 120
2077535	Zinc	99.6		P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362169

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077466	Aluminum	100	100	P/P	80 - 120
2077466	Antimony	108	107	P/P	80 - 120
2077466	Arsenic	92.0	92.5	P/P	80 - 120
2077466	Boron	100	99.4	P/P	80 - 120
2077466	Cadmium	92.0	89.5	P/P	80 - 120
2077466	Chromium	97.3	96.7	P/P	80 - 120
2077466	Copper	102	101	P/P	80 - 120
2077466	Lead	99.0	98.9	P/P	80 - 120
2077466	Nickel	105	104	P/P	80 - 120
2077466	Selenium	107	104	P/P	80 - 120
2077466	Silver	99.5	98.5	P/P	80 - 120
2077466	Thallium	110	111	P/P	80 - 120
2077535	Aluminum	99.6		P	80 - 120
2077535	Antimony	109		P	80 - 120
2077535	Arsenic	95.2		P	80 - 120
2077535	Boron	95.3		P	80 - 120
2077535	Cadmium	91.1		P	80 - 120
2077535	Chromium	96.9		P	80 - 120
2077535	Copper	103		P	80 - 120
2077535	Lead	99.9		P	80 - 120
2077535	Nickel	105		P	80 - 120
2077535	Selenium	108		P	80 - 120
2077535	Silver	99.5		P	80 - 120
2077535	Thallium	113		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362299

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077574	Chloride	101		P	90 - 110
2077580	Chloride	102		P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362302

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077574	Sulfate	103		P	90 - 110
2077580	Sulfate	103		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362562

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077582	Ammonia-N	101	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362480

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077577	Kjeldahl Nitrogen	102	100	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362494

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077627	NO2NO3-N	99.9	99.4	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362351

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077582	Total-P	98.0	98.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362019

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077667	O-Phosphate-P	95.4	96.6	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P362575

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077861	Fluoride	98.5	100	P/P	89 - 106

Reference Method: SM 4500 F-C-97
Batch ID: P362577

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077663	Fluoride	101	100	P/P	89 - 106

Reference Method: SM 5310 B-00
Batch ID: P362314

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2077683	Organic Carbon	102	103	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P362004

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077639	Turbidity	1.23	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P362005

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077640	Turbidity	6.80	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P362169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077466	Barium	0.195	Spike	P	0 - 20
2077466	Calcium	1.75	Spike	P	0 - 20
2077466	Iron	2.01	Spike	P	0 - 20
2077466	Magnesium	2.16	Spike	P	0 - 20
2077466	Potassium	2.61	Spike	P	0 - 20
2077466	Sodium	2.22	Spike	P	0 - 20
2077466	Zinc	0.177	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P362169

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077466	Aluminum	0.121	Spike	P	0 - 20
2077466	Antimony	0.675	Spike	P	0 - 20
2077466	Arsenic	0.476	Spike	P	0 - 20
2077466	Boron	0.702	Spike	P	0 - 20
2077466	Cadmium	2.78	Spike	P	0 - 20
2077466	Chromium	0.580	Spike	P	0 - 20
2077466	Copper	0.268	Spike	P	0 - 20
2077466	Lead	0.174	Spike	P	0 - 20
2077466	Nickel	0.935	Spike	P	0 - 20
2077466	Selenium	2.61	Spike	P	0 - 20
2077466	Silver	1.08	Spike	P	0 - 20
2077466	Thallium	0.810	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362299

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077574	Chloride	0.0275	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P362302

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077574	Sulfate	0.196	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P362562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077582	Ammonia-N	0.788	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P362480

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077577	Kjeldahl Nitrogen	1.40	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P362494

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077627	NO2NO3-N	0.489	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P362351

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077582	Total-P	0.839	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P362019

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077667	O-Phosphate-P	1.25	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P362031

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077575	Color (true)	0.175	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P362033

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077352	Color (true)	9.57	Sample	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2320 B-97
 Batch ID: P362570

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077861	Total Alkalinity	0.219	Sample	P	0 - 2.8

Reference Method: SM 2320 B-97
 Batch ID: P362572

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077663	Total Alkalinity	0.559	Sample	P	0 - 2.8

Reference Method: SM 2540 C-97
 Batch ID: P362631

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077640	TDS	0.191	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
 Batch ID: P362575

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077861	Fluoride	1.44	Spike	P	0 - 2.5

Reference Method: SM 4500 F-C-97
 Batch ID: P362577

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077663	Fluoride	0.470	Spike	P	0 - 2.5

Reference Method: SM 5310 B-00
 Batch ID: P362314

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2077683	Organic Carbon	0.814	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 180.1 Rev. 2.0

Run ID: A90636

Included Lab Sample IDs: 2077636, 2077639, 2077640

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A90643

Included Lab Sample IDs: 2077638, 2077643, 2077644

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.3	96.8	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A90648

Included Lab Sample IDs: 2077636, 2077639, 2077640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	102	103	P/P	85 - 115
Color (true)	103	102	P/P	90 - 115
Color (true)	103	103	P/P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A90755

Included Lab Sample IDs: 2077649

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Barium	99.5	99.0	P/P	90 - 110
Calcium	95.7	95.0	P/P	90 - 110
Iron	96.8	96.4	P/P	90 - 110
Magnesium	96.2	95.8	P/P	90 - 110
Potassium	94.4	95.1	P/P	90 - 110
Sodium	94.4	94.9	P/P	90 - 110
Zinc	98.5	98.0	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A90760

Included Lab Sample IDs: 2077636, 2077639, 2077640

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

Reference Method: SM 5310 B-00

Run ID: A90771

Included Lab Sample IDs: 2077637, 2077641, 2077642

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90819

Included Lab Sample IDs: 2077637, 2077641

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

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A90837

Included Lab Sample IDs: 2077642

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	99.2	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A90845

Included Lab Sample IDs: 2077637, 2077641, 2077642

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A90870

Included Lab Sample IDs: 2077637, 2077641, 2077642

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

Reference Method: SM 2320 B-97

Run ID: A90871

Included Lab Sample IDs: 2077636, 2077639, 2077640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	100	98.5	P/P	90 - 110
Total Alkalinity	96.7	99.7	P/P	90 - 110
Total Alkalinity	99.7	98.1	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A90871

Included Lab Sample IDs: 2077636, 2077639, 2077640

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	100	101	P/P	90 - 110
Fluoride	98.6	99.5	P/P	90 - 110
Fluoride	99.5	101	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A90897

Included Lab Sample IDs: 2077637, 2077641, 2077642

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	99.8	P/P	90 - 110
Kjeldahl Nitrogen	98.7	104	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A90981

Included Lab Sample IDs: 2077649

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	91.5	91.4	P/P	90 - 110
Cadmium	90.1	90.4	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A91051

Included Lab Sample IDs: 2077649

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	97.2	98.2	P/P	90 - 110
Antimony	103	103	P/P	90 - 110
Boron	93.5	91.8	P/P	90 - 110
Chromium	99.5	99.9	P/P	90 - 110
Copper	101	102	P/P	90 - 110
Lead	93.7	93.6	P/P	90 - 110
Nickel	102	103	P/P	90 - 110
Selenium	101	102	P/P	90 - 110
Silver	97.7	97.4	P/P	90 - 110
Thallium	99.9	102	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					1.23	
	Turbidity					6.80	
EPA 200.7 Rev. 4.4	Barium	99.9	96.5	96.7	97.1		0.195
	Calcium	93.1	92.2	92.6			1.75
	Iron	97.0	95.7	97.7	96.0		2.01
	Magnesium	98.5	93.7	97.6	93.7		2.16
	Potassium	92.5	88.9	93.3	89.8		2.61
	Sodium	89.8	91.2	93.5			2.22
	Zinc	98.9	98.3	98.1	99.6		0.177
EPA 200.8 Rev. 5.4	Aluminum	102	100	100	99.6		0.121
	Antimony	87.4	108	107	109		0.675
	Arsenic	90.7	92.0	92.5	95.2		0.476
	Boron	101	100	99.4	95.3		0.702
	Cadmium	90.3	92.0	89.5	91.1		2.78
	Chromium	99.1	97.3	96.7	96.9		0.580
	Copper	103	102	101	103		0.268
	Lead	96.9	99.0	98.9	99.9		0.174
	Nickel	104	105	104	105		0.935
	Selenium	103	107	104	108		2.61
	Silver	102	99.5	98.5	99.5		1.08
	Thallium	107	110	111	113		0.810
EPA 300.0 Rev. 2.1	Chloride	105	101	102		0.0275	
	Sulfate	106	103	103		0.196	
EPA 350.1 Rev. 2.0	Ammonia-N	99.9	101	100			0.788
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	97.2	102	100			1.40
EPA 353.2 Rev. 2.0	NO ₂ NO ₃ -N	99.5	99.9	99.4			0.489
EPA 365.1 Rev. 2.0	Total-P	99.8	98.0	98.8			0.839
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	95.4	96.6			1.25
SM 2120 B	Color (true)	101				0.175	
	Color (true)	101				9.57	
SM 2320 B-97	Total Alkalinity	98.0				0.219	
	Total Alkalinity	99.7				0.559	
SM 2540 C-97	TDS					0.191	
SM 4500 F-C-97	Fluoride	97.8	98.5	100			1.44
	Fluoride	99.3	101	100			0.470
SM 5310 B-00	Organic Carbon	99.9	102	103			0.814

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	2077636, 2077639, 2077640
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2077649
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2077649
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	2077636, 2077639, 2077640
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	2077636, 2077639, 2077640
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	2077637, 2077641, 2077642
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	2077637, 2077641, 2077642

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	2077637, 2077641, 2077642
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	2077637, 2077641, 2077642
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2077638, 2077643, 2077644
SM 2120 B / E31780	True Color measured at 450 nm	2077636, 2077639, 2077640
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	2077636, 2077639, 2077640
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	2077636, 2077639, 2077640
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2077636, 2077639, 2077640
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2077636, 2077639, 2077640
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	2077637, 2077641, 2077642

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	04/11/2019			04/11/2019 16:15	Adrian Shelby	2077636, 2077639, 2077640
EPA 200.7 Rev. 4.4	04/11/2019	04/15/2019 16:30	Elliott D. Healy	04/16/2019 15:07	Betina Topolski	2077649
	04/11/2019	04/15/2019 16:30	Elliott D. Healy	04/16/2019 15:14	Betina Topolski	2077649
EPA 200.8 Rev. 5.4	04/11/2019	04/15/2019 16:30	Elliott D. Healy	04/25/2019 02:19	Martin Acosta	2077649
	04/11/2019	04/15/2019 16:30	Elliott D. Healy	04/27/2019 05:04	Martin Acosta	2077649
EPA 300.0 Rev. 2.1	04/11/2019			04/17/2019 07:27	Lipi Saha	2077636
	04/11/2019			04/17/2019 07:39	Lipi Saha	2077639
	04/11/2019			04/17/2019 07:51	Lipi Saha	2077640
EPA 350.1 Rev. 2.0	04/11/2019			04/18/2019 11:22	Ping Hua	2077637
	04/11/2019			04/18/2019 11:29	Ping Hua	2077641
	04/11/2019			04/18/2019 11:31	Ping Hua	2077642
EPA 351.2 Rev. 2.0	04/11/2019	04/19/2019 11:00	Adrian Shelby	04/22/2019 15:38	Joseph Suarez	2077637
	04/11/2019	04/19/2019 11:00	Adrian Shelby	04/22/2019 15:43	Joseph Suarez	2077641
	04/11/2019	04/19/2019 11:00	Adrian Shelby	04/22/2019 15:44	Joseph Suarez	2077642
EPA 353.2 Rev. 2.0	04/11/2019			04/19/2019 10:25	Beverly Y. Sanders	2077637
	04/11/2019			04/19/2019 10:26	Beverly Y. Sanders	2077641
	04/11/2019			04/19/2019 10:27	Beverly Y. Sanders	2077642
EPA 365.1 Rev. 2.0	04/11/2019	04/17/2019 12:40	Sima Feizi	04/18/2019 12:00	Rosalyn Ballman	2077637
	04/11/2019	04/17/2019 12:40	Sima Feizi	04/18/2019 12:01	Rosalyn Ballman	2077641
	04/11/2019	04/17/2019 12:40	Sima Feizi	04/18/2019 17:27	Rosalyn Ballman	2077642
EPA 365.1 Rev. 2.0 dissolved	04/11/2019			04/11/2019 15:39	Jhamieka S. Greenwood	2077638
	04/11/2019			04/11/2019 15:40	Jhamieka S. Greenwood	2077643
	04/11/2019			04/11/2019 15:41	Jhamieka S. Greenwood	2077644
SM 2120 B	04/11/2019			04/11/2019 16:03	Mariam Hanna	2077636
	04/11/2019			04/11/2019 16:14	Mariam Hanna	2077640
	04/11/2019			04/11/2019 16:22	Mariam Hanna	2077639
SM 2320 B-97	04/11/2019			04/19/2019 01:06	Samantha Davila	2077639
	04/11/2019			04/19/2019 02:02	Samantha Davila	2077636
	04/11/2019			04/19/2019 10:35	Samantha Davila	2077640
SM 2540 C-97	04/11/2019			04/12/2019 18:11	Mariam Hanna	2077636, 2077639, 2077640
SM 2540 D-97	04/11/2019			04/12/2019 18:23	Mariam Hanna	2077636, 2077639, 2077640
SM 4500 F-C-97	04/11/2019			04/19/2019 01:06	Samantha Davila	2077639
	04/11/2019			04/19/2019 02:02	Samantha Davila	2077636
	04/11/2019			04/19/2019 10:35	Samantha Davila	2077640
SM 5310 B-00	04/11/2019			04/16/2019 21:47	Julia Storbeck	2077637
	04/11/2019			04/16/2019 21:59	Julia Storbeck	2077641
	04/11/2019			04/16/2019 22:11	Julia Storbeck	2077642