Chemical Analysis Report

NE-DIST-2022-03-01-01

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

Event Description: **San Sebastian retrieve**
Request ID: **RQ-2022-02-21-27**
Customer: **NE-DIST**
Project ID: **SMP**

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Certified by: Thekkekalathil Chandrasekhar, Environmental Consultant Date Certified: 23-MAR-2022 10:41

Case Narrative

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

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

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

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

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

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

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

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

Precision is reported as relative percent difference unless otherwise noted.

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

QC Codes used in this report may include:

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

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

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

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

Sample Location: SAN SEBASTIAN R @ SR 16 **Collection Date/Time: 02/28/2022 10:30**

Field ID: 27010058 Matrix: W-SURF-SLT

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2308916	EPA 180.1 Rev. 2.0	Turbidity	7.9		NTU	P410515	
	SM 2320 B-2011	Total Alkalinity	132		mg CaCO3/L	P410712	
	SM 2540 D-2011	TSS	18		mg/L	P410902	
	SM 4500 F-C-2011	Fluoride	1.1		mg F/L	P410716	
2308917	EPA 350.1 Rev. 2.0	Ammonia-N	0.029		mg N/L	P410685	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.62		mg N/L	P410550	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.012		mg N/L	P410911	
	EPA 365.1 Rev. 2.0	Total-P	0.077		mg P/L	P410718	
	SM 5310 B-2011	Organic Carbon	6.2		mg C/L	P411060	
2308922	EPA 200.7 Rev. 4.4	Calcium	431		mg/L	P410650	
		Iron	210	I	ug/L	P410650	
		Magnesium	1.13E+03		mg/L	P410650	
		Strontium	7.75E+03		ug/L	P410650	
		Tin	150	U	ug/L	P410650	
		Vanadium	8.0	U	ug/L	P410650	
		Zinc	20	U	ug/L	P410650	
	EPA 200.8 Rev. 5.4	Aluminum	193		ug/L	P410650	
		Antimony	0.20	U	ug/L	P410650	
		Arsenic	2.26		ug/L	P410650	
		Beryllium	0.040	U	ug/L	P410650	
		Cadmium	0.080	U	ug/L	P410650	
		Chromium	1.6	U	ug/L	P410650	
		Cobalt	0.17	I	ug/L	P410650	
		Copper	1.8	I	ug/L	P410650	
		Lead	0.80	U	ug/L	P410650	
		Manganese	35.6		ug/L	P410650	
		Molybdenum	10.6		ug/L	P410650	
		Nickel	2.0	U	ug/L	P410650	
		Selenium	0.80	U	ug/L	P410650	
		Silver	0.040	U	ug/L	P410650	

Ref. Method and Comment:
SM 2540 D-2011: Batch relative percent difference is unavailable because of low analyte concentration in the QC sample.
EPA 200.7 Rev. 4.4: Batch matrix spike recoveries for calcium, magnesium and strontium are unavailable because of high analyte concentration in the QC sample. Precision data and spike recoveries for tin are unavailable because sample matrix interference necessitated a high dilution.

Sample Location: FB_02282022 **Collection Date/Time: 02/28/2022 10:55**

Field ID: FB_02282022 Matrix: W-FIELD-BK

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2308918	EPA 180.1 Rev. 2.0	Turbidity	0.10	U	NTU	P410515	
	SM 2320 B-2011	Total Alkalinity	0.65	U	mg CaCO3/L	P410840	
	SM 2540 D-2011	TSS	2	U	mg/L	P410900	
	SM 4500 F-C-2011	Fluoride	0.035	U	mg F/L	P410845	
2308919	EPA 350.1 Rev. 2.0	Ammonia-N	0.002	U	mg N/L	P410686	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	0.080	U	mg N/L	P410551	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.004	U	mg N/L	P410872	
	EPA 365.1 Rev. 2.0	Total-P	0.002	U	mg P/L	P410719	
	SM 5310 B-2011	Organic Carbon	0.50	U	mg C/L	P410643	
2308923	EPA 200.7 Rev. 4.4	Calcium	0.075	U	mg/L	P410595	
		Iron	30	U	ug/L	P410595	
		Magnesium	0.040	U	mg/L	P410595	
		Strontium	2.0	U	ug/L	P410595	
		Tin	3.0	U	ug/L	P410595	
		Vanadium	2.0	U	ug/L	P410595	
		Zinc	5.0	U	ug/L	P410595	
	EPA 200.8 Rev. 5.4	Aluminum	5.0	U	ug/L	P410595	
		Antimony	0.050	U	ug/L	P410595	
		Arsenic	0.050	U	ug/L	P410595	
		Beryllium	0.010	U	ug/L	P410595	
		Cadmium	0.020	U	ug/L	P410595	
		Chromium	0.40	U	ug/L	P410595	
		Cobalt	0.020	U	ug/L	P410595	
		Copper	0.40	U	ug/L	P410595	
		Lead	0.20	U	ug/L	P410595	
		Manganese	0.10	U	ug/L	P410595	
		Molybdenum	0.15	U	ug/L	P410595	
		Nickel	0.50	U	ug/L	P410595	
		Selenium	0.20	U	ug/L	P410595	
		Silver	0.010	U	ug/L	P410595	

Ref. Method and Comment:
EPA 200.8 Rev. 5.4: Batch matrix spike recoveries for manganese are unavailable for one of two spiked samples 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: P410515

Component	Result	Code	Units
Turbidity	0.10	U	NTU

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410595

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410650

Component	Result	Code	Units
Calcium	0.075	U	mg/L
Iron	30	U	ug/L
Magnesium	0.040	U	mg/L
Strontium	2.0	U	ug/L
Tin	3.0	U	ug/L
Vanadium	2.0	U	ug/L
Zinc	5.0	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410595

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L
Beryllium	0.010	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Component	Result	Code	Units
Aluminum	5.0	U	ug/L
Antimony	0.050	U	ug/L
Arsenic	0.050	U	ug/L

Quality Assurance Report
Method Blank Results

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Component	Result	Code	Units
Beryllium	0.010	U	ug/L
Cadmium	0.020	U	ug/L
Chromium	0.40	U	ug/L
Cobalt	0.020	U	ug/L
Copper	0.40	U	ug/L
Lead	0.20	U	ug/L
Manganese	0.10	U	ug/L
Molybdenum	0.15	U	ug/L
Nickel	0.50	U	ug/L
Selenium	0.20	U	ug/L
Silver	0.010	U	ug/L

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410685

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410686

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410550

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410551

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410872

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410911

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

Component	Result	Code	Units

Quality Assurance Report
Method Blank Results

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410719

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

Reference Method: SM 2320 B-2011
Batch ID: P410712

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

Reference Method: SM 2320 B-2011
Batch ID: P410840

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

Reference Method: SM 2540 D-2011
Batch ID: P410900

Component	Result	Code	Units
TSS	2	U	mg/L

Reference Method: SM 2540 D-2011
Batch ID: P410902

Component	Result	Code	Units
TSS	3	U	mg/L

Reference Method: SM 4500 F-C-2011
Batch ID: P410716

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 4500 F-C-2011
Batch ID: P410845

Component	Result	Code	Units
Fluoride	0.035	U	mg F/L

Reference Method: SM 5310 B-2011
Batch ID: P410643

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Method Blank Results

Reference Method: SM 5310 B-2011
Batch ID: P411060

Component	Result	Code	Units
Organic Carbon	0.50	U	mg C/L

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P410515

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Turbidity	97.3		P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410595

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	108		P	85 - 115
Iron	108		P	85 - 115
Magnesium	106		P	85 - 115
Strontium	104		P	85 - 115
Tin	105		P	85 - 115
Vanadium	97.8		P	85 - 115
Zinc	105		P	85 - 115

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410650

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Calcium	106		P	85 - 115
Iron	107		P	85 - 115
Magnesium	103		P	85 - 115
Strontium	103		P	85 - 115
Tin	104		P	85 - 115
Vanadium	96.3		P	85 - 115
Zinc	104		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410595

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	100		P	85 - 115
Antimony	99.6		P	85 - 115
Arsenic	98.5		P	85 - 115
Beryllium	97.0		P	85 - 115
Cadmium	98.9		P	85 - 115
Chromium	95.7		P	85 - 115
Cobalt	97.5		P	85 - 115
Copper	96.5		P	85 - 115
Lead	95.2		P	85 - 115
Manganese	96.6		P	85 - 115
Molybdenum	98.3		P	85 - 115
Nickel	98.0		P	85 - 115
Selenium	98.5		P	85 - 115
Silver	98.8		P	85 - 115

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Aluminum	93.1		P	85 - 115
Antimony	92.2		P	85 - 115
Arsenic	93.2		P	85 - 115

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Beryllium	86.7		P	85 - 115
Cadmium	91.7		P	85 - 115
Chromium	88.3		P	85 - 115
Cobalt	92.3		P	85 - 115
Copper	90.2		P	85 - 115
Lead	88.6		P	85 - 115
Manganese	90.1		P	85 - 115
Molybdenum	92.2		P	85 - 115
Nickel	91.8		P	85 - 115
Selenium	91.9		P	85 - 115
Silver	96.9		P	85 - 115

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410685

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

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410686

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410550

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

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410551

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410872

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

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410911

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Laboratory Control Sample Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

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

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410719

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	98.1		P	90 - 110

Reference Method: SM 2320 B-2011
Batch ID: P410712

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	95.3		P	94 - 106

Reference Method: SM 2320 B-2011
Batch ID: P410840

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total Alkalinity	99.0		P	94 - 106

Reference Method: SM 4500 F-C-2011
Batch ID: P410716

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	103		P	93 - 104

Reference Method: SM 4500 F-C-2011
Batch ID: P410845

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Fluoride	98.0		P	93 - 104

Reference Method: SM 5310 B-2011
Batch ID: P410643

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	93.8		P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P411060

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Organic Carbon	94.8		P	85 - 115

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410595

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308895	Calcium	104		P	80 - 120
2308895	Iron	104	107	P/P	80 - 120
2308895	Magnesium	103		P	80 - 120
2308895	Strontium	104	105	P/P	80 - 120
2308895	Tin	108	105	P/P	80 - 120
2308895	Vanadium	99.7	102	P/P	80 - 120
2308895	Zinc	105	107	P/P	80 - 120

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410650

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2307617	Iron	100	105	P/P	70 - 130
2307617	Vanadium	97.6	101	P/P	70 - 130
2307617	Zinc	97.0	101	P/P	70 - 130

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410595

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2307546	Aluminum	99.5		P	75 - 125
2307546	Antimony	104		P	75 - 125
2307546	Arsenic	102		P	75 - 125
2307546	Beryllium	92.6		P	75 - 125
2307546	Cadmium	101		P	75 - 125
2307546	Chromium	101		P	75 - 125
2307546	Cobalt	100		P	75 - 125
2307546	Copper	93.5		P	75 - 125
2307546	Lead	97.7		P	75 - 125
2307546	Manganese	101		P	75 - 125
2307546	Molybdenum	105		P	75 - 125
2307546	Nickel	98.9		P	75 - 125
2307546	Selenium	99.6		P	75 - 125
2307546	Silver	95.9		P	75 - 125
2308895	Aluminum	102	101	P/P	80 - 120
2308895	Antimony	100	99.5	P/P	80 - 120
2308895	Arsenic	99.5	99.2	P/P	80 - 120
2308895	Beryllium	97.0	97.4	P/P	80 - 120
2308895	Cadmium	100	100	P/P	80 - 120
2308895	Chromium	97.8	97.9	P/P	80 - 120
2308895	Cobalt	99.2	98.9	P/P	80 - 120
2308895	Copper	96.8	96.8	P/P	80 - 120
2308895	Lead	96.8	96.6	P/P	80 - 120
2308895	Molybdenum	99.6	100	P/P	80 - 120
2308895	Nickel	99.5	100	P/P	80 - 120
2308895	Selenium	98.6	97.5	P/P	80 - 120
2308895	Silver	97.2	96.6	P/P	80 - 120

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2307617	Aluminum	103	103	P/P	70 - 130
2307617	Antimony	100	99.9	P/P	70 - 130
2307617	Arsenic	105	105	P/P	70 - 130
2307617	Beryllium	96.3	99.9	P/P	70 - 130
2307617	Cadmium	90.5	89.5	P/P	70 - 130
2307617	Chromium	95.2	95.9	P/P	70 - 130
2307617	Cobalt	111	111	P/P	70 - 130
2307617	Copper	97.9	97.5	P/P	70 - 130
2307617	Lead	104	104	P/P	70 - 130
2307617	Manganese	94.6	94.3	P/P	70 - 130
2307617	Molybdenum	78.5	71.3	P/P	70 - 130
2307617	Nickel	108	108	P/P	70 - 130
2307617	Selenium	92.4	92.6	P/P	70 - 130
2307617	Silver	89.4	89.3	P/P	70 - 130

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410685

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308743	Ammonia-N	97.6	99.4	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410686

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308900	Ammonia-N	101	98.4	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410550

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2307283	Kjeldahl Nitrogen	99.5	97.3	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410551

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308688	Kjeldahl Nitrogen	90.5	90.8	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410872

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308902	NO2NO3-N	98.0	98.0	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410911

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308327	NO2NO3-N	102	102	P/P	90 - 110

Quality Assurance Report
Matrix Spike Accuracy

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2307973	Total-P	103	102	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410719

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308988	Total-P	100	104	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Batch ID: P410716

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308822	Fluoride	101	102	P/P	92 - 107

Reference Method: SM 4500 F-C-2011
Batch ID: P410845

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308962	Fluoride	98.0	95.6	P/P	92 - 107

Reference Method: SM 5310 B-2011
Batch ID: P410643

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308902	Organic Carbon	97.8	97.1	P/P	85 - 115

Reference Method: SM 5310 B-2011
Batch ID: P411060

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2308823	Organic Carbon	91.9	94.2	P/P	85 - 115

Quality Assurance Report
Precision

Reference Method: EPA 180.1 Rev. 2.0
Batch ID: P410515

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308899	Turbidity	1.33	Sample	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308895	Calcium	1.48	Spike	P	0 - 20
2308895	Iron	2.22	Spike	P	0 - 20
2308895	Magnesium	1.34	Spike	P	0 - 20
2308895	Strontium	0.454	Spike	P	0 - 20
2308895	Tin	2.00	Spike	P	0 - 20
2308895	Vanadium	2.04	Spike	P	0 - 20
2308895	Zinc	1.96	Spike	P	0 - 20

Reference Method: EPA 200.7 Rev. 4.4
Batch ID: P410650

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2307617	Calcium	2.18	Spike	P	0 - 20
2307617	Iron	4.34	Spike	P	0 - 20
2307617	Magnesium	0.173	Spike	P	0 - 20
2307617	Strontium	3.06	Spike	P	0 - 20
2307617	Vanadium	3.33	Spike	P	0 - 20
2307617	Zinc	4.41	Spike	P	0 - 20

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410595

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308895	Aluminum	0.594	Spike	P	0 - 20
2308895	Antimony	0.926	Spike	P	0 - 20
2308895	Arsenic	0.306	Spike	P	0 - 20
2308895	Beryllium	0.354	Spike	P	0 - 20
2308895	Cadmium	0.136	Spike	P	0 - 20
2308895	Chromium	0.187	Spike	P	0 - 20
2308895	Cobalt	0.383	Spike	P	0 - 20
2308895	Copper	0.0692	Spike	P	0 - 20
2308895	Lead	0.203	Spike	P	0 - 20
2308895	Manganese	1.23	Spike	P	0 - 20
2308895	Molybdenum	0.326	Spike	P	0 - 20
2308895	Nickel	0.481	Spike	P	0 - 20
2308895	Selenium	1.09	Spike	P	0 - 20
2308895	Silver	0.574	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 200.8 Rev. 5.4
Batch ID: P410650

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2307617	Aluminum	0.400	Spike	P	0 - 20
2307617	Antimony	0.306	Spike	P	0 - 20
2307617	Arsenic	0.526	Spike	P	0 - 20
2307617	Beryllium	3.65	Spike	P	0 - 20
2307617	Cadmium	1.11	Spike	P	0 - 20
2307617	Chromium	0.771	Spike	P	0 - 20
2307617	Cobalt	0.308	Spike	P	0 - 20
2307617	Copper	0.378	Spike	P	0 - 20
2307617	Lead	0.227	Spike	P	0 - 20
2307617	Manganese	0.283	Spike	P	0 - 20
2307617	Molybdenum	3.97	Spike	P	0 - 20
2307617	Nickel	0.289	Spike	P	0 - 20
2307617	Selenium	0.228	Spike	P	0 - 20
2307617	Silver	0.105	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410685

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308743	Ammonia-N	1.20	Spike	P	0 - 20

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P410686

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308900	Ammonia-N	1.97	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410550

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2307283	Kjeldahl Nitrogen	1.49	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P410551

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308688	Kjeldahl Nitrogen	0.338	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410872

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308902	NO2NO3-N	0.0	Spike	P	0 - 20

Quality Assurance Report
Precision

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P410911

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308327	NO2NO3-N	0.491	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410718

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2307973	Total-P	0.258	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P410719

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308988	Total-P	2.83	Spike	P	0 - 20

Reference Method: SM 2320 B-2011
Batch ID: P410712

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308822	Total Alkalinity	0.372	Sample	P	0 - 5.2

Reference Method: SM 2320 B-2011
Batch ID: P410840

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308962	Total Alkalinity	0.538	Sample	P	0 - 5.2

Reference Method: SM 2540 D-2011
Batch ID: P410900

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308776	TSS	4.76	Sample	P	0 - 10

Reference Method: SM 4500 F-C-2011
Batch ID: P410716

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308822	Fluoride	0.953	Spike	P	0 - 2.1

Reference Method: SM 4500 F-C-2011
Batch ID: P410845

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308962	Fluoride	1.47	Spike	P	0 - 2.1

Quality Assurance Report
Precision

Reference Method: SM 5310 B-2011
Batch ID: P410643

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308902	Organic Carbon	0.504	Spike	P	0 - 20

Reference Method: SM 5310 B-2011
Batch ID: P411060

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2308823	Organic Carbon	1.90	Spike	P	0 - 20

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report
Calibration Verification

Reference Method: EPA 180.1 Rev. 2.0
Run ID: A110692
Included Lab Sample IDs: 2308916, 2308918

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

Reference Method: SM 5310 B-2011
Run ID: A110740
Included Lab Sample IDs: 2308919

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	95.6	98.2	P/P	90 - 110

Reference Method: EPA 350.1 Rev. 2.0
Run ID: A110761
Included Lab Sample IDs: 2308917, 2308919

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	98.2	97.8	P/P	90 - 110
Ammonia-N	98.3	98.2	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A110775
Included Lab Sample IDs: 2308923

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.7	99.9	P/P	90 - 110
Antimony	95.9	94.0	P/P	90 - 110
Arsenic	99.9	96.5	P/P	90 - 110
Beryllium	95.3	94.1	P/P	90 - 110
Cadmium	98.9	97.2	P/P	90 - 110
Chromium	96.3	94.5	P/P	90 - 110
Cobalt	98.3	96.5	P/P	90 - 110
Copper	99.1	95.9	P/P	90 - 110
Lead	94.6	92.5	P/P	90 - 110
Manganese	96.1	96.4	P/P	90 - 110
Molybdenum	99.6	96.7	P/P	90 - 110
Nickel	99.3	97.4	P/P	90 - 110
Selenium	98.3	96.8	P/P	90 - 110
Silver	96.1	94.5	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A110777
Included Lab Sample IDs: 2308916

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	95.1	95.6	P/P	90 - 110

Reference Method: SM 4500 F-C-2011
Run ID: A110777
Included Lab Sample IDs: 2308916

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Fluoride	103	100	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0
Run ID: A110781
Included Lab Sample IDs: 2308917, 2308919

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	97.4	99.2	P/P	90 - 110
Kjeldahl Nitrogen	99.3	100	P/P	90 - 110

Reference Method: EPA 200.8 Rev. 5.4
Run ID: A110791
Included Lab Sample IDs: 2308922

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Aluminum	99.7	100	P/P	90 - 110
Antimony	97.0	98.4	P/P	90 - 110
Arsenic	99.9	99.3	P/P	90 - 110
Beryllium	97.2	96.6	P/P	90 - 110
Cadmium	97.5	98.3	P/P	90 - 110
Chromium	97.5	96.8	P/P	90 - 110
Cobalt	99.8	97.7	P/P	90 - 110
Copper	100	97.7	P/P	90 - 110
Lead	93.2	92.2	P/P	90 - 110
Manganese	98.0	97.2	P/P	90 - 110
Molybdenum	98.4	98.8	P/P	90 - 110
Nickel	100	98.0	P/P	90 - 110
Selenium	98.9	99.5	P/P	90 - 110
Silver	94.9	94.9	P/P	90 - 110

Reference Method: EPA 200.7 Rev. 4.4
Run ID: A110800
Included Lab Sample IDs: 2308922, 2308923

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Calcium	101	102	P/P	90 - 110
Calcium	103	104	P/P	90 - 110
Iron	101	102	P/P	90 - 110
Iron	103	103	P/P	90 - 110
Magnesium	101	102	P/P	90 - 110
Magnesium	103	103	P/P	90 - 110
Strontium	95.1	95.7	P/P	90 - 110
Strontium	97.5	98.2	P/P	90 - 110
Tin	96.1	96.1	P/P	90 - 110
Tin	97.7	98.2	P/P	90 - 110
Vanadium	95.5	95.8	P/P	90 - 110
Vanadium	96.7	97.6	P/P	90 - 110
Zinc	100	99.7	P/P	90 - 110
Zinc	98.7	98.6	P/P	90 - 110

Reference Method: SM 2320 B-2011
Run ID: A110830
Included Lab Sample IDs: 2308918

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total Alkalinity	98.8	99.4	P/P	90 - 110

Quality Assurance Report
Calibration Verification

Reference Method: SM 4500 F-C-2011
Run ID: A110830
Included Lab Sample IDs: 2308918

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

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A110835
Included Lab Sample IDs: 2308919

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	100	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Run ID: A110852
Included Lab Sample IDs: 2308917

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	103	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Run ID: A110898
Included Lab Sample IDs: 2308917, 2308919

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

Reference Method: SM 5310 B-2011
Run ID: A110922
Included Lab Sample IDs: 2308917

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Organic Carbon	93.8	95.6	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	97.3					1.33	
EPA 200.7 Rev. 4.4	Calcium	108	104					1.48
	Calcium	106						2.18
	Iron	108	104	107				2.22
	Iron	107	100	105				4.34
	Magnesium	106	103					1.34
	Magnesium	103						0.173
	Strontium	104	104	105				0.454
	Strontium	103						3.06
	Tin	105	108	105				2.00
	Tin	104						
	Vanadium	97.8	99.7	102				2.04
	Vanadium	96.3	97.6	101				3.33
	Zinc	105	105	107				1.96
	Zinc	104	97.0	101				4.41
EPA 200.8 Rev. 5.4	Aluminum	100	102	101	99.5			0.594
	Aluminum	93.1	103	103				0.400
	Antimony	99.6	100	99.5	104			0.926
	Antimony	92.2	100	99.9				0.306
	Arsenic	98.5	99.5	99.2	102			0.306
	Arsenic	93.2	105	105				0.526
	Beryllium	97.0	97.0	97.4	92.6			0.354
	Beryllium	86.7	96.3	99.9				3.65
	Cadmium	98.9	100	100	101			0.136
	Cadmium	91.7	90.5	89.5				1.11
	Chromium	95.7	97.8	97.9	101			0.187
	Chromium	88.3	95.2	95.9				0.771
	Cobalt	97.5	99.2	98.9	100			0.383
	Cobalt	92.3	111	111				0.308
	Copper	96.5	96.8	96.8	93.5			0.0692
	Copper	90.2	97.9	97.5				0.378
	Lead	95.2	96.8	96.6	97.7			0.203
	Lead	88.6	104	104				0.227
	Manganese	96.6	101					1.23
	Manganese	90.1	94.6	94.3				0.283
	Molybdenum	98.3	99.6	100	105			0.326
	Molybdenum	92.2	78.5	71.3				3.97
	Nickel	98.0	99.5	100	98.9			0.481
	Nickel	91.8	108	108				0.289
	Selenium	98.5	98.6	97.5	99.6			1.09
	Selenium	91.9	92.4	92.6				0.228
	Silver	98.8	97.2	96.6	95.9			0.574
	Silver	96.9	89.4	89.3				0.105
EPA 350.1 Rev. 2.0	Ammonia-N	99.6	97.6	99.4				1.20
	Ammonia-N	98.4	101	98.4				1.97
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	99.6	99.5	97.3				1.49
	Kjeldahl Nitrogen	99.5	90.5	90.8				0.338
EPA 353.2 Rev. 2.0	NO2NO3-N	100	98.0	98.0				0.0
	NO2NO3-N	102	102	102				0.491
EPA 365.1 Rev. 2.0	Total-P	105	103	102				0.258
	Total-P	98.1	100	104				2.83
SM 2320 B-2011	Total Alkalinity	95.3					0.372	
	Total Alkalinity	99.0					0.538	
SM 2540 D-2011	TSS						4.76	

Quality Assurance Report
Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision		
					LCS	SMP	MS
SM 4500 F-C-2011	Fluoride	103	101	102			0.953
	Fluoride	98.0	98.0	95.6			1.47
SM 5310 B-2011	Organic Carbon	93.8	97.8	97.1			0.504
	Organic Carbon	94.8	91.9	94.2			1.90

Reference Method Descriptions

Method	Description	Associated Samples
EPA 180.1 Rev. 2.0	Turbidity in aqueous matrices	2308916, 2308918
EPA 200.7 Rev. 4.4	Total Recoverable Metals analysis using ICP emission spectroscopy for aqueous samples supporting Clean Water Act Projects	2308922, 2308923
EPA 200.8 Rev. 5.4	Total Recoverable Metals analysis using ICP-MS for aqueous samples supporting Clean Water Act Projects	2308922, 2308923
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2308917, 2308919
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2308917, 2308919
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2308917, 2308919
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2308917, 2308919
SM 2320 B-2011	Alkalinity in aqueous matrices as mg CaCO3/L	2308916, 2308918
SM 2540 D-2011	Total Suspended Solids in aqueous matrices using a maximum of 250 mL of sample	2308916, 2308918
SM 4500 F-C-2011	Fluoride in aqueous matrices, without distillation (not valid for NPDES monitoring)	2308916, 2308918
SM 5310 B-2011	Nonpurgeable Organic Carbon in aqueous matrices	2308917, 2308919

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	03/01/2022			03/01/2022 16:08	Khloe J Berg	2308916
	03/01/2022			03/01/2022 16:10	Khloe J Berg	2308918
EPA 200.7 Rev. 4.4	03/01/2022	03/03/2022 10:15	Megan Whitefoot	03/07/2022 15:12	Josef B Mick	2308923
	03/01/2022	03/04/2022 10:00	Megan Whitefoot	03/07/2022 22:40	Josef B Mick	2308922
	03/01/2022	03/04/2022 10:00	Megan Whitefoot	03/07/2022 22:48	Josef B Mick	2308922
EPA 200.8 Rev. 5.4	03/01/2022	03/03/2022 10:15	Megan Whitefoot	03/04/2022 13:58	Alexander Thompson	2308923
	03/01/2022	03/04/2022 10:00	Megan Whitefoot	03/07/2022 21:53	Alexander Thompson	2308922
EPA 350.1 Rev. 2.0	03/01/2022			03/04/2022 11:45	Judith K. Clark	2308917
	03/01/2022			03/04/2022 12:21	Judith K. Clark	2308919
EPA 351.2 Rev. 2.0	03/01/2022	03/03/2022 12:56	Samantha L Bates	03/04/2022 16:14	Alexandra J Mattheus	2308917
	03/01/2022	03/03/2022 12:56	Samantha L Bates	03/04/2022 16:44	Alexandra J Mattheus	2308919
EPA 353.2 Rev. 2.0	03/01/2022			03/09/2022 11:07	Beverly Y. Sanders	2308919
	03/01/2022			03/09/2022 17:27	Nathaniel J Jones	2308917
EPA 365.1 Rev. 2.0	03/01/2022	03/10/2022 14:40	Simonne.V. Calhoun	03/11/2022 15:50	Sarah A Nixon	2308917
	03/01/2022	03/10/2022 14:40	Simonne.V. Calhoun	03/11/2022 16:01	Sarah A Nixon	2308919
SM 2320 B-2011	03/01/2022			03/04/2022 14:36	Dale L. Simmons	2308916
	03/01/2022			03/08/2022 21:37	Dale L. Simmons	2308918
SM 2540 D-2011	03/01/2022			03/02/2022 14:26	Yijie Li	2308916, 2308918
SM 4500 F-C-2011	03/01/2022			03/04/2022 13:44	Dale L. Simmons	2308916
	03/01/2022			03/08/2022 21:37	Dale L. Simmons	2308918
SM 5310 B-2011	03/01/2022			03/02/2022 17:12	Khloe J Berg	2308919
	03/01/2022			03/11/2022 19:40	Khloe J Berg	2308917