

Chemical Analysis Report

SO-DIST-2016-12-20-01

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

Event Description: **SMP: Myrtle & Myrtle**
Request ID: **RQ-2016-12-19-07**
Customer: **SO-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FLDEP South District Office
2295 Victoria Ave. Suite 364
Fort Myers, FL 33901
Attn: Ben Paswater

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Certified by: Colin Wright, Program Administrator

Date Certified: 17-JAN-2017 15:34

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light gray 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 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: MYRTLE SLOUGH @ SR31

Collection Date/Time: 12/19/2016 09:00

Field ID: G3SD121916-3

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859049	EPA 180.1 Rev. 2.0	Turbidity	17		NTU	P317088	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P317397	
		Sulfate	70		mg SO4/L	P317400	
		Color (true)	48		PCU	P317102	
	SM 2320 B-97	Total Alkalinity	224		mg CaCO3/L	P317267	
	SM 2540 C-97	TDS	570	A	mg/L	P317656	
	SM 2540 D-97	TSS	9.6	I	mg/L	P317634	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P317272	
1859052	EPA 350.1 Rev. 2.0	Ammonia-N	0.042		mg N/L	P317459	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.76		mg N/L	P317108	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.35		mg N/L	P317370	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P317309	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P317234	
1859055	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P317098	
1859061	EPA 200.7 Rev. 4.4	Calcium	118		mg/L	P317263	
		Iron	590		ug/L	P317263	
		Magnesium	11.2		mg/L	P317263	
		Potassium	6.6		mg/L	P317263	
		Sodium	66.8		mg/L	P317263	
		Zinc	5.0	U	ug/L	P317263	
	EPA 200.8 Rev. 5.4	Arsenic	0.61		ug/L	P317263	
		Cadmium	0.020	U	ug/L	P317263	
		Chromium	0.94		ug/L	P317263	
		Copper	0.61		ug/L	P317263	
		Lead	0.18	I	ug/L	P317263	
		Nickel	1.43		ug/L	P317263	
		Silver	0.0050	U	ug/L	P317263	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: MYRTLE SLOUGH @ SR31 DUPLICATE

Collection Date/Time: 12/19/2016 09:05

Field ID: G3SD121916-4

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859050	EPA 180.1 Rev. 2.0	Turbidity	17	A	NTU	P317089	
	EPA 300.0 Rev. 2.1	Chloride	130		mg Cl/L	P317397	
		Sulfate	70		mg SO4/L	P317400	
		Color (true)	49		PCU	P317101	
	SM 2320 B-97	Total Alkalinity	224		mg CaCO3/L	P317267	
	SM 2540 C-97	TDS	557		mg/L	P317657	
	SM 2540 D-97	TSS	11		mg/L	P317635	
	SM 4500 F-C-97	Fluoride	0.19		mg F/L	P317272	
1859053	EPA 350.1 Rev. 2.0	Ammonia-N	0.042		mg N/L	P317459	

Field ID: G3SD121916-4

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859053	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.75		mg N/L	P317108	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.35		mg N/L	P317370	
	EPA 365.1 Rev. 2.0	Total-P	0.041		mg P/L	P317309	
	SM 5310 B-00	Organic Carbon	13		mg C/L	P317234	
1859056	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.019		mg P/L	P317098	
1859062	EPA 200.7 Rev. 4.4	Calcium	119		mg/L	P317263	
		Iron	580		ug/L	P317263	
		Magnesium	11.3		mg/L	P317263	
		Potassium	6.7		mg/L	P317263	
		Sodium	67.5		mg/L	P317263	
		Zinc	5.0	U	ug/L	P317263	
	EPA 200.8 Rev. 5.4	Arsenic	0.63		ug/L	P317263	
		Cadmium	0.020	U	ug/L	P317263	
		Chromium	0.96		ug/L	P317263	
		Copper	0.57		ug/L	P317263	
		Lead	0.17	I	ug/L	P317263	
		Nickel	1.41		ug/L	P317263	
		Silver	0.0050	U	ug/L	P317263	

Ref. Method and Comment:

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Sample Location: FIELD BLANK

Collection Date/Time: 12/19/2016 09:15

Field ID: G3SDBLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859051	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P317089	
	EPA 300.0 Rev. 2.1	Chloride	0.23	I	mg Cl/L	P317397	
		Sulfate	0.20	U	mg SO4/L	P317400	
		Color (true)	2.5	U	PCU	P317101	
	SM 2320 B-97	Total Alkalinity	0.65	U	mg CaCO3/L	P317267	
	SM 2540 C-97	TDS	15	U	mg/L	P317656	
	SM 2540 D-97	TSS	2	U	mg/L	P317634	
	SM 4500 F-C-97	Fluoride	0.035	U	mg F/L	P317272	
1859054	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P317459	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P317108	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P317370	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P317341	
	SM 5310 B-00	Organic Carbon	0.50	U	mg C/L	P317234	
1859057	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.004	U	mg P/L	P317098	
1859063	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P317263	
		Iron	30	U	ug/L	P317263	
		Magnesium	0.040	U	mg/L	P317263	
		Potassium	0.30	U	mg/L	P317263	
		Sodium	0.50	U	mg/L	P317263	

Field ID: G3SDBLANK

Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1859063	EPA 200.7 Rev. 4.4	Zinc	5.0	U	ug/L	P317263	
	EPA 200.8 Rev. 5.4	Arsenic	0.050	U	ug/L	P317263	
		Cadmium	0.020	U	ug/L	P317263	
		Chromium	0.050	U	ug/L	P317263	
		Copper	0.10	U	ug/L	P317263	
		Lead	0.050	U	ug/L	P317263	
		Nickel	0.050	U	ug/L	P317263	
		Silver	0.0050	U	ug/L	P317263	

Ref. Method and Comment:

EPA 300.0 Rev. 2.1: The result was confirmed on 12/28/2016.

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

EPA 351.2 Rev. 2.0: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

EPA 365.1 Rev. 2.0: Total-P: Batch matrix spike recoveries are unavailable because of high analyte concentration in the QC sample.

Quality Assurance Report

Method Blank Results

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P317088

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 180.1 Rev. 2.0

Batch ID: P317089

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4

Batch ID: P317263

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: P317263

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.050	U	ug/L
Copper	0.10	U	ug/L
Lead	0.050	U	ug/L
Nickel	0.050	U	ug/L
Silver	0.0050	U	ug/L

Quality Assurance Report

Method Blank Results

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317397

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317400

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317459

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317108

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317370

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317309

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317341

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317098

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

Reference Method: SM 2120 B
Batch ID: P317101

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Quality Assurance Report Method Blank Results

Reference Method: SM 2120 B
Batch ID: P317102

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P317267

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

Reference Method: SM 2540 C-97
Batch ID: P317656

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P317657

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317634

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P317635

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P317272

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P317234

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: P317263

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: P317263

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	95.6		P	85 - 115
Iron	94.6		P	85 - 115
Magnesium	98.5		P	85 - 115
Potassium	88.8		P	85 - 115
Sodium	101		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317263

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	101		P	85 - 115
Cadmium	99.4		P	85 - 115
Chromium	97.2		P	85 - 115
Copper	99.4		P	85 - 115
Lead	96.7		P	85 - 115
Nickel	102		P	85 - 115
Silver	97.0		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317397

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Chloride	98.9		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317400

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	92.6		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317459

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	96.9		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317108

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317370

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

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317309

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317341

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317098

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

Reference Method: SM 2320 B-97
Batch ID: P317267

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.6		P	95 - 108

Reference Method: SM 4500 F-C-97
Batch ID: P317272

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.6		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P317234

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	95.8		P	85 - 115

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317263

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859348	Calcium	94.9		P	80 - 120
1859348	Iron	92.7		P	80 - 120
1859348	Magnesium	93.3		P	80 - 120
1859348	Potassium	96.6		P	80 - 120
1859348	Sodium	95.2		P	80 - 120
1859348	Zinc	100		P	80 - 120
1859360	Calcium	95.9		P	80 - 120
1859360	Iron	95.4	94.6	P/P	80 - 120
1859360	Magnesium	94.7	93.8	P/P	80 - 120
1859360	Potassium	91.0	89.7	P/P	80 - 120
1859360	Sodium	101		P	80 - 120
1859360	Zinc	101	99.8	P/P	80 - 120

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4

Batch ID: P317263

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859348	Arsenic	99.5		P	80 - 120
1859348	Cadmium	99.1		P	80 - 120
1859348	Chromium	96.8		P	80 - 120
1859348	Copper	93.0		P	80 - 120
1859348	Lead	95.5		P	80 - 120
1859348	Nickel	95.4		P	80 - 120
1859348	Silver	96.7		P	80 - 120
1859360	Arsenic	101	101	P/P	80 - 120
1859360	Cadmium	102	101	P/P	80 - 120
1859360	Chromium	100	98.5	P/P	80 - 120
1859360	Copper	95.6	95.7	P/P	80 - 120
1859360	Lead	95.1	95.7	P/P	80 - 120
1859360	Nickel	96.6	96.0	P/P	80 - 120
1859360	Silver	94.8	94.8	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P317397

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859044	Chloride	97.8		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1

Batch ID: P317400

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859044	Sulfate	93.7		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0

Batch ID: P317459

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859002	Ammonia-N	96.1	95.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Batch ID: P317370

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859045	NO2NO3-N	104	105	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Batch ID: P317309

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859001	Total-P	100	91.5	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Batch ID: P317098

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1859055	O-Phosphate-P	99.5	100	P/P	90 - 110

Quality Assurance Report Matrix Spike Accuracy

Reference Method: SM 4500 F-C-97
Batch ID: P317272

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858661	Fluoride	96.8	99.9	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P317234

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1858998	Organic Carbon	94.0	94.5	P/P	85 - 115

Quality Assurance Report Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P317088

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858993	Turbidity	1.24	Sample	P	0 - 20

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P317089

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859050	Turbidity	0.0	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P317263

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859360	Calcium	1.34	Spike	P	0 - 20
1859360	Iron	0.917	Spike	P	0 - 20
1859360	Magnesium	0.520	Spike	P	0 - 20
1859360	Potassium	1.15	Spike	P	0 - 20
1859360	Sodium	1.08	Spike	P	0 - 20
1859360	Zinc	0.951	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P317263

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859360	Arsenic	0.105	Spike	P	0 - 20
1859360	Cadmium	0.749	Spike	P	0 - 20
1859360	Chromium	1.51	Spike	P	0 - 20
1859360	Copper	0.0866	Spike	P	0 - 20
1859360	Lead	0.590	Spike	P	0 - 20
1859360	Nickel	0.609	Spike	P	0 - 20
1859360	Silver	0.00388	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317397

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859044	Chloride	0.838	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P317400

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859044	Sulfate	1.15	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P317459

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859002	Ammonia-N	0.667	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P317108

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859035	Kjeldahl Nitrogen	2.30	Sample	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P317370

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859045	NO2NO3-N	0.935	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317309

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859001	Total-P	8.71	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P317341

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859072	Total-P	17.7	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P317098

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859055	O-Phosphate-P	0.505	Spike	P	0 - 20

Quality Assurance Report Precision

Reference Method: SM 2120 B
Batch ID: P317101

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859068	Color (true)	0.225	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P317102

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858994	Color (true)	0.886	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P317267

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858661	Total Alkalinity	0.382	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P317656

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859049	TDS	3.51	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P317657

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1859097	TDS	6.32	Sample	P	0 - 10

Reference Method: SM 4500 F-C-97
Batch ID: P317272

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858661	Fluoride	2.57	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P317234

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1858998	Organic Carbon	0.390	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

Quality Assurance Report Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0

Run ID: A73489

Included Lab Sample IDs: 1859049, 1859050, 1859051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	97.5	98.0	P/P	95 - 105
Turbidity	98.0	98.0	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A73491

Included Lab Sample IDs: 1859055, 1859056, 1859057

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	97.1	97.0	P/P	90 - 110
O-Phosphate-P	98.4	97.9	P/P	90 - 110

Reference Method: SM 2120 B

Run ID: A73492

Included Lab Sample IDs: 1859049, 1859050, 1859051

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

Reference Method: SM 5310 B-00

Run ID: A73539

Included Lab Sample IDs: 1859052, 1859053, 1859054

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	96.0	96.4	P/P	90 - 110
Organic Carbon	96.4	97.7	P/P	90 - 110

Reference Method: SM 2320 B-97

Run ID: A73550

Included Lab Sample IDs: 1859049, 1859050, 1859051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	99.2	97.9	P/P	90 - 110

Reference Method: SM 4500 F-C-97

Run ID: A73550

Included Lab Sample IDs: 1859049, 1859050, 1859051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	99.5	99.0	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A73555

Included Lab Sample IDs: 1859052, 1859053, 1859054

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	105	107	P/P	90 - 110

Quality Assurance Report Calibration Verification

Reference Method: EPA 300.0 Rev. 2.1

Run ID: A73576

Included Lab Sample IDs: 1859049, 1859050, 1859051

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	99.8	P/P	90 - 110
Chloride	99.7	100	P/P	90 - 110
Sulfate	90.5	94.0	P/P	90 - 110
Sulfate	95.4	90.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A73580

Included Lab Sample IDs: 1859052, 1859053, 1859054

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

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A73601

Included Lab Sample IDs: 1859052, 1859053, 1859054

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.0	96.1	P/P	90 - 110
Ammonia-N	96.4	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A73615

Included Lab Sample IDs: 1859052, 1859053, 1859054

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	97.5	97.5	P/P	90 - 110
Total-P	97.5	97.8	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4

Run ID: A73628

Included Lab Sample IDs: 1859061, 1859062, 1859063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	93.7	92.7	P/P	90 - 110
Calcium	95.0	94.3	P/P	90 - 110
Iron	91.5	92.6	P/P	90 - 110
Iron	93.0	94.7	P/P	90 - 110
Magnesium	95.0	95.2	P/P	90 - 110
Magnesium	95.0	95.7	P/P	90 - 110
Potassium	99.4	101	P/P	90 - 110
Potassium	99.9	100	P/P	90 - 110
Sodium	100	99.1	P/P	90 - 110
Sodium	102	99.3	P/P	90 - 110
Zinc	101	101	P/P	90 - 110
Zinc	103	102	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4

Run ID: A73669

Included Lab Sample IDs: 1859061, 1859062, 1859063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
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Quality Assurance Report Calibration Verification

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A73669
Included Lab Sample IDs: 1859061, 1859062, 1859063

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	99.2	P/P	90 - 110
Arsenic	99.2	98.8	P/P	90 - 110
Cadmium	96.3	96.7	P/P	90 - 110
Cadmium	97.1	96.3	P/P	90 - 110
Chromium	94.4	96.5	P/P	90 - 110
Chromium	96.5	97.3	P/P	90 - 110
Copper	99.1	98.7	P/P	90 - 110
Lead	94.9	94.9	P/P	90 - 110
Lead	94.9	94.3	P/P	90 - 110
Nickel	100	97.5	P/P	90 - 110
Nickel	101	100	P/P	90 - 110
Silver	98.2	97.9	P/P	90 - 110
Silver	98.8	98.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A73684
Included Lab Sample IDs: 1859061, 1859062

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Copper	99.0	98.8	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.
Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.
Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery			Precision SMP	MS
			LCS	MS	MS		
EPA 180.1 Rev. 2.0	Turbidity					1.24	
	Turbidity					0.0	
EPA 200.7 Rev. 4.4	Calcium	95.6	94.9	95.9			1.34
	Iron	94.6	92.7	95.4	94.6		0.917
	Magnesium	98.5	93.3	94.7	93.8		0.520
	Potassium	88.8	96.6	91.0	89.7		1.15
	Sodium	101	95.2	101			1.08
	Zinc	101	100	101	99.8		0.951
EPA 200.8 Rev. 5.4	Arsenic	101	99.5	101	101		0.105
	Cadmium	99.4	99.1	102	101		0.749
	Chromium	97.2	96.8	100	98.5		1.51
	Copper	99.4	93.0	95.6	95.7		0.0866
	Lead	96.7	95.5	95.1	95.7		0.590
	Nickel	102	95.4	96.6	96.0		0.609
	Silver	97.0	96.7	94.8	94.8		0.0038
EPA 300.0 Rev. 2.1	Chloride	98.9	97.8			0.838	
	Sulfate	92.6	93.7			1.15	
EPA 350.1 Rev. 2.0	Ammonia-N	96.9	96.1	95.3			0.667
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	103				2.30	
EPA 353.2 Rev. 2.0	NO2NO3-N	106	104	105			0.935

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		LCS	Precision	MS
						SMP	
EPA 365.1 Rev. 2.0	Total-P	98.7	100	91.5			8.71
	Total-P	98.4					17.7
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	103	99.5	100			0.505
SM 2120 B	Color (true)					0.225	
	Color (true)					0.886	
SM 2320 B-97	Total Alkalinity	99.6				0.382	
SM 2540 C-97	TDS					3.51	
	TDS					6.32	
SM 4500 F-C-97	Fluoride	97.6	96.8	99.9			2.57
SM 5310 B-00	Organic Carbon	95.8	94.0	94.5			0.390

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1859049, 1859050, 1859051
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1859061, 1859062, 1859063
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1859061, 1859062, 1859063
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1859049, 1859050, 1859051
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1859049, 1859050, 1859051
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1859052, 1859053, 1859054
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1859052, 1859053, 1859054
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1859052, 1859053, 1859054
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1859052, 1859053, 1859054
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1859055, 1859056, 1859057
SM 2120 B / E31780	True Color measured at 450 nm	1859049, 1859050, 1859051
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO ₃ /L	1859049, 1859050, 1859051
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1859049, 1859050, 1859051
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1859049, 1859050, 1859051
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1859049, 1859050, 1859051
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1859052, 1859053, 1859054

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	12/20/2016			12/20/2016 13:27	Julie Michelle Frank	1859049, 1859050, 1859051
EPA 200.7 Rev. 4.4	12/20/2016	12/22/2016	Elliott D. Healy	12/28/2016	Joshua Ayres	1859061, 1859062, 1859063
EPA 200.8 Rev. 5.4	12/20/2016	12/22/2016	Elliott D. Healy	12/29/2016	Charles J. Peterson	1859061, 1859062, 1859063
	12/20/2016	12/22/2016	Elliott D. Healy	12/31/2016	Charles J. Peterson	1859061, 1859062
EPA 300.0 Rev. 2.1	12/20/2016			12/24/2016	Ping Hua	1859049, 1859050, 1859051
EPA 350.1 Rev. 2.0	12/20/2016			12/27/2016	Julie Michelle Frank	1859052, 1859053, 1859054
EPA 351.2 Rev. 2.0	12/20/2016	12/21/2016	Adrian Shelby	12/22/2016	Joseph Suarez	1859052, 1859053, 1859054
EPA 353.2 Rev. 2.0	12/20/2016			12/23/2016	Beverly Y. Sanders	1859052, 1859053, 1859054
EPA 365.1 Rev. 2.0	12/20/2016	12/23/2016	Vijayalakshmi Reddy	12/28/2016	Lipi Saha	1859052, 1859053, 1859054
EPA 365.1 Rev. 2.0 dissolved	12/20/2016			12/20/2016 16:59	Julia Storbeck	1859055
	12/20/2016			12/20/2016 17:02	Julia Storbeck	1859057
	12/20/2016			12/20/2016 17:27	Julia Storbeck	1859056
SM 2120 B	12/20/2016			12/20/2016 16:26	Jared I. Manley	1859050, 1859051
	12/20/2016			12/20/2016 16:36	Jared I. Manley	1859049
SM 2320 B-97	12/20/2016			12/22/2016	Dale L. Simmons	1859049, 1859050, 1859051
SM 2540 C-97	12/20/2016			12/23/2016	Yijie Li	1859049, 1859050, 1859051
SM 2540 D-97	12/20/2016			12/23/2016	Yijie Li	1859049, 1859050, 1859051
SM 4500 F-C-97	12/20/2016			12/22/2016	Dale L. Simmons	1859049, 1859050, 1859051
SM 5310 B-00	12/20/2016			12/21/2016	Julie Michelle Frank	1859052, 1859053, 1859054