Chemical Analysis Report

SE-DIST-2016-08-09-01

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

Event Description: **SMP-G5 new sites**
Request ID: **RQ-2016-08-08-57**
Customer: **SE-DIST**
Project ID: **SMP**

Send Reports to:
FL Dept. of Environmental Protection
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Matthew Sewell

For additional information please contact
Timothy W. Fitzpatrick
Liang-Tsair Lin, Ph.D.
Colin Wright, Ph.D.
Thekkekalathil Chandrasekhar, PhD, QA Officer
Phone (850) 245-8085

Certified by: Thekkekalathil Chandrasekhar, Chemist Administrator Date Certified: 31-AUG-2016 15:30

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: WCA1 North @ G-301 **Collection Date/Time: 08/08/2016 10:40**

Field ID: G5SE0046 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822549	EPA 180.1 Rev. 2.0	Turbidity	6.0		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	100		mg Cl/L	P309870	
		Sulfate	36		mg SO4/L	P309873	
	SM 2120 B	Color (true)	81	A	PCU	P309416	
	SM 2320 B-97	Total Alkalinity	142		mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	380		mg/L	P309826	
	SM 2540 D-97	TSS	8	I	mg/L	P309767	
	SM 4500 F-C-97	Fluoride	0.23		mg F/L	P309564	
1822551	EPA 350.1 Rev. 2.0	Ammonia-N	0.042		mg N/L	P309533	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.7		mg N/L	P309741	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.22		mg N/L	P309611	
	EPA 365.1 Rev. 2.0	Total-P	0.092		mg P/L	P309722	
	SM 5310 B-00	Organic Carbon	20		mg C/L	P310046	
1822553	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.018		mg P/L	P309427	
1822571	EPA 200.7 Rev. 4.4	Calcium	55.4		mg/L	P309594	
		Iron	99	I	ug/L	P309594	
		Magnesium	13.5		mg/L	P309594	
		Potassium	6.3		mg/L	P309594	
		Sodium	69.0		mg/L	P309594	
		Zinc	5.0	U	ug/L	P309594	
	EPA 200.8 Rev. 5.4	Arsenic	1.64		ug/L	P309594	
		Beryllium	0.010	U	ug/L	P309594	
		Cadmium	0.020	U	ug/L	P309594	
		Chromium	0.21		ug/L	P309594	
		Copper	0.52		ug/L	P309594	
		Lead	0.11	I	ug/L	P309594	
		Nickel	0.31		ug/L	P309594	
		Silver	0.0050	U	ug/L	P309594	

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: Westpalm Beach Canal @ the ENR Supply Canal **Collection Date/Time: 08/08/2016 11:00**

Field ID: G5SE0012 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822543	EPA 180.1 Rev. 2.0	Turbidity	11		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	110		mg Cl/L	P309870	
		Sulfate	57		mg SO4/L	P309873	
	SM 2120 B	Color (true)	120		PCU	P309415	
	SM 2320 B-97	Total Alkalinity	182		mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	485		mg/L	P309825	
	SM 2540 D-97	TSS	8	I	mg/L	P309766	
	SM 4500 F-C-97	Fluoride	0.35		mg F/L	P309564	

Field ID: G5SE0012 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822545	EPA 350.1 Rev. 2.0	Ammonia-N	0.21		mg N/L	P309533	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.0		mg N/L	P309741	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.94		mg N/L	P309611	
	EPA 365.1 Rev. 2.0	Total-P	0.065		mg P/L	P309721	
	SM 5310 B-00	Organic Carbon	25		mg C/L	P310046	
1822547	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.025		mg P/L	P309427	

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: Hilscan 0.25m South of I-16 Canal **Collection Date/Time: 08/08/2016 11:45**

Field ID: G5SE0005 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822544	EPA 180.1 Rev. 2.0	Turbidity	7.0		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	140		mg Cl/L	P309870	
		Sulfate	65		mg SO4/L	P309873	
	SM 2120 B	Color (true)	160		PCU	P309415	
	SM 2320 B-97	Total Alkalinity	268		mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	629		mg/L	P309826	
	SM 2540 D-97	TSS	8	I	mg/L	P309767	
	SM 4500 F-C-97	Fluoride	0.64		mg F/L	P309564	
1822546	EPA 350.1 Rev. 2.0	Ammonia-N	0.27		mg N/L	P309533	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.7		mg N/L	P309741	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.88		mg N/L	P309611	
	EPA 365.1 Rev. 2.0	Total-P	0.14		mg P/L	P309721	
	SM 5310 B-00	Organic Carbon	33		mg C/L	P310046	
1822548	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.078		mg P/L	P309427	

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: WCA1 South **Collection Date/Time: 08/08/2016 12:35**

Field ID: G5SE0047 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822550	EPA 180.1 Rev. 2.0	Turbidity	7.8		NTU	P309442	
	EPA 300.0 Rev. 2.1	Chloride	77		mg Cl/L	P309870	
		Sulfate	26		mg SO4/L	P309873	
	SM 2120 B	Color (true)	110		PCU	P309416	
	SM 2320 B-97	Total Alkalinity	102		mg CaCO3/L	P309562	
	SM 2540 C-97	TDS	324	A	mg/L	P309826	
	SM 2540 D-97	TSS	9	I	mg/L	P309767	
	SM 4500 F-C-97	Fluoride	0.26		mg F/L	P309564	
1822552	EPA 350.1 Rev. 2.0	Ammonia-N	0.017		mg N/L	P309533	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	2.2		mg N/L	P309741	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.005	I	mg N/L	P310020	
	EPA 365.1 Rev. 2.0	Total-P	0.045		mg P/L	P309722	

Field ID: G5SE0047 Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
1822552	SM 5310 B-00	Organic Carbon	24		mg C/L	P310046	
1822554	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.007	I	mg P/L	P309427	
1822572	EPA 200.7 Rev. 4.4	Calcium	39.0		mg/L	P309594	
		Iron	130		ug/L	P309594	
		Magnesium	11.8		mg/L	P309594	
		Potassium	4.6		mg/L	P309594	
		Sodium	53.9		mg/L	P309594	
		Zinc	5.0	U	ug/L	P309594	
	EPA 200.8 Rev. 5.4	Arsenic	1.15		ug/L	P309594	
		Beryllium	0.011	I	ug/L	P309594	
		Cadmium	0.020	U	ug/L	P309594	
		Chromium	0.32		ug/L	P309594	
		Copper	0.96		ug/L	P309594	
		Lead	0.22		ug/L	P309594	
		Nickel	0.25		ug/L	P309594	
		Silver	0.0050	U	ug/L	P309594	

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: P309442

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309594

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: P309594

Component	Result	Code	Units
Arsenic	0.050	U	ug/L
Beryllium	0.010	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: P309870

Component	Result	Code	Units
Chloride	0.20	U	mg Cl/L

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Component	Result	Code	Units
Sulfate	0.20	U	mg SO4/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309533

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309721

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

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

Quality Assurance Report
Method Blank Results

Reference Method: SM 2120 B
Batch ID: P309415

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2120 B
Batch ID: P309416

Component	Result	Code	Units
Color (true)	2.5	U	PCU

Reference Method: SM 2320 B-97
Batch ID: P309562

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

Reference Method: SM 2540 C-97
Batch ID: P309825

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 C-97
Batch ID: P309826

Component	Result	Code	Units
TDS	15	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P309766

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-97
Batch ID: P309767

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-00
Batch ID: P310046

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: P309594

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	105		P	85 - 115
Iron	107		P	85 - 115
Magnesium	106		P	85 - 115
Potassium	102		P	85 - 115
Sodium	107		P	85 - 115
Zinc	101		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Arsenic	96.4		P	85 - 115
Beryllium	94.6		P	85 - 115
Cadmium	97.8		P	85 - 115
Chromium	96.7		P	85 - 115
Copper	96.5		P	85 - 115
Lead	97.9		P	85 - 115
Nickel	96.6		P	85 - 115
Silver	97.1		P	85 - 115

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309870

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

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Sulfate	94.3		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309533

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

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

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309721

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	107		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

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

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

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

Reference Method: SM 2320 B-97
Batch ID: P309562

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

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	97.7		P	92 - 103

Reference Method: SM 5310 B-00
Batch ID: P310046

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.6		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309594

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823138	Calcium	104		P	80 - 120
1823138	Iron	107	111	P/P	80 - 120
1823138	Magnesium	107		P	80 - 120
1823138	Potassium	103	104	P/P	80 - 120
1823138	Sodium	103	104	P/P	80 - 120
1823138	Zinc	102	102	P/P	80 - 120

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823138	Arsenic	97.9	98.7	P/P	80 - 120
1823138	Beryllium	96.4	98.1	P/P	80 - 120
1823138	Cadmium	100	99.3	P/P	80 - 120
1823138	Chromium	98.5	99.7	P/P	80 - 120
1823138	Copper	95.5	95.4	P/P	80 - 120
1823138	Lead	99.3	100	P/P	80 - 120
1823138	Nickel	95.6	95.9	P/P	80 - 120
1823138	Silver	99.7	100	P/P	80 - 120

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309870

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822641	Chloride	99.0		P	90 - 110
1822780	Chloride	98.3		P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822641	Sulfate	95.9		P	90 - 110
1822780	Sulfate	93.5		P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309533

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822551	Ammonia-N	98.7	100	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822533	Kjeldahl Nitrogen	106	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822552	NO2NO3-N	94.3	97.3	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1823209	NO2NO3-N	96.0	97.0	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309721

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822505	Total-P	104	104	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822580	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822542	O-Phosphate-P	99.7	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822579	Fluoride	98.4	99.7	P/P	91 - 105

Reference Method: SM 5310 B-00
Batch ID: P310046

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
1822244	Organic Carbon	99.5	104	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P309442

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822529	Turbidity	4.41	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P309594

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823138	Calcium	0.0250	Spike	P	0 - 20
1823138	Iron	2.54	Spike	P	0 - 20
1823138	Magnesium	1.37	Spike	P	0 - 20
1823138	Potassium	0.799	Spike	P	0 - 20
1823138	Sodium	0.538	Spike	P	0 - 20
1823138	Zinc	0.0398	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823138	Arsenic	0.752	Spike	P	0 - 20
1823138	Beryllium	1.77	Spike	P	0 - 20
1823138	Cadmium	0.717	Spike	P	0 - 20
1823138	Chromium	1.15	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P309594

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823138	Copper	0.0527	Spike	P	0 - 20
1823138	Lead	1.23	Spike	P	0 - 20
1823138	Nickel	0.280	Spike	P	0 - 20
1823138	Silver	0.439	Spike	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309870

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822780	Chloride	0.00100	Sample	P	0 - 20

Reference Method: EPA 300.0 Rev. 2.1
Batch ID: P309873

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822780	Sulfate	0.389	Sample	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P309533

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822551	Ammonia-N	0.798	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P309741

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822533	Kjeldahl Nitrogen	1.12	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P309611

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822552	NO2NO3-N	3.05	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P310020

Replicated

Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1823209	NO2NO3-N	0.608	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309721

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822505	Total-P	0.0378	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P309722

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822580	Total-P	0.784	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P309427

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822542	O-Phosphate-P	0.600	Spike	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P309415

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822525	Color (true)	0.484	Sample	P	0 - 20

Reference Method: SM 2120 B
Batch ID: P309416

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822549	Color (true)	0.889	Sample	P	0 - 20

Reference Method: SM 2320 B-97
Batch ID: P309562

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822579	Total Alkalinity	0.0425	Sample	P	0 - 4.8

Reference Method: SM 2540 C-97
Batch ID: P309825

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822499	TDS	3.18	Sample	P	0 - 10

Reference Method: SM 2540 C-97
Batch ID: P309826

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822550	TDS	3.70	Sample	P	0 - 10

Quality Assurance Report
Precision

Reference Method: SM 4500 F-C-97
Batch ID: P309564

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822579	Fluoride	0.979	Spike	P	0 - 3.0

Reference Method: SM 5310 B-00
Batch ID: P310046

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
1822244	Organic Carbon	2.27	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: SM 2120 B
Run ID: A71020
Included Lab Sample IDs: 1822543, 1822544, 1822549, 1822550

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Color (true)	96.5	96.0	P/P	90 - 115
Color (true)	97.0	96.5	P/P	90 - 115
Color (true)	97.7	97.6	P/P	90 - 115

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Run ID: A71024
Included Lab Sample IDs: 1822547, 1822548, 1822553, 1822554

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

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A71025
Included Lab Sample IDs: 1822543, 1822544, 1822549, 1822550

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Turbidity	100	99.5	P/P	95 - 105

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A71060
Included Lab Sample IDs: 1822545, 1822546, 1822551, 1822552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	104	104	P/P	90 - 110
Ammonia-N	98.9	99.6	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 2320 B-97
Run ID: A71072
Included Lab Sample IDs: 1822543, 1822544, 1822549, 1822550

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	102	100	P/P	90 - 110

Reference Method: SM 4500 F-C-97
Run ID: A71072
Included Lab Sample IDs: 1822543, 1822544, 1822549, 1822550

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A71077
Included Lab Sample IDs: 1822545, 1822546, 1822551

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

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A71119
Included Lab Sample IDs: 1822571, 1822572

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Arsenic	100	96.6	P/P	90 - 110
Beryllium	97.9	95.7	P/P	90 - 110
Cadmium	99.2	97.4	P/P	90 - 110
Chromium	100	97.5	P/P	90 - 110
Copper	100	96.5	P/P	90 - 110
Lead	99.5	97.1	P/P	90 - 110
Nickel	99.9	96.3	P/P	90 - 110
Silver	100	97.2	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A71131
Included Lab Sample IDs: 1822571, 1822572

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	100	102	P/P	95 - 105
Iron	101	101	P/P	95 - 105
Magnesium	103	103	P/P	95 - 105
Potassium	101	101	P/P	95 - 105
Sodium	97.8	98.3	P/P	95 - 105
Zinc	101	102	P/P	95 - 105

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A71171
Included Lab Sample IDs: 1822545, 1822546, 1822551

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

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A71172
Included Lab Sample IDs: 1822545, 1822546, 1822551, 1822552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	96.3	98.9	P/P	90 - 110
Kjeldahl Nitrogen	98.9	93.7	P/P	90 - 110

Reference Method: EPA 300.0 Rev. 2.1
Run ID: A71177
Included Lab Sample IDs: 1822543, 1822544, 1822549, 1822550

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Chloride	100	101	P/P	90 - 110
Sulfate	95.9	95.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A71187
Included Lab Sample IDs: 1822552

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	102	98.5	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A71229
Included Lab Sample IDs: 1822552

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

Reference Method: SM 5310 B-00
Run ID: A71236
Included Lab Sample IDs: 1822545, 1822546, 1822551, 1822552

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

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

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 180.1 Rev. 2.0	Turbidity					4.41	
EPA 200.7 Rev. 4.4	Calcium	105	104				0.0250
	Iron	107	107	111			2.54
	Magnesium	106	107				1.37
	Potassium	102	103	104			0.799
	Sodium	107	103	104			0.538
	Zinc	101	102	102			0.0398
EPA 200.8 Rev. 5.4	Arsenic	96.4	97.9	98.7			0.752
	Beryllium	94.6	96.4	98.1			1.77

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
EPA 200.8 Rev. 5.4	Cadmium	97.8	100	99.3			0.717
	Chromium	96.7	98.5	99.7			1.15
	Copper	96.5	95.5	95.4			0.0527
	Lead	97.9	99.3	100			1.23
	Nickel	96.6	95.6	95.9			0.280
	Silver	97.1	99.7	100			0.439
EPA 300.0 Rev. 2.1	Chloride	99.6	98.3	99.0		0.0010	
	Sulfate	94.3	93.5	95.9		0.389	
EPA 350.1 Rev. 2.0	Ammonia-N	95.8	98.7	100			0.798
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	109	106	104			1.12
EPA 353.2 Rev. 2.0	NO2NO3-N	102	94.3	97.3			3.05
	NO2NO3-N	101	96.0	97.0			0.608
EPA 365.1 Rev. 2.0	Total-P	107	104	104			0.0378
	Total-P	106	103	102			0.784
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	100	99.7	100			0.600
SM 2120 B	Color (true)					0.484	
	Color (true)					0.889	
SM 2320 B-97	Total Alkalinity	103				0.0425	
SM 2540 C-97	TDS					3.18	
	TDS					3.70	
SM 4500 F-C-97	Fluoride	97.7	98.4	99.7			0.979
SM 5310 B-00	Organic Carbon	94.6	99.5	104			2.27

Reference Method Descriptions

Method / DoH Cert #	Description	Associated Samples
EPA 180.1 Rev. 2.0 / E31780	Turbidity in aqueous matrices	1822543, 1822544, 1822549, 1822550
EPA 200.7 Rev. 4.4 / E31780	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	1822571, 1822572
EPA 200.8 Rev. 5.4 / E31780	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	1822571, 1822572
EPA 300.0 Rev. 2.1 / E31780	Chloride in aqueous matrices	1822543, 1822544, 1822549, 1822550
EPA 300.0 Rev. 2.1 / E31780	Sulfate in aqueous matrices	1822543, 1822544, 1822549, 1822550
EPA 350.1 Rev. 2.0 / E31780	Ammonia in aqueous matrices as mg N/L	1822545, 1822546, 1822551, 1822552
EPA 351.2 Rev. 2.0 / E31780	Total Kjeldahl Nitrogen in aqueous matrices	1822545, 1822546, 1822551, 1822552
EPA 353.2 Rev. 2.0 / E31780	Nitrite/Nitrate in aqueous matrices as mg N/L	1822545, 1822546, 1822551, 1822552
EPA 365.1 Rev. 2.0 / E31780	Total Phosphorus in aqueous matrices as mg P/L	1822545, 1822546, 1822551, 1822552
EPA 365.1 Rev. 2.0 dissolved / E31780	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	1822547, 1822548, 1822553, 1822554
SM 2120 B / E31780	True Color measured at 450 nm	1822543, 1822544, 1822549, 1822550
SM 2320 B-97 / E31780	Alkalinity in aqueous matrices as mg CaCO3/L	1822543, 1822544, 1822549, 1822550
SM 2540 C-97 / E31780	Total Dissolved Solids in aqueous matrices	1822543, 1822544, 1822549, 1822550
SM 2540 D-97 / E31780	Total Suspended Solids in aqueous matrices	1822543, 1822544, 1822549, 1822550
SM 4500 F-C-97 / E31780	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	1822543, 1822544, 1822549, 1822550
SM 5310 B-00 / E31780	Nonpurgeable Organic Carbon in aqueous matrices	1822545, 1822546, 1822551, 1822552

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	08/09/2016			08/09/2016 14:10	Sima Feizi	1822543, 1822544, 1822549, 1822550
EPA 200.7 Rev. 4.4	08/09/2016	08/11/2016	Elliott D. Healy	08/15/2016	Joshua Ayres	1822571, 1822572
EPA 200.8 Rev. 5.4	08/09/2016	08/11/2016	Elliott D. Healy	08/12/2016	Charles J. Peterson	1822571, 1822572
EPA 300.0 Rev. 2.1	08/09/2016			08/17/2016	Ping Hua	1822543, 1822544, 1822549, 1822550
EPA 350.1 Rev. 2.0	08/09/2016			08/10/2016	Julie Michelle Frank	1822545, 1822546, 1822551, 1822552
EPA 351.2 Rev. 2.0	08/09/2016	08/15/2016	Sofia Elnemr	08/16/2016	Virginia P. Brown	1822545, 1822546, 1822551, 1822552
EPA 353.2 Rev. 2.0	08/09/2016			08/11/2016	Beverly Y. Sanders	1822545, 1822546, 1822551
	08/09/2016			08/19/2016	Beverly Y. Sanders	1822552
EPA 365.1 Rev. 2.0	08/09/2016	08/15/2016	Vijayalakshmi Reddy	08/16/2016	Lipi Saha	1822545, 1822546, 1822551
	08/09/2016	08/15/2016	Vijayalakshmi Reddy	08/17/2016	Lipi Saha	1822552
EPA 365.1 Rev. 2.0 dissolved	08/09/2016			08/09/2016 14:47	Julia Storbeck	1822547
	08/09/2016			08/09/2016 14:48	Julia Storbeck	1822548
	08/09/2016			08/09/2016 14:49	Julia Storbeck	1822553
	08/09/2016			08/09/2016 14:50	Julia Storbeck	1822554
SM 2120 B	08/09/2016			08/09/2016 13:20	Rochelle Y Jackson	1822543
	08/09/2016			08/09/2016 13:24	Rochelle Y Jackson	1822549
	08/09/2016			08/09/2016 13:25	Rochelle Y Jackson	1822550
	08/09/2016			08/09/2016 14:09	Rochelle Y Jackson	1822544
SM 2320 B-97	08/09/2016			08/11/2016	Dale L. Simmons	1822543, 1822544, 1822549, 1822550
SM 2540 C-97	08/09/2016			08/10/2016	Yijie Li	1822543, 1822544, 1822549, 1822550
SM 2540 D-97	08/09/2016			08/10/2016	Yijie Li	1822543, 1822544, 1822549, 1822550
SM 4500 F-C-97	08/09/2016			08/11/2016	Dale L. Simmons	1822543, 1822544, 1822549, 1822550
SM 5310 B-00	08/09/2016			08/18/2016	Sofia Elnemr	1822545
	08/09/2016			08/19/2016	Sofia Elnemr	1822546, 1822551, 1822552