

Chemical Analysis Report

CEN-DIST-2017-02-17-02

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

Event Description: **South Grasshopper Lk + D&B**
Request ID: **RQ-2017-02-13-62**
Customer: **CEN-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
3319 Maguire Blvd., Suite 232
Orlando, FL 32803-3767
Attn: Mike Linger

For additional information please contact
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Certified by: Liang Lin, Environmental Administrator

Date Certified: 15-MAR-2017 15:10

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

Case Narrative

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

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

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

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

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited 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: Grasshopper Lake S @ 325m SE of Boat Ramp Collection Date/Time: 02/16/2017 12:09

Field ID: G2CE0070

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1873741	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P320076	
	EPA 300.0 Rev. 2.1	Chloride	8.8		mg Cl/L	P320911	
		Sulfate	4.5		mg SO4/L	P320819	
	SM 2120 B	Color (true)	8.9		PCU	P320077	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P320411	
	SM 2540 C-97	TDS	40		mg/L	P320523	
	SM 2540 D-97	TSS	4	I	mg/L	P320521	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P320418	
1873743	EPA 350.1 Rev. 2.0	Ammonia-N	0.003	I	mg N/L	P320318	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.44		mg N/L	P320167	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320278	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P320177	
	SM 5310 B-00	Organic Carbon	5.0		mg C/L	P320099	
1873745	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320084	

Ref. Method and Comment:

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

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Grasshopper Lake S @ 325m SE of Boat Ramp Collection Date/Time: 02/16/2017 12:09

Field ID: G2CE0070_DUP

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1873742	EPA 180.1 Rev. 2.0	Turbidity	1.1		NTU	P320076	
	EPA 300.0 Rev. 2.1	Chloride	8.8		mg Cl/L	P320911	
		Sulfate	4.6		mg SO4/L	P320819	
	SM 2120 B	Color (true)	8.4		PCU	P320077	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P320411	
	SM 2540 C-97	TDS	38		mg/L	P320523	
	SM 2540 D-97	TSS	3	I	mg/L	P320521	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P320418	
1873744	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	I	mg N/L	P320318	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.47		mg N/L	P320167	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320278	
	EPA 365.1 Rev. 2.0	Total-P	0.011		mg P/L	P320177	
	SM 5310 B-00	Organic Carbon	5.0		mg C/L	P320099	
1873746	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320084	

Ref. Method and Comment:

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

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: Grasshopper Lake S @ 325m SE of Boat Ramp Collection Date/Time: 02/16/2017 12:44

Field ID: BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1873738	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P320076	

Field ID: BLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1873738	EPA 300.0 Rev. 2.1	Chloride	0.20	U	mg Cl/L	P320911	
		Sulfate	0.20	U	mg SO4/L	P320819	
	SM 2120 B	Color (true)	2.5	U	PCU	P320077	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P320411	
	SM 2540 C-97	TDS	15	U	mg/L	P320523	
	SM 2540 D-97	TSS	2	U	mg/L	P320521	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P320418	
1873739	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P320318	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P320162	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P320278	
	EPA 365.1 Rev. 2.0	Total-P	0.003	I	mg P/L	P320177	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P320099	
1873740	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P320084	
1873770	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P320209	
		Iron	30	U	ug/L	P320209	
		Magnesium	0.040	U	mg/L	P320209	
		Potassium	0.30	U	mg/L	P320209	
		Sodium	0.50	U	mg/L	P320209	
		Zinc	5.0	U	ug/L	P320209	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P320209	
		Cadmium	0.020	U	ug/L	P320209	
		Chromium	0.40	U	ug/L	P320209	
		Copper	0.20	U	ug/L	P320209	
		Lead	0.050	U	ug/L	P320209	
		Nickel	0.20	U	ug/L	P320209	
		Silver	0.010	U	ug/L	P320209	

Ref. Method and Comment:

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

SM 4500 F-C-97: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: The result was confirmed on 02/27/2017.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P320076

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P320209

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P320209

Component	Result	Code	Units
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320209

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P320819

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P320911

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320318

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320162

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320167

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P320278

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

Quality Assurance Report Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320177

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P320084

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

Reference Method: SM 2120 B
Batch ID: P320077

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P320411

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

Reference Method: SM 2540 C-97
Batch ID: P320523

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P320521

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P320418

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P320099

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: P320209

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
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Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P320209

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	103		P	85 - 115
Magnesium	108		P	85 - 115
Potassium	101		P	85 - 115
Sodium	99.3		P	85 - 115
Zinc	99.3		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320209

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	92.6		P	85 - 115
Cadmium	90.5		P	85 - 115
Chromium	91.4		P	85 - 115
Copper	93.2		P	85 - 115
Lead	92.2		P	85 - 115
Nickel	94.2		P	85 - 115
Silver	85.6		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P320819

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P320911

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	96.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P320318

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: P320162

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	109		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P320167

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P320278

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

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P320177

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	94.8		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P320084

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

Reference Method: SM 2320 B-97
 Batch ID: P320411

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

Reference Method: SM 4500 F-C-97
 Batch ID: P320418

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	95.6		P	92 - 103

Reference Method: SM 5310 B-00
 Batch ID: P320099

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.7		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
 Batch ID: P320209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873654	Calcium	104	105	P/P	80 - 120
1873654	Iron	103	106	P/P	80 - 120
1873654	Magnesium	106	107	P/P	80 - 120
1873654	Potassium	94.4	94.1	P/P	80 - 120
1873654	Sodium	97.8		P	80 - 120
1873654	Zinc	99.8	99.9	P/P	80 - 120
1873658	Calcium	99.8		P	80 - 120
1873658	Iron	104		P	80 - 120
1873658	Magnesium	105		P	80 - 120
1873658	Potassium	94.8		P	80 - 120
1873658	Sodium	99.2		P	80 - 120
1873658	Zinc	99.2		P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
 Batch ID: P320209

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873654	Arsenic	89.1	88.9	P/P	80 - 120
1873654	Cadmium	86.8	87.1	P/P	80 - 120
1873654	Chromium	87.9	87.5	P/P	80 - 120
1873654	Copper	90.3	90.5	P/P	80 - 120
1873654	Lead	88.9	88.2	P/P	80 - 120
1873654	Nickel	90.1	90.0	P/P	80 - 120
1873654	Silver	83.0	85.0	P/P	80 - 120
1873658	Arsenic	86.6		P	85 - 115
1873658	Cadmium	87.1		P	85 - 115
1873658	Chromium	86.9		P	85 - 115
1873658	Copper	87.6		P	85 - 115
1873658	Lead	88.9		P	85 - 115
1873658	Nickel	88.0		P	85 - 115
1873658	Silver	83.6		P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P320819

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873397	Sulfate	102		P	90 - 110
1873398	Sulfate	104		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P320911

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873397	Chloride	95.4		P	90 - 110
1873398	Chloride	97.1		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P320318

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873517	Ammonia-N	100	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P320162

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873639	Kjeldahl Nitrogen	100	96.6	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P320167

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873805	Kjeldahl Nitrogen	94.9	91.7	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P320278

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873743	NO2NO3-N	105	105	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P320177

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873805	Total-P	94.5	93.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P320084

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873519	O-Phosphate-P	97.8	98.1	P/P	90 - 110

Reference Method: SM 5310 B-00
Batch ID: P320099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1873517	Organic Carbon	96.5	94.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P320076

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873516	Turbidity	3.45	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P320209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873654	Calcium	0.630	Spike	P	0 - 20
1873654	Iron	2.09	Spike	P	0 - 20
1873654	Magnesium	0.736	Spike	P	0 - 20
1873654	Potassium	0.207	Spike	P	0 - 20
1873654	Sodium	1.55	Spike	P	0 - 20
1873654	Zinc	0.106	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P320209

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873654	Arsenic	0.276	Spike	P	0 - 20
1873654	Cadmium	0.352	Spike	P	0 - 20
1873654	Chromium	0.465	Spike	P	0 - 20
1873654	Copper	0.143	Spike	P	0 - 20
1873654	Lead	0.752	Spike	P	0 - 20
1873654	Nickel	0.129	Spike	P	0 - 20
1873654	Silver	2.34	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P320819

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873398	Sulfate	0.686	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
 Batch ID: P320911

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873398	Chloride	0.163	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
 Batch ID: P320318

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873517	Ammonia-N	1.51	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P320162

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873639	Kjeldahl Nitrogen	1.91	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
 Batch ID: P320167

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873805	Kjeldahl Nitrogen	3.15	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
 Batch ID: P320278

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873743	NO2NO3-N	0.0	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
 Batch ID: P320177

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873805	Total-P	0.668	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
 Batch ID: P320084

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873519	O-Phosphate-P	0.293	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P320077

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873515	Color (true)	1.91	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P320411

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873822	Total Alkalinity	0.289	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P320523

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873516	TDS	3.62	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P320418

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873822	Fluoride	0.947	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P320099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1873517	Organic Carbon	1.55	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: A74556
Included Lab Sample IDs: 1873738, 1873741, 1873742

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

Reference Method: SM 2120 B
Run ID: A74558
Included Lab Sample IDs: 1873738, 1873741, 1873742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	94.5	96.5	P/P	85 - 115

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A74564

Included Lab Sample IDs: 1873740, 1873745, 1873746

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.2	97.5	P/P	90 - 110
O-Phosphate-P	97.5	97.1	P/P	90 - 110

Reference Method: SM 5310 B-00

Run ID: A74569

Included Lab Sample IDs: 1873739, 1873743, 1873744

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.2	96.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A74623

Included Lab Sample IDs: 1873770

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	101	P/P	90 - 110
Iron	102	103	P/P	90 - 110
Magnesium	102	103	P/P	90 - 110
Potassium	102	103	P/P	90 - 110
Sodium	101	100	P/P	90 - 110
Zinc	103	102	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A74639

Included Lab Sample IDs: 1873739, 1873743, 1873744

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	101	99.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A74641

Included Lab Sample IDs: 1873739, 1873743, 1873744

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	95.0	P/P	90 - 110
NO2NO3-N	102	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A74650

Included Lab Sample IDs: 1873739, 1873743, 1873744

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A74655

Included Lab Sample IDs: 1873739, 1873743, 1873744

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

Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A74681

Included Lab Sample IDs: 1873770

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	95.2	93.3	P/P	90 - 110
Cadmium	92.1	91.9	P/P	90 - 110
Chromium	94.9	94.4	P/P	90 - 110
Copper	96.3	94.2	P/P	90 - 110
Lead	92.7	92.6	P/P	90 - 110
Nickel	98.1	94.7	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A74690

Included Lab Sample IDs: 1873738, 1873741, 1873742

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

Reference Method: SM 4500 F-C-97

Run ID: A74690

Included Lab Sample IDs: 1873738, 1873741, 1873742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	97.5	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A74765

Included Lab Sample IDs: 1873738, 1873741, 1873742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Sulfate	105	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A74817

Included Lab Sample IDs: 1873770

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Silver	96.7	95.2	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A74874

Included Lab Sample IDs: 1873738, 1873741, 1873742

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	93.8	96.9	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						3.45
EPA 200.7 Rev. 4.4	Calcium	105	104	105	99.8		0.630
	Iron	103	103	106	104		2.09
	Magnesium	108	106	107	105		0.736
	Potassium	101	94.4	94.1	94.8		0.207
	Sodium	99.3	97.8	99.2			1.55
	Zinc	99.3	99.8	99.9	99.2		0.106
EPA 200.8 Rev. 5.4	Arsenic	92.6	86.6	89.1	88.9		0.276
	Cadmium	90.5	87.1	86.8	87.1		0.352
	Chromium	91.4	86.9	87.9	87.5		0.465
	Copper	93.2	87.6	90.3	90.5		0.143
	Lead	92.2	88.9	88.9	88.2		0.752
	Nickel	94.2	88.0	90.1	90.0		0.129
	Silver	85.6	83.0	85.0	83.6		2.34
EPA 300.0 Rev. 2.1	Chloride	96.6	97.1	95.4		0.163	
	Sulfate	103	104	102		0.686	
EPA 350.1 Rev. 2.0	Ammonia-N	102	100	98.4			1.51
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	100	96.6			1.91
	Kjeldahl Nitrogen	103	94.9	91.7			3.15
EPA 353.2 Rev. 2.0	NO2NO3-N	104	105	105			0.0
EPA 365.1 Rev. 2.0	Total-P	94.8	94.5	93.8			0.668
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	97.8	98.1			0.293
SM 2120 B	Color (true)					1.91	
SM 2320 B-97	Total Alkalinity	103				0.289	
SM 2540 C-97	TDS					3.62	
SM 4500 F-C-97	Fluoride	95.6					0.947
SM 5310 B-00	Organic Carbon	93.7	96.5	94.5			1.55

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1873738, 1873741, 1873742
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1873770
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1873770
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1873738, 1873741, 1873742
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1873738, 1873741, 1873742
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1873739, 1873743, 1873744
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1873739, 1873743, 1873744
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1873739, 1873743, 1873744
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1873739, 1873743, 1873744
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1873740, 1873745, 1873746
SM 2120 B / E31780	True Color measured at 450 nm	1873738, 1873741, 1873742
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1873738, 1873741, 1873742
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1873738, 1873741, 1873742
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1873738, 1873741, 1873742

Reference Method Descriptions

Method / DoH Cert #	Description	<u>Associated Samples</u>
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1873738, 1873741, 1873742
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1873739, 1873743, 1873744

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	02/17/2017			02/17/2017 13:56	Julie Michelle Frank	1873738, 1873741, 1873742
EPA 200.7 Rev. 4.4	02/17/2017	02/21/2017	Michael I. Thompson	02/21/2017	Joshua Ayres	1873770
EPA 200.8 Rev. 5.4	02/17/2017	02/21/2017	Michael I. Thompson	02/22/2017	Betina Topolski	1873770
	02/17/2017	02/21/2017	Michael I. Thompson	03/01/2017	Betina Topolski	1873770
EPA 300.0 Rev. 2.1	02/17/2017			03/01/2017	Ping Hua	1873738, 1873741, 1873742
	02/17/2017			03/02/2017	Ping Hua	1873738, 1873741, 1873742
EPA 350.1 Rev. 2.0	02/17/2017			02/22/2017	Sofia Elnemr	1873739, 1873743, 1873744
EPA 351.2 Rev. 2.0	02/17/2017	02/21/2017	Adrian Shelby	02/22/2017	Joseph Suarez	1873739, 1873743, 1873744
EPA 353.2 Rev. 2.0	02/17/2017			02/22/2017	Beverly Y. Sanders	1873739, 1873743, 1873744
EPA 365.1 Rev. 2.0	02/17/2017	02/21/2017	Adrian Shelby	02/22/2017	Lipi Saha	1873739, 1873743, 1873744
EPA 365.1 Rev. 2.0 dissolved	02/17/2017			02/17/2017 16:22	Julia Storbeck	1873745, 1873746
	02/17/2017			02/17/2017 16:28	Julia Storbeck	1873740
SM 2120 B	02/17/2017			02/17/2017 14:27	Julie Michelle Frank	1873738
	02/17/2017			02/17/2017 14:28	Julie Michelle Frank	1873741, 1873742
SM 2320 B-97	02/17/2017			02/22/2017	Dale L. Simmons	1873738, 1873741, 1873742
SM 2540 C-97	02/17/2017			02/20/2017	Yijie Li	1873738, 1873741, 1873742
SM 2540 D-97	02/17/2017			02/20/2017	Yijie Li	1873738, 1873741, 1873742
SM 4500 F-C-97	02/17/2017			02/22/2017	Dale L. Simmons	1873738, 1873741, 1873742
SM 5310 B-00	02/17/2017			02/18/2017	Julie Michelle Frank	1873739, 1873743, 1873744