Lockheed Martin Corporation
6801 Rockledge Drive
MP CCT 246
Bethesda, MD 20817
Telephone (301) 548-2223

March 23, 2018 **VIA OVERNIGHT CARRIER**

Saaya Jessica Okazaki
WSA/Compliance Program
Maryland Department of the Environment
Water Management Administration
1800 Washington Boulevard, Suite 420
Baltimore, MD. 21230

Re: Transmittal of the MDE NPDES Permit Closure and Compliance Report
Lockheed Martin Corporation Middle River Complex
Cow Pen Creek and Dark Head Cove Sediment Remediation Project
State Permit No. 17-DP-3843, MD0071935,
Middle River, Maryland

Dear Ms. Okazaki:

The letter constitutes the final National Pollutant Discharge Elimination System (NPDES) report of authorized surface water discharges for the Cow Pen Creek and Dark Head Cove Sediment Remediation Project adjacent to Lockheed Martin Corporation's (Lockheed Martin) Middle River Complex (MRC) in Middle River, Maryland, (State Permit No. 17-DP-3843-MD0071935), and a request for closure of the permit.

Summary of the Remediation Effort and Water Discharges

Work authorized by the Maryland Department of the Environment (MDE) and United States Army Corps of Engineers (USACE) under the Cow Pen Creek and Dark Head Cove Sediment Remediation Project started on October 26, 2016, and all work was completed on December 27, 2017. Remediation included dredging 3.2 acres of contaminated sediment in Dark Head Cove, and dredging and excavating 7.1 acres of contaminated sediment in Cow Pen Creek. In addition, a layer of activated carbon was placed over 13.7 acres of substrate in Dark Head Cove as *in situ* treatment, a sand Residual Management Layer (RML) was placed over all dredged areas, a streambed gravel mix was placed within the excavated creek bed, and backfill was placed over other excavated portions of Cow Pen Creek. Other activities authorized and completed included the repair of approximately 1,400 linear feet of existing bulkhead along Dark Head Cove.

A silt curtain, installed before work began, was used to prevent suspended materials from traveling to downstream areas; the curtain was removed on December 8, 2017, within 30 days

following completion of the *in situ* treatment on December 6, 2017. Most project work was completed over two seasons and within the in-water work period between October 15 and February 15. However, during Season 1, some dredging in Dark Head Cove and Cow Pen Creek extended beyond the end date of February 15, 2017, to March 3, 2017; this extension of work was approved by the Maryland Department of the Environment (MDE) and the United States Army Corps of Engineers (USACE) on February 16, 2017. In addition, a portion of the Cow Pen Creek sediment excavation was conducted during the subaquatic vegetation (SAV) work closure period between June 15, 2017, and October 15, 2017. Work in Cow Pen Creek during this time was authorized under an in-water work period waiver approved by the USACE and MDE as part of their respective permit approval processes.

Season 1 Remediation Work October 15, 2016 – March 3, 2017

During Season 1, approximately 3.2 acres of contaminated sediment was dredged from Dark Head Cove. This activity began on October 26, 2016, and ended on March 3, 2017, (an extension waiver was received from MDE and the USACE on February 16, 2017, to work beyond the February 15, 2017, in-water work window). A silt curtain was installed at the mouth of Dark Head Cove before starting all in-water work, and was removed on March 9, 2017. Note that during Season 1 all contact water was successfully contained within the dewatering pad and was ultimately disposed of through the sanitary sewer under Baltimore County Wastewater Discharge Permit (WWDP) No. 1667. No contact or process water from the dewatering pad was discharged to any surface waters of the United States during Season 1.

Other activities completed during this period included installation of new sheet piling along 1,400 feet of existing bulkhead in Dark Head Cove. Temporary cofferdams were installed around the outfalls in this area to allow for proper installation and welding of the outfall pipes through the repaired bulkhead. The cofferdams have been removed, and normal water levels have been restored to this area. Temporary dewatering of the cofferdam areas during Season 1 was permitted under the USACE Nationwide Permit 38 No. 2015-61958-M02 and MDE Tidal Wetlands Permit No. 15-WL-1119 and therefore did not require an NPDES surface water discharge permit.

Season 2 Remediation Work June 2017 – December 27, 2017

Following a June 2017 mobilization, Season 2 excavation of contaminated sediment in Cow Pen Creek started in July per the in-water work waiver approved by MDE. The excavation process within the creek channel included placement of both an upstream and downstream dam to isolate and temporarily dewater individual sections of the creek during excavation, and required a NPDES permit to effectively manage the volume of water entering an open excavation. Excavated sediment was dewatered at an onshore dewatering pad. Water within each excavation "cell," as well as water collected at the dewatering pad, was pumped to an onshore portable treatment system and then discharged downstream below the lower dam back into Cow Pen Creek. Discharges to Cow Pen Creek through the treatment system from both the dewatered cells and from water collected in the dewatering pad were authorized by MDE under NPDES Industrial Discharge Permit No. 17-DP-3843 - MD0071935.

The outfall for the surface water discharge, referred to as Outfall 001, was periodically relocated along the stream channel as the excavation work progressed downstream. The surface water

discharge permit established discharge limits for total suspended solids (TSS), cadmium, copper, lead, and pH. The limit for TSS was established at a daily maximum of 20 milligrams per liter (mg/L), and at 15 mg/L as a monthly daily average. The limit for pH was set as a daily maximum range between 6.0 and 9.0, while the monthly average range was 6.5 to 8.5. The daily maximum for cadmium was 5.0 micrograms per liter (µg/L), with a monthly average of 0.45 µg/L. The daily maximum for copper was 31.6 µg/L, while the monthly average was 18.9 µg/L. The daily maximum for lead was set at 246 µg/L, with a monthly average of 6.4 µg/L. The above limits were approved in a July 6, 2017, correspondence from MDE, and are based on site-specific hardness data collected in Cow Pen Creek.

Surface water overtopped a downstream dam during a large and unanticipated storm that occurred during Season 2 on July 28 and 29, 2017, resulting in an unintended discharge of surface water. However, per correspondence dated August 1, 2017, from Ms. Marjorie Mewbourne of MDE Wastewater Division, this discharge was beyond the control of the construction team and was remedied as quickly as possible, and therefore did not constitute a violation of the NPDES permit. Furthermore, a silt curtain had been placed near the mouth of Cow Pen Creek before starting work to minimize migration of suspended material to downstream areas in the event of a dam failure. Once *in situ* treatment started on October 21, 2017, the silt curtain was removed from Cow Pen Creek and moved to the mouth of Dark Head Cove.

Other minor deviations from normal operations and discharges occurred when piping occurred beneath the bladder dam beginning on November 10, 2017, and continuing until the dam was repaired and typical treatment system discharges were restarted on November 24, 2017. While the treatment system operated normally during this two-week period, treatment was slowed or stopped periodically to process highly turbid water behind the dam and until dam repairs could be made. Also, some water appeared to move between the up- and downstream sides of the dam during this period; however, the volume of water movement is unknown.

Compliance with the Authorized Limits for TSS, pH, Cadmium, Copper, and Lead Under NPDES State Permit No. DP-17-3843

Outside of the period when excessive rainfall caused flooding of the excavation area, discharges to surface waters from Outfall 001 were within permitted limits for all parameters. Results from required sampling of the effluent from Outfall 001 were recorded as part of standard quarterly reports in the NetDMR electronic reporting system during system operation between July and December 2017 (Quarters 3 and 4 in 2017). Note that a "no discharge" report was submitted for Quarter 2, 2017, (since the permit was issued June 1, 2017, and operation did not start until July 2017).

TSS Exceedance During the July/August Storm Events

As noted in the attached TSS exceedance report previously submitted to MDE (Attachment A), exceedances of TSS were noted during the period of heavy storms in late July to early-mid- August 2017. While MDE indicated that these exceedances were beyond the design capability of the treatment system and were therefore not considered a violation of the authorized permit limit for TSS, Lockheed Martin conducted additional TSS sampling beyond that required for the MDE discharge permit after the dam was breached. Additional sampling included initial sampling for TSS over a three-day period beginning on August 23, 2017, to evaluate the degree

of TSS resulting from the dam breach, and subsequent weekly sampling for TSS for the life of the project. Note that this additional TSS sampling was beyond the requirement established by the discharge permit and was completed voluntarily by Lockheed Martin.

Results of the three consecutive sampling events, in the attached TestAmerica lab reports (Attachment B), indicate that while the TSS concentration (5.9 mg/L) on August 23, 2017, was within the permitted TSS level, subsequent TSS concentrations exceeded the permitted level on both August 24, 2017, (23 mg/L) and August 25, 2017 (41 mg/L). The system was shut down and completely rehabilitated to restore its function. This rehabilitation included a complete change-out of the carbon vessels and the sand media filtration units, as well as reducing the filtration size of the lead bag-filter from 25 to 20 microns. Once the system was restarted, weekly TSS sampling results, which resumed on September 4, 2017, indicated that TSS levels had returned to its typical levels (below the permitted discharge concentration) for the remainder of the project. Results of the weekly TSS results are provided in the table below, and in the attached TestAmerica lab reports (Attachment B).

Additional Weekly TSS Sampling Results – 9/04/17 – 12/19/17 (Project End)
Cow Pen Creek and Dark Head Cove Remediation Project
State Discharge Permit No. 17-DP-3843

Date	Value	Units
9/4/2017	ND	mg/L
9/5/2017	1.7	mg/L
9/6/2017	ND	mg/L
9/18/2017	8.2	mg/L
9/20/2017	1.9	mg/L
9/26/2017	6.6	mg/L
10/2/2017	11.0	mg/L
10/12/2017	1.5	mg/L
10/18/2017	2.4	mg/L
10/24/2017	2.7	mg/L
10/31/2017	ND	mg/L
11/8/2017	2.6	mg/L
11/14/2017	ND	mg/L
11/28/2017	4.6	mg/L
11/30/2017	5.0	mg/L
12/5/2017	1.6	mg/L
12/19/2017	1.3	mg/L

ND – Not Detected at a reporting limit of 1 mg/L

No TSS concentration exceedances were observed at the treatment system outfall during the temporary failure of the bladder dam in November 2017, as indicated by the weekly TSS sampling events that occurred during this period.

As part of an alternate treatment-system test that evaluated options to expedite the dewatering process during the dam failure, Lockheed Martin sampled and analyzed water from behind and downstream of the bladder dam, as well as from the excavation area, that was treated using

filtration by sand and by geotextile fabric. Results of this experiment, included in the attached TestAmerica lab reports dated November 15, 2017, indicate that water sampled post-sand and post-geotextile fabric treatment exceeded the NPDES TSS discharge criterion. Therefore, these possible treatment methods were not employed. Note that the post-sand filter and post-geotextile fabric samples were collected solely to evaluate the effectiveness of these alternative treatment methods, and the water processed during these brief tests was discharged back into the flooded excavation area.

Cadmium Exceedance during the July/August Storm Events

As reported in the cadmium exceedance report previously submitted to MDE (Attachment C), the monthly average for cadmium in July 2017 was 0.88 µg/L, while the monthly average for August 2017 was 0.53 µg/L. Both values are above the monthly average limit (0.45 µg/L) set by the permit. The monthly average values were based on two samples collected for each month. Cadmium in the first sample in July, collected on July 20, 2017, was not detected at a reporting limit of 0.043 µg/L, while cadmium in the second sample, collected on July 25, 2017, was 0.99 µg/L. Cadmium in the first sample in August, collected on August 9, 2017, was 3.1 µg/L, while cadmium in the second sample, collected on August 28, 2017, was 0.42 µg/L. The likely cause of the elevated cadmium results is described below. Note that all values were well below the daily maximum permit limit of 5.0 µg/L.

Potential Cause of Cadmium Exceedance

Only one of the cadmium results listed above is significantly elevated as compared to other data points: the August 9, 2017 sample with a cadmium concentration of 3.1 µg/L. The late-July storm described above was followed by two other large storms on August 18, 2017, and August 21, 2017. Rainfall from these storms overwhelmed the watershed, the temporary dams, and the water treatment system, resulting in a large volume of highly turbid water entering the stream channel, and requiring extended maintenance on the treatment system, which was performed between July 31st and September 4th. TSS levels were also elevated during this period, and the highest cadmium concentration (3.1 µg/L), recorded on August 9, 2017, coincided with the highest recorded TSS reading of 49 mg/L. Because cadmium is typically associated with particulates/suspended solids, it is likely that the elevated cadmium concentration recorded on August 9, 2017, is related to the late-July storm, and the subsequent elevated cadmium concentrations detected during the month of August are likewise related to the August storms. Subsequent TSS and cadmium results from samples collected in September were below both the daily and average monthly maximum limits specified in the current discharge permit, indicating that the treatment system was functioning properly and maintaining concentrations within permitted limits after the system was rehabilitated in response to the storms in July and August.

The cadmium exceedances prompted Lockheed Martin to collect two additional samples per month beginning in November 2017, bringing the total number of samples per month to four. The additional data were collected to provide a more robust set of data to more accurately evaluate the actual average concentrations for cadmium throughout each month.

Results of the additional sampling conducted between November and December 2017, when remediation was complete, were factored into the overall monthly average values, and were recorded in the NetDMR electronic reporting system. These results indicate that the daily

maximum and monthly average cadmium concentrations did not exceed the authorized levels specified in the MDE discharge permit.

Permit Closure

As noted above, the remediation effort and all surface water discharges terminated on December 27, 2017. Therefore, Lockheed Martin requests closure of the above referenced permit.

Please let me know if you have any questions. My office phone number is (301) 548-2209.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation
Lockheed Martin Corporation

Enclosures:
Attachment A
Attachment B
Attachment C

cc: (via email with enclosure)
James Carroll, MDE
Gary Schold, MDE
Mark Mank, MDE
Marjorie Mewbourne, MDE
Thomas Johnson, MDE
Christine Kline, Lockheed Martin
Norm Varney, Lockheed Martin
Lynnette Drake, Lockheed Martin
Scott Heinlein, LMCPI
Cannon Silver, CDM Smith
Mike Martin, Tetra Tech

ATTACHMENT A

Lockheed Martin Corporation
6801 Rockledge Drive MP: CCT-246
Bethesda, MD 20817
Telephone 301-548-2209

August 28, 2017

VIA PRIVATE CARRIER

Saaya Jessica Okazaki
WSA/Compliance Division
Maryland Dept. of the Environment
1800 Washington Blvd, Suite 420
Baltimore, MD 21230

Subject: Notification of Noncompliance with Effluent Limits
State Discharge Permit No. 17DP3843, NPDES No. MD0071935
Lockheed Martin Corporation; Middle River Complex
2323 Eastern Boulevard, Middle River, Baltimore County, Maryland

Dear Ms. Okazaki:

This notification is provided in accordance with General Condition B.2. Noncompliance with Effluent Limits of the above referenced permit. The corrective actions described in the notification are currently being implemented.

Please let me know if you have any questions. My office phone is (301) 548-2209.

Sincerely,

Thomas D. Blackman
Project Lead, Environmental Remediation

cc: (via email with enclosure)
James Carroll, MDE
Gary Schold, MDE
Mark Mank, MDE
Marjorie Mewbourne, MDE
Thomas Johnson, MDE

Non-compliance Notification

State Discharge Permit No. 17DP3843 NPDES No. MD0071935

Lockheed Martin Cow Pen Creek Remediation Discharge – Outfall 001

Description of the Non-Complying Discharge and its impact on the aquatic environment

On August 9, 2017, a sample was collected in accordance with the above referenced NPDES permit. Laboratory analysis conducted by TestAmerica and made aware to Lockheed Martin on August 23 indicated that parameters being monitored including cadmium, copper, lead, and pH were within permitted limits; however, Total Suspended Solids (TSS) was reported at a concentration of 49 mg/L, above the permitted limit of 20 mg/L. It is unlikely that the temporary discharge of TSS slightly above the permitted level would cause adverse consequences in the aquatic environment because it was temporary, and due to recent heavy storm events, TSS in the receiving waters would also be expected to be elevated.

Cause of Non-compliance

The primary cause of the non-compliance is the elevated rainfall event that occurred during the latter part of July. On July 28th and 29th a severe thunderstorm produced over 5 inches of rainfall in the general area with preliminary indications from interpretation of National Oceanic and Atmospheric Administration (NOAA) data that this storm approached a 25-year storm event. The excessive precipitation exceeded the designed capacity (10-year flow event) of the stream diversion and water treatment system; thus, storm water entered the excavation area. Following the impact of this storm, the treatment system was not pumping at full capacity due to the inundation of turbid storm water. From that point forward, Tetra Tech performed routine maintenance on the system (such as, replacing bag filters, backwashing carbon media, backwashing sand filters, removing a 2-inch layer of sediment caked at the top of the sand media, and replacing sump pit gravel) beginning on July 30th to bring the water treatment system back into full operation, and to minimize impact from storm events. The sample collected on August 9th was collected shortly following the turbid water surge event and actions taken to clean the system. Note, prior to the July 28th and July 29th storm event the two previous lab-analyzed TSS concentrations in the water treatment effluent were below the NPDES discharge limits at not detectable (less than 1 mg/L) and 14 mg/L, respectively.

Anticipated time of non-compliance is expected to continue, or if such condition has been corrected, the duration of the period of non-compliance

The non-compliance is expected to have started around the time of the severe storm event that occurred on July 28th and 29th and terminated sometime prior to August 23rd. Upon becoming aware of the TSS concentration exceeding the permit limit on August 23rd, Lockheed Martin immediately began conducting daily TSS sampling on expedited turnaround time to determine if the TSS levels had been reduced and were now in compliance with permitted limits. A sample was collected on August 23rd and was found to have a TSS concentration of 5.9 mg/L, below the permitted level. However, the next sample collected on August 24th recorded a level of 23 mg/L, just above the permitted level. The system was shut down and additional corrective measures as described below will be implemented prior to restarting the system.

Steps taken to reduce or eliminate the non-complying discharge

Based on the TSS data from the August 23rd and 24th sampling events, it appears the ongoing maintenance activities have not fully rehabilitated the water treatment from the effects of its having been inundated with turbid water created by the late July storms. The corrective actions to be completed prior to restart of the system will include complete change out of the carbon media, complete change out of the sand filtration units, and reducing the filtration size of the lead bag filter from 25 microns to 20 microns. Once these actions are completed, the system will be restarted, maintenance as discussed above will be resumed, and systems operations will be subject to the activities described below to prevent reoccurrence.

Steps taken to prevent reoccurrence

Steps taken to prevent reoccurrence will be as follows:

1. Upon system startup, collect and analyze samples for TSS in succession over a three day period on 24-hour turnaround time.
2. If all three TSS sample results pass the discharge criteria, an aggressive maintenance schedule will be performed, consisting of increasing backwash of sand filters both in duration and frequency, back washing carbon units, and continued timely change-out of bag filters.
3. Once the system is verified to be in compliance, future monitoring for TSS will include sampling and analysis, on a 24-hour turnaround time, conducted at a frequency of once per week, which is a frequency greater than the current permit requirement of bimonthly monitoring.

If any TSS data exceed the permit limit then the following actions will be taken:

a. Shut down the system
b. Increase the filtration, most likely by including 1 micron filters to treat the system effluent
c. Restart the system and sample for TSS on a 24-hour turnaround time
d. If resampling produces results that still exceed the permit limit, then either smaller filtration cartridges (0.5 micron) will be utilized or more extensive system changes will be considered

Description of the accelerated or additional monitoring to determine the nature of the impact of the non-complying discharge

Lockheed Martin is conducting TSS monitoring through the certified lab TestAmerica. Since the TSS result was received on August 23rd, subsequent results are being provided within 24 hours of sampling. As discussed above, this process will be conducted three times in succession after system restart; and, thereafter, weekly monitoring for TSS will be conducted.

ATTACHMENT B

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-142444-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
8/24/2017 4:46:41 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-142444-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-142444-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 08/24/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

TOTAL SUSPENDED SOLIDS

Sample DW -14-082317 (680-142444-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/24/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142444-1	DW -14-082317	Water	08/23/17 15:30	08/24/17 09:10

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Client Sample ID: DW -14-082317
Date Collected: 08/23/17 15:30
Date Received: 08/24/17 09:10

Lab Sample ID: 680-142444-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.9		1.0	1.0	mg/L			08/24/17 13:13	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-492811/1
Matrix: Water
Analysis Batch: 492811

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			08/24/17 13:13	1

Lab Sample ID: LCS 680-492811/2
Matrix: Water
Analysis Batch: 492811

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	20.0		mg/L		100	80 - 120		

Lab Sample ID: LCSD 680-492811/3
Matrix: Water
Analysis Batch: 492811

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	19.5		mg/L		98	80 - 120	3	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

General Chemistry

Analysis Batch: 492811

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142444-1	DW -14-082317	Total/NA	Water	2540 D-2011	
MB 680-492811/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-492811/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-492811/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142444-1

Client Sample ID: DW -14-082317
Date Collected: 08/23/17 15:30
Date Received: 08/24/17 09:10

Lab Sample ID: 680-142444-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	492811	08/24/17 13:13	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

162089

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

8/23/17

Client Contact	Project Manager: Keir Craigie	Site Contact: Tobin Roberts	Date: 8/23/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 478-835-6644	Lab Contact: Terry Lanier	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Parkway	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — 24 Hours			Lab Sampling:
Project Name: MRE Sediment Remedy				Job / SDG No.:
Site: MRE Middle River MD				
PO # Project # 68017129				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS - 25400	Sample Specific Notes:
DW-14-082317	8/23/17	1530	G	Aq	1			X	

8/23/17

680-142444 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: 24 Hour TAT, TSS Resample keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company: Tetra Tech Inc	Date/Time: 8/23/17 1605	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

8/24/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-142444-1

Login Number: 142444
List Number: 1
Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142444-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-142509-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
8/25/2017 5:02:01 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-142509-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-142509-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 08/25/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.8 C.

TOTAL SUSPENDED SOLIDS

Sample DW-15-082417 (680-142509-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/25/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142509-1	DW-15-082417	Water	08/24/17 15:00	08/25/17 09:05

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Client Sample ID: DW-15-082417
Date Collected: 08/24/17 15:00
Date Received: 08/25/17 09:05

Lab Sample ID: 680-142509-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	23		2.0	2.0	mg/L			08/25/17 14:18	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-492970/1
Matrix: Water
Analysis Batch: 492970

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			08/25/17 14:18	1

Lab Sample ID: LCS 680-492970/2
Matrix: Water
Analysis Batch: 492970

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	21.5		mg/L		108	80 - 120		

Lab Sample ID: LCSD 680-492970/3
Matrix: Water
Analysis Batch: 492970

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	21.5		mg/L		108	80 - 120	0	25

Lab Sample ID: 680-142509-1 DU
Matrix: Water
Analysis Batch: 492970

Client Sample ID: DW-15-082417
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	23			22.4		mg/L				3	5

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

General Chemistry

Analysis Batch: 492970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142509-1	DW-15-082417	Total/NA	Water	2540 D-2011	
MB 680-492970/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-492970/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-492970/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	
680-142509-1 DU	DW-15-082417	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142509-1

Client Sample ID: DW-15-082417
Date Collected: 08/24/17 15:00
Date Received: 08/25/17 09:05

Lab Sample ID: 680-142509-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	492970	08/25/17 14:18	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

Chain of Custody Record

000432

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Kerr Craigie	Site Contact: John Roberts	Date: 8/24/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 478-835-6694	Lab Contact: Jerry Lesser	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-951-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — 24 HRS			Lab Sampling:
Project Name: MRC Sediment Remedy				Job / SDG No.:
Site: MRC Middle River, MD				
P O # Project # 80177-9				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS - 25340	Sample Specific Notes:
DW-15-082417	8/24/17	1500	G	AQ	1			X	

8/24/17

680-142509 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: 24 HR TAT, TSS sample Kerr.Craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:
Relinquished by:	Company: Tetra Tech	Date/Time: 8/24/17 1930	Received by:	Company: CAW.	Date/Time: 08-25-17 0905
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: 3.6 (CF) 3.8°c	Date/Time:

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-142509-1

Login Number: 142509

List Number: 1

Creator: Banda, Christy S

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142509-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
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GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
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Kentucky (UST)	State Program	4	18	06-30-18
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L-A-B	ISO/IEC 17025		L2463.01	09-22-19
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Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
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New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
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North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-142571-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Jerry Lanier

Authorized for release by:
8/28/2017 5:04:22 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-142571-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-142571-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 08/26/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.5 C.

TOTAL SUSPENDED SOLIDS

Sample DW-16-082517 (680-142571-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 08/28/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142571-1	DW-16-082517	Water	08/25/17 11:30	08/26/17 08:45

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Client Sample ID: DW-16-082517
Date Collected: 08/25/17 11:30
Date Received: 08/26/17 08:45

Lab Sample ID: 680-142571-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	41		3.2	3.2	mg/L			08/28/17 12:28	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-493230/1
Matrix: Water
Analysis Batch: 493230

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			08/28/17 12:28	1

Lab Sample ID: LCS 680-493230/2
Matrix: Water
Analysis Batch: 493230

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	21.0		mg/L		105	80 - 120		

Lab Sample ID: LCSD 680-493230/3
Matrix: Water
Analysis Batch: 493230

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	22.5		mg/L		113	80 - 120	7	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

General Chemistry

Analysis Batch: 493230

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142571-1	DW-16-082517	Total/NA	Water	2540 D-2011	
MB 680-493230/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-493230/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-493230/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Client Sample ID: DW-16-082517
Date Collected: 08/25/17 11:30
Date Received: 08/26/17 08:45

Lab Sample ID: 680-142571-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	310 mL	1000 mL	493230	08/28/17 12:28	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

TESTAMERICA SAVANNAH, GA ☆

Chain of Custody Record

000431

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TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 8/25/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 478-835-6694	Lab Contact: Jerry Laniel	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, VA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — 24 HRS			Lab Sampling:
Project Name: MPE Sediment Remedy				Job / SDG No.:
Site: MPE Middle River, MD				
PO# Project # 80172 9				

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	TSS - 25400	Sample Specific Notes:
DW-16-082517	8/25/17	1130	G	Aq	1			X	

8/25/17

680-142571 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

1

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: 24 HR TAT, TSS Sample. Keir.craigie@tetratech.com (0.2(CF+0.3)0.5

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

	Company	Date/Time	Received by	Company	Date/Time
Relinquished by:	Tetra Tech Inc	8/25/17 1140		TA	8/25/17 1140
Relinquished by:	TA	8/25/17 1300			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: Janice Edwards	Company: TALB	Date/Time: 8/26/17 0845

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8/28/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-142571-1

Login Number: 142571

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142571-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-17 *
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-142848-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
9/7/2017 4:12:31 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-142848-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-142848-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/06/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

TOTAL SUSPENDED SOLIDS

Samples DW-18-090417 (680-142848-1) and DW-19-090517 (680-142848-2) were analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/07/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142848-1	DW-18-090417	Water	09/04/17 13:00	09/06/17 09:30
680-142848-2	DW-19-090517	Water	09/05/17 08:00	09/06/17 09:30

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Client Sample ID: DW-18-090417 — **Lab Sample ID: 680-142848-1**
Date Collected: 09/04/17 13:00 — **Matrix: Water**
Date Received: 09/06/17 09:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 09:09	1

Client Sample ID: DW-19-090517 — **Lab Sample ID: 680-142848-2**
Date Collected: 09/05/17 08:00 — **Matrix: Water**
Date Received: 09/06/17 09:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	**1.7**		1.0	1.0	mg/L			09/07/17 09:09	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-494338/1
Matrix: Water
Analysis Batch: 494338

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 09:09	1

Lab Sample ID: LCS 680-494338/2
Matrix: Water
Analysis Batch: 494338

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	19.0		mg/L		95	80 - 120		

Lab Sample ID: LCSD 680-494338/3
Matrix: Water
Analysis Batch: 494338

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	20.0		mg/L		100	80 - 120	5	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

General Chemistry

Analysis Batch: 494338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142848-1	DW-18-090417	Total/NA	Water	2540 D-2011	
680-142848-2	DW-19-090517	Total/NA	Water	2540 D-2011	
MB 680-494338/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-494338/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-494338/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142848-1

Client Sample ID: DW-18-090417

Lab Sample ID: 680-142848-1

Date Collected: 09/04/17 13:00

Matrix: Water

Date Received: 09/06/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494338	09/07/17 09:09	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: DW-19-090517

Lab Sample ID: 680-142848-2

Date Collected: 09/05/17 08:00

Matrix: Water

Date Received: 09/06/17 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494338	09/07/17 09:09	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton ☆ TESTAMERICA SAVANNAH ☆
4101 Shuffel Street, N. N.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

180326

162095

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other: BALTIMORE

Client Contact	Project Manager: Keir Cragie	Site Contact: John Roberts	Date: 9/5/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 478-935-6694	Lab Contact: Jerry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: MRE Sediment Remedy	☐ 1 week			
Site: MRE Middle River	☐ 2 days			Job / SDG No.:
PO# 6861729	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals Cu, Pb, Cal. 200.8	TSS - 2540D	Hardness - 2340C	Sample Specific Notes:
DW-18-090417	9/4/17	1300	G	AQ	1				X		
DW-19-090517	9/5/17	0800	G	AQ	3			X	X	X	☆ 24 HR TAT

9/5/17

680-142848 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
☆ Contact Keir Cragie for TAT requirements ☆ Middle River Sediment Project - NPDES Sampling + TSS Sampling ☆

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by:	Tetra Tech Inc	9/5/17 1955	Received by:	TestAmerica	9-5-17 / 1955
Relinquished by:	TestAmerica	9-5-2017/1600	Received by:		
Relinquished by:			Received in Laboratory by: MSL	TASAV	9/6/17 930

2.9°C (CF) 3.1°C

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9/7/2017

13 12 11 10 9 8 7 6 5 4 3 2 1

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-142848-1

Login Number: 142848

List Number: 1

Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142848-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-142907-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
9/7/2017 4:16:07 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-142907-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-142907-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/07/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.5 C.

TOTAL SUSPENDED SOLIDS

Sample DW-20-090617 (680-142907-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/07/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-142907-1	DW-20-090617	Water	09/06/17 08:55	09/07/17 09:10

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Client Sample ID: DW-20-090617
Lab Sample ID: 680-142907-1
Date Collected: 09/06/17 08:55
Matrix: Water
Date Received: 09/07/17 09:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 11:11	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-494353/1
Matrix: Water
Analysis Batch: 494353

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/07/17 09:31	1

Lab Sample ID: LCS 680-494353/2
Matrix: Water
Analysis Batch: 494353

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	23.5		mg/L		118	80 - 120		

Lab Sample ID: LCSD 680-494353/3
Matrix: Water
Analysis Batch: 494353

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	21.0		mg/L		105	80 - 120	11	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

General Chemistry

Analysis Batch: 494353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-142907-1	DW-20-090617	Total/NA	Water	2540 D-2011	
MB 680-494353/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-494353/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-494353/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-142907-1

Client Sample ID: DW-20-090617
Date Collected: 09/06/17 08:55
Date Received: 09/07/17 09:10

Lab Sample ID: 680-142907-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	494353	09/07/17 11:11	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton

4101 Shuffel Street, N. N. ★ TESTAMERICA SAVANNAH GA ★

North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

162094

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Cragle	Site Contact: John Roberts	Date: 9/6/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 478-835-6694	Lab Contact: Jerry Lawler	Carrier: FedEx	1 of 1 COCs
Address: 14803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day	24 hr TAT		Lab Sampling:
Project Name: MRC Sediment Remedy				Job / SDG No.:
Site: MRC Middle River				
PO # Project # 6801729				

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS-25960	Sample Specific Notes:
DW-20-090617	9/6/17	0855	G	AQ	1			X	

9/6/17

680-142907 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ★ Middle River Sediment, Additional TSS Sampling 9/6/17 ★

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

	Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
1		Tetra Tech Inc.	9/6/17 1300		TAN	9.6.17 @ 1300
2		TestAmerica	9-6-2017 1530			09-07-17 0910
3		Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time: 0.3 (CF) 0.5

9/7/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-142907-1

Login Number: 142907

List Source: TestAmerica Savannah

List Number: 1

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-142907-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-17 *
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-143198-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Jerry Lanier

Authorized for release by:
9/20/2017 12:05:49 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-143198-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-143198-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/19/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.3 C.

TOTAL SUSPENDED SOLIDS

Sample DW-22-091817 (680-143198-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143198-1	DW-22-091817	Water	09/18/17 11:30	09/19/17 09:15

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Client Sample ID: DW-22-091817
Date Collected: 09/18/17 11:30
Date Received: 09/19/17 09:15

Lab Sample ID: 680-143198-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	8.2		1.0	1.0	mg/L			09/19/17 12:29	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-495213/1
Matrix: Water
Analysis Batch: 495213

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/19/17 12:29	1

Lab Sample ID: LCS 680-495213/2
Matrix: Water
Analysis Batch: 495213

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	22.0		mg/L		110	80 - 120		

Lab Sample ID: LCSD 680-495213/3
Matrix: Water
Analysis Batch: 495213

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	22.0		mg/L		110	80 - 120	0	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

General Chemistry

Analysis Batch: 495213

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143198-1	DW-22-091817	Total/NA	Water	2540 D-2011	
MB 680-495213/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-495213/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-495213/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Client Sample ID: DW-22-091817
Date Collected: 09/18/17 11:30
Date Received: 09/19/17 09:15

Lab Sample ID: 680-143198-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	495213	09/19/17 12:29	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

TEST AMERICA SAVANNAH GA

162092

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 9/18/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 478-835-6694	Lab Contact: Terry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day	24 Hr TAT		Lab Sampling:
Project Name: MPC Sediment Remedy				Job / SDG No.:
Site: MPC, Middle River				
P O # Project # 680/729				

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS-25460	Sample Specific Notes:
DW-22-091817	9/18/17	1130	G	AQ	4			X	(4) 250mL poly bottles

9/18/17

680-143198 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Middle River Sediment, Additional TSS samples 9/18/17

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____
Relinquished by:	Company: Tetra Tech Inc	Date/Time: 9/18/17	Received by:	Company: Test America	Date/Time: 09/18/2017 13:31
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time: 3.0(CF+0.3)3.3 9/19/17 0915

9/20/2017

13 12 11 10 9 8 7 6 5 4 3 2 1

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-143198-1

Login Number: 143198

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143198-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-143293-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
9/22/2017 10:24:53 AM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-143293-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-143293-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/21/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.9 C.

TOTAL SUSPENDED SOLIDS

Sample DW-23-092017 (680-143293-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/21/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143293-1	DW-23-092017	Water	09/20/17 09:30	09/21/17 09:15

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Client Sample ID: DW-23-092017
Date Collected: 09/20/17 09:30
Date Received: 09/21/17 09:15

Lab Sample ID: 680-143293-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.9		1.0	1.0	mg/L			09/21/17 13:24	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-495536/1
Matrix: Water
Analysis Batch: 495536

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/21/17 13:24	1

Lab Sample ID: LCS 680-495536/2
Matrix: Water
Analysis Batch: 495536

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	20.0	21.5		mg/L		108	80 - 120

Lab Sample ID: LCSD 680-495536/3
Matrix: Water
Analysis Batch: 495536

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	20.0	22.5		mg/L		113	80 - 120	5	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

General Chemistry

Analysis Batch: 495536

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143293-1	DW-23-092017	Total/NA	Water	2540 D-2011	
MB 680-495536/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-495536/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-495536/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143293-1

Client Sample ID: DW-23-092017
Date Collected: 09/20/17 09:30
Date Received: 09/21/17 09:15

Lab Sample ID: 680-143293-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	495536	09/21/17 13:24	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

180325 Chain of Custody Record

★ TESTAMERICA SAVANNAH, GA ★

BALTIMORE

000649

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Kevin Craigie	Site Contact: John Roberts	Date: 9/20/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 978-635-6694	Lab Contact: Jerry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: MDC Sediment Remedy	☐ 1 week 3 days ★			
Site: MDC Middle River	☐ 2 days			Job / SDG No.:
PO# Project # 6801729	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals Cu, Pb, Cd (200.8)	TSS - 2540D	Hardness-2340C	Sample Specific Notes:
OW-23-092017	9/20/17	0930	G	Aq	3			X	X	X	★ TSS 24hr TAT ★

9/20/17

680-143293 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ 4 1 4

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ★ Middle River Sediment Project NPDES sampling ★ ★ TestAmerica Savannah, GA ★
★ 3 DAY TAT except for TSS which is 24hr TAT ★

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time	Received by:	Company	Date/Time
Relinquished by:	Tetra Tech Inc	9/20/17 1515		TestAmerica	09/20/17 15:15
Relinquished by:	TestAmerica	9-20-2017/1605		SAV. 680-143293	
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time: 09-21-17 0915

1.7 (CF) 1.9 C

9/22/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-143293-1

Login Number: 143293

List Number: 1

Creator: Banda, Christy S

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-143293-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-17 *
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-143538-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
9/28/2017 5:05:51 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-143538-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-143538-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 09/27/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.2 C.

TOTAL SUSPENDED SOLIDS

Sample DW-24-092617 (680-143538-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 09/27/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143538-1	DW-24-092617	Water	09/26/17 10:30	09/27/17 09:25

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Client Sample ID: DW-24-092617
Date Collected: 09/26/17 10:30
Date Received: 09/27/17 09:25

Lab Sample ID: 680-143538-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	6.6		1.0	1.0	mg/L			09/27/17 18:05	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-496357/1
Matrix: Water
Analysis Batch: 496357

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			09/27/17 18:05	1

Lab Sample ID: LCS 680-496357/2
Matrix: Water
Analysis Batch: 496357

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	20.0	18.5		mg/L		93	80 - 120

Lab Sample ID: LCSD 680-496357/3
Matrix: Water
Analysis Batch: 496357

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	20.0	18.5		mg/L		93	80 - 120	0	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

General Chemistry

Analysis Batch: 496357

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143538-1	DW-24-092617	Total/NA	Water	2540 D-2011	
MB 680-496357/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-496357/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-496357/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143538-1

Client Sample ID: DW-24-092617
Date Collected: 09/26/17 10:30
Date Received: 09/27/17 09:25

Lab Sample ID: 680-143538-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	496357	09/27/17 18:05	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

TESTAMERICA SAVANNAH, GA

180325 559

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

BALTIMORE

Client Contact	Project Manager: Kear Craigie	Site Contact: John Roberts	Date: 9/26/17	COC No:
Company Name: TETRA TECH INC	Tel/Fax: 978-635-6694	Lab Contact: Jerry Hearn	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — 24 HRS			Lab Sampling:
Project Name: MRC Sediment Remedy				Job / SDG No.:
Site: MRC Middle River				
PO # Project # 68D1729				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	755-25400	Sample Specific Notes:
DW-24-092617	9/26/17	1030	G	AQ	4			X	*4-250mL poly s

9/26/17

680-143538 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment Project NPDES Sampling * TestAmerica, Savannah, GA *
* 24hr TAT *

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

	Company	Date/Time	Received by	Company	Date/Time
Relinquished by:	Tetra Tech Inc	9/26/17 1119		TestAmerica	9/26/17 11:19
Relinquished by:	TestAmerica	9-26-2017/1552			
Relinquished by:			Received in Laboratory by:	Sav.	09-27-17 0925

3.0 (C) 3.2°

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-143538-1

Login Number: 143538

List Number: 1

Creator: Banda, Christy S

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-143538-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-143779-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Michele R Kersey

Authorized for release by:
10/4/2017 11:54:41 AM
Michele Kersey, Project Manager II
(912)354-7858
michele.kersey@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-143779-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-143779-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 10/3/2017 9:15 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.4º C.

TOTAL SUSPENDED SOLIDS

Sample DW-24-100217 (680-143779-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/03/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-143779-1	DW-24-100217	Water	10/02/17 09:45	10/03/17 09:15

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Client Sample ID: DW-24-100217
Date Collected: 10/02/17 09:45
Date Received: 10/03/17 09:15

Lab Sample ID: 680-143779-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	11		2.0	2.0	mg/L			10/03/17 16:07	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-497078/1
Matrix: Water
Analysis Batch: 497078

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/03/17 16:07	1

Lab Sample ID: LCS 680-497078/2
Matrix: Water
Analysis Batch: 497078

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	20.0		mg/L		100	80 - 120		

Lab Sample ID: LCSD 680-497078/3
Matrix: Water
Analysis Batch: 497078

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120	2	25

Lab Sample ID: 680-143779-1 DU
Matrix: Water
Analysis Batch: 497078

Client Sample ID: DW-24-100217
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	11			10.6		mg/L				0	5

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

General Chemistry

Analysis Batch: 497078

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-143779-1	DW-24-100217	Total/NA	Water	2540 D-2011	
MB 680-497078/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-497078/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-497078/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	
680-143779-1 DU	DW-24-100217	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Client Sample ID: DW-24-100217
Date Collected: 10/02/17 09:45
Date Received: 10/03/17 09:15

Lab Sample ID: 680-143779-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	497078	10/03/17 16:07	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore

7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

* TESTAMERICA SAVANNAH, GA *

Chain of Custody Record

000543

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 10/2/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Mullis
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day	3 DAYS * + 24HR	180325 BALTIMORE	Lab Sampling:
Project Name: MPC - Sediment Remedy				Job / SDG No.:
Site: MPC - Middle River				
PO # Project # 6801729				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals Cu, Pb, Cd (200.8)	TSS - 2540D	Hardness - 2340C	Sample Specific Notes:
DW-24-100217	10/2/17	0945	G	Aq	3			X	X	X	* TSS 24HR TAT *

10/2/17

680-143779 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment Project - NPDES Sampling * * 3 DAY TAT * 24HR TAT for TSS *

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by:	Tetra Tech Inc	10/2/17 1525	Received by:	TestAmerica	10-2-2017/1525
Relinquished by:	T.A	10/02/17 1628	Received by:		
Relinquished by:			Received in Laboratory by:	TAL	10/3/17 0915

(0.1CC + 0.3)0.4

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-143779-1

Login Number: 143779

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-143779-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
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Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-144296-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Jerry Lanier

Authorized for release by:
10/16/2017 5:35:59 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-144296-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-144296-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 10/13/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.6 C.

TOTAL SUSPENDED SOLIDS

Sample DW-25-101217 (680-144296-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/15/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144296-1	DW-25-101217	Water	10/12/17 07:20	10/13/17 08:55

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Client Sample ID: DW-25-101217 **Lab Sample ID: 680-144296-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Total Suspended Solids	1.5		1.0	1.0	mg/L	1		2540 D-2011	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Client Sample ID: DW-25-101217
Date Collected: 10/12/17 07:20
Date Received: 10/13/17 08:55

Lab Sample ID: 680-144296-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.5		1.0	1.0	mg/L			10/15/17 10:42	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-498556/1
Matrix: Water
Analysis Batch: 498556

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/15/17 10:42	1

Lab Sample ID: LCS 680-498556/2
Matrix: Water
Analysis Batch: 498556

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120		

Lab Sample ID: LCSD 680-498556/3
Matrix: Water
Analysis Batch: 498556

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	22.0		mg/L		110	80 - 120	7	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

General Chemistry

Analysis Batch: 498556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144296-1	DW-25-101217	Total/NA	Water	2540 D-2011	
MB 680-498556/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-498556/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-498556/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144296-1

Client Sample ID: DW-25-101217
Date Collected: 10/12/17 07:20
Date Received: 10/13/17 08:55

Lab Sample ID: 680-144296-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	498556	10/15/17 10:42	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore

7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

☆ Test America Savannah, GA ☆

Chain of Custody Record

180325
000588
BALTIMORE

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TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Cragie	Site Contact: John Roberts	Date: 10/12/17	COC No:
Company Name: Tetra Tech	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek PKwy	Analysis Turnaround Time			Sampler: MVillis
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: MRC - Sediment Remedy	☐ 1 week			
Site: MRC - Middle River	☐ 2 days			Job / SDG No.:
PO# Project # 6801729	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS - 25540 D	Sample Specific Notes:
DW-25-101217	10/12/17	0720	G	Aq	1	N	N	X	☆ TSS 24 Hr TAT ☆

10/12/17

680-144296 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☐ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ☆ Middle River Sediment Project - NPDES Sampling ☆ ☆ 3 Day TAT ☆ 24HR TAT For TSS ☆

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by:	Tetra Tech Inc	10/12/17/1455	Received by:	TestAmerica	10-12-2017/1455
Relinquished by:	TestAmerica	10-12-2017/1538	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: MTyk	Company: TA BAV	Date/Time: 10/13/17 855

10/16/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-144296-1

Login Number: 144296

List Number: 1

Creator: Tyler, Matthew M

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-144296-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-144485-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
10/20/2017 12:55:21 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-144485-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-144485-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 10/19/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 1.4 C.

TOTAL SUSPENDED SOLIDS

Sample DW-26-101817 (680-144485-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/19/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144485-1	DW-26-101817	Water	10/18/17 13:30	10/19/17 09:21

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Client Sample ID: DW-26-101817
Date Collected: 10/18/17 13:30
Date Received: 10/19/17 09:21

Lab Sample ID: 680-144485-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.4		1.0	1.0	mg/L			10/19/17 14:44	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-499150/1
Matrix: Water
Analysis Batch: 499150

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/19/17 11:35	1

Lab Sample ID: LCS 680-499150/2
Matrix: Water
Analysis Batch: 499150

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	16.5		mg/L		83	80 - 120		

Lab Sample ID: LCSD 680-499150/3
Matrix: Water
Analysis Batch: 499150

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	16.0		mg/L		80	80 - 120	3	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

General Chemistry

Analysis Batch: 499150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144485-1	DW-26-101817	Total/NA	Water	2540 D-2011	
MB 680-499150/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-499150/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-499150/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144485-1

Client Sample ID: DW-26-101817
Date Collected: 10/18/17 13:30
Date Received: 10/19/17 09:21

Lab Sample ID: 680-144485-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	499150	10/19/17 14:44	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

* TESTAMERICA SAVANNAH *

Chain of Custody Record

180325
000582
BALTIMORE

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 10/18/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 478-875-6694	Lab Contact: Jerry Lenier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks 30 DAYS			Lab Sampling:
Project Name: MPC Sediment Remedy	☐ 1 week			Job / SDG No.:
Site: MPC - Middle River	☐ 2 days TSS 24 Hrs			
P O # 680/729	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals Cu,Pb,Cd, 200.8	TSS - 2540D	Hardness - 2340C	Sample Specific Notes:
DW-26-101817	10/18/17	1330	G	AQ	3			X	X	X	* TSS - 24 hr TAT
								4	1	4	

10/18/17

680-144485 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment Project - NPDES Sampling * keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech Inc	10/18/17 1430		TestAmerica	10/19/17 15:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	TestAmerica	10-18-2017/1655			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
			MJR	TA SAV	10/19/17 921

1.1°C (IR) 1.4°C

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-144485-1

Login Number: 144485

List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-144485-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-144693-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
10/26/2017 6:13:14 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-144693-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-144693-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 10/25/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.1 C.

TOTAL SUSPENDED SOLIDS

Sample DW-27-102417 (680-144693-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 10/26/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144693-1	DW-27-102417	Water	10/24/17 09:00	10/25/17 09:40

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Client Sample ID: DW-27-102417
Date Collected: 10/24/17 09:00
Date Received: 10/25/17 09:40

Lab Sample ID: 680-144693-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.7		1.0	1.0	mg/L			10/26/17 11:32	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-500137/1
Matrix: Water
Analysis Batch: 500137

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			10/26/17 11:32	1

Lab Sample ID: LCS 680-500137/2
Matrix: Water
Analysis Batch: 500137

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	23.5		mg/L		118	80 - 120		

Lab Sample ID: LCSD 680-500137/3
Matrix: Water
Analysis Batch: 500137

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	23.5		mg/L		118	80 - 120	0	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

General Chemistry

Analysis Batch: 500137

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144693-1	DW-27-102417	Total/NA	Water	2540 D-2011	
MB 680-500137/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-500137/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-500137/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144693-1

Client Sample ID: DW-27-102417
Date Collected: 10/24/17 09:00
Date Received: 10/25/17 09:40

Lab Sample ID: 680-144693-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	500137	10/26/17 11:32	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

Chain of Custody Record

TESTAMERICA SAVANNAH

000584

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TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 10/24/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 978-835-6894	Lab Contact: Jerry Lester	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Roberts
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day — 24 HRS			Lab Sampling:
Project Name: MRE Sediment Remedy				Job / SDG No.:
Site: MRE Middle River				
P O #				

180325

BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Reqs TSS (2540D)	Sample Specific Notes:
DW-27-102417	10/24/17	0900	G	AR	1			X	- TSS - DW-27-102417

10/24/17

680-144693 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

(X) Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client (X) Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: Middle River TSS Sample 24 hr TAT keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech Inc	10/24/17		TA BAL	10/24/17 1352
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	TA BALT	10/24/17 1500			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
				TASAV	10/25/17 940

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-144693-1

Login Number: 144693

List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-144693-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-144998-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
11/2/2017 5:55:26 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-144998-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-144998-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 11/01/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

TOTAL SUSPENDED SOLIDS

Sample DW-28-103117 (680-144998-13) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/02/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-144998-13	DW-28-103117	Water	10/31/17 10:00	11/01/17 09:00

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Client Sample ID: DW-28-103117
Date Collected: 10/31/17 10:00
Date Received: 11/01/17 09:00

Lab Sample ID: 680-144998-13
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/02/17 10:45	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-501048/1
Matrix: Water
Analysis Batch: 501048

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/02/17 10:45	1

Lab Sample ID: LCS 680-501048/2
Matrix: Water
Analysis Batch: 501048

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	21.5		mg/L		108	80 - 120		

Lab Sample ID: LCSD 680-501048/3
Matrix: Water
Analysis Batch: 501048

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120	5	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

General Chemistry

Analysis Batch: 501048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-144998-13	DW-28-103117	Total/NA	Water	2540 D-2011	
MB 680-501048/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-501048/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-501048/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Client Sample ID: DW-28-103117
Date Collected: 10/31/17 10:00
Date Received: 11/01/17 09:00

Lab Sample ID: 680-144998-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	501048	11/02/17 10:45	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore

7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

Chain of Custody Record

180325
000586

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

TESTAMERICA SAVANNAH

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

BALTIMORE

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 10/31/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 978-835-6674	Lab Contact: Jeff Leaton	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler:
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week 3 DAYS ☐ 2 days TSS 24 HRS ☐ 1 day			Lab Sampling:
Project Name: MRC Sediment Remedy				Job / SDG No.:
Site: MRC - Middle River				
PO# 6801729				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Metals Cu, Pb, Cd, 200.8	TSS - 2540D	Hardness - 2340C	Sample Specific Notes:
OW-28-103117	10/31/17	1000	G	Aq	4			X	X	X	*TSS-24 Hr TAT

10/31/17

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ — 4 / 1 / 4

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment Project - NPDES sampling * keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

	Company	Date/Time	Received by	Company	Date/Time
Relinquished by:	Tetra Tech Inc	10/31/17 1536		TestAmerica	10-31-2017 / 1536
Relinquished by:	TestAmerica	10-31-2017 / 1715			
Relinquished by:			Received in Laboratory by: MTH	TASAV	11/01/17 900

0.4°C (CF) 0.7°C

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-144998-1

Login Number: 144998

List Source: TestAmerica Savannah

List Number: 1

Creator: Tyler, Matthew M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-144998-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-17 *
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-145357-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Kathryn Smith

Authorized for release by:
11/10/2017 9:49:50 PM
Kathryn Smith, Manager of Project Management
(912)354-7858
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-145357-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-145357-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 11/09/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 2.7º C.

TOTAL SUSPENDED SOLIDS

Sample DW-29-110817 (680-145357-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/09/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145357-1	DW-29-110817	Water	11/08/17 10:10	11/09/17 09:20

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Client Sample ID: DW-29-110817
Date Collected: 11/08/17 10:10
Date Received: 11/09/17 09:20

Lab Sample ID: 680-145357-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	2.6		1.0	1.0	mg/L			11/09/17 13:41	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-501991/1
Matrix: Water
Analysis Batch: 501991

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/09/17 13:41	1

Lab Sample ID: LCS 680-501991/2
Matrix: Water
Analysis Batch: 501991

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120		

Lab Sample ID: LCSD 680-501991/3
Matrix: Water
Analysis Batch: 501991

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120	0	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

General Chemistry

Analysis Batch: 501991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145357-1	DW-29-110817	Total/NA	Water	2540 D-2011	
MB 680-501991/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-501991/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-501991/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145357-1

Client Sample ID: DW-29-110817
Date Collected: 11/08/17 10:10
Date Received: 11/09/17 09:20

Lab Sample ID: 680-145357-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	501991	11/09/17 13:41	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

☆ TESTAMERICA SAVANNAH ☆

Chain of Custody Record

180325

000578

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

BALTIMORE

Client Contact	Project Manager: Keir Craigle	Site Contact: John Roberts	Date: 10/8/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lawler	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Roberts
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks 3 DAYS			Lab Sampling:
Project Name: MAC Sediment Remedy	☐ 1 week TSS 24 HRS			
Site: MAC - Middle River	☐ 2 days			Job / SDG No.:
PO # # 6801729	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals CalHg 200.8	TSS - 2540D	Hardness - 2340C	Sample Specific Notes:
OW-29-110817	11/8/17	1010	G	AQ	4			X	X	X	

680-145357 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ 4 1 4

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: # Middle River Sediment Project - NPDES Sampling # keir.craigle@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company: Tetra Tech Inc	Date/Time: 11/8/17 1415	Received by:	Company: TA Bott	Date/Time: 11/8/17 1415
Relinquished by:	Company: TA Bott	Date/Time: 11/8/17 1814	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TASAV	Date/Time: 11-9-17 920

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11/10/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-145357-1

Login Number: 145357

List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-145357-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-145587-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Kathryn Smith

Authorized for release by:
11/16/2017 5:11:16 PM
Kathryn Smith, Manager of Project Management
(912)354-7858
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-145587-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE
Client: Tetra Tech, Inc.
Project: Middle River Sediment Remediation

Report Number: 680-145587-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 11/15/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.7 C.

TOTAL SUSPENDED SOLIDS

Sample DW-30-111417 (680-145587-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/16/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145587-1	DW-30-111417	Water	11/14/17 12:15	11/15/17 09:20

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Client Sample ID: DW-30-111417
Date Collected: 11/14/17 12:15
Date Received: 11/15/17 09:20

Lab Sample ID: 680-145587-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/16/17 07:16	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-502809/1
Matrix: Water
Analysis Batch: 502809

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/16/17 07:16	1

Lab Sample ID: LCS 680-502809/2
Matrix: Water
Analysis Batch: 502809

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	20.5		mg/L		103	80 - 120		

Lab Sample ID: LCSD 680-502809/3
Matrix: Water
Analysis Batch: 502809

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	19.5		mg/L		98	80 - 120	5	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

General Chemistry

Analysis Batch: 502809

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145587-1	DW-30-111417	Total/NA	Water	2540 D-2011	
MB 680-502809/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-502809/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-502809/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145587-1

Client Sample ID: DW-30-111417
Date Collected: 11/14/17 12:15
Date Received: 11/15/17 09:20

Lab Sample ID: 680-145587-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	502809	11/16/17 07:16	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

☆TESTAMERICA SAVANNAH☆

Chain of Custody Record

000736

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 11/14/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lanier	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Roberts
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks 3 DAYS			Lab Sampling:
Project Name: MRC Sediment Remedy	☐ 1 week			
Site: Middle River, MD	☐ 2 days TSS 24HRS			Job / SDG No.:
PO # #6801729	☐ 1 day			

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals Cu, Pb, Cd, Zn, Fe	TSS - 2540 D	Hardness - 2340 C	Sample Specific Notes:
OW-30-111417	11/14/17	1215	G	AQ	4			X	X	X	

11/14/17

680-145587 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

4 | 4

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: ☆ Middle River Sediment Project - NPDES sampling ☆ Keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No.: _____
Relinquished by:	Company: Tetra Tech Inc	Date/Time: 11/14/17	Received by:	Company: TA	Date/Time: 11/14/17 14:22
Relinquished by:	Company: TA	Date/Time: 11/14/17 1552	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TAB	Date/Time: 11/15/17 0920

3.4 (CF 0.3) 3.7

11/16/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-145587-1

Login Number: 145587

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-145587-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-145650-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Kathryn Smith

Authorized for release by:
11/17/2017 5:33:39 PM
Kathryn Smith, Manager of Project Management
(912)354-7858
kathy.smith@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-145650-1	ASAND-111517	Water	11/15/17 12:45	11/16/17 09:15
680-145650-2	E-ND-111517	Water	11/15/17 12:55	11/16/17 09:15
680-145650-3	E-MC-111517	Water	11/15/17 13:05	11/16/17 09:15
680-145650-4	E-AD-111517	Water	11/15/17 13:15	11/16/17 09:15
680-145650-5	US-DAM-111517	Water	11/15/17 13:25	11/16/17 09:15
680-145650-6	ICURT-111517	Water	11/15/17 13:35	11/16/17 09:15
680-145650-7	OCURT-111517	Water	11/15/17 13:45	11/16/17 09:15
680-145650-8	GEOEXC-111517	Water	11/15/17 13:55	11/16/17 09:15

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Method	Method Description	Protocol	Laboratory
2340C-2011	Hardness, Total	SM	TAL SAV
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample ID: ASAND-111517
Lab Sample ID: 680-145650-1
Date Collected: 11/15/17 12:45
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1900		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	22		4.0	4.0	mg/L			11/17/17 12:31	1

Client Sample ID: E-ND-111517
Lab Sample ID: 680-145650-2
Date Collected: 11/15/17 12:55
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2100		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	16		2.0	2.0	mg/L			11/17/17 12:31	1

Client Sample ID: E-MC-111517
Lab Sample ID: 680-145650-3
Date Collected: 11/15/17 13:05
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2300		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	19		2.0	2.0	mg/L			11/17/17 12:31	1

Client Sample ID: E-AD-111517
Lab Sample ID: 680-145650-4
Date Collected: 11/15/17 13:15
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1800		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	25		4.0	4.0	mg/L			11/17/17 12:31	1

Client Sample ID: US-DAM-111517
Lab Sample ID: 680-145650-5
Date Collected: 11/15/17 13:25
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1900		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	24		4.0	4.0	mg/L			11/17/17 12:31	1

Client Sample ID: ICURT-111517
Lab Sample ID: 680-145650-6
Date Collected: 11/15/17 13:35
Matrix: Water
Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1800		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	9.5		1.3	1.3	mg/L			11/17/17 12:31	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Client Sample ID: OCURT-111517

Lab Sample ID: 680-145650-7

Date Collected: 11/15/17 13:45

Matrix: Water

Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	1600		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	9.7		1.0	1.0	mg/L			11/17/17 12:31	1

Client Sample ID: GEOEXC-111517

Lab Sample ID: 680-145650-8

Date Collected: 11/15/17 13:55

Matrix: Water

Date Received: 11/16/17 09:15

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	2100		250	250	mg/L			11/17/17 08:17	1
Total Suspended Solids	28		4.0	4.0	mg/L			11/17/17 12:31	1

Method: 2340C-2011 - Hardness, Total

Lab Sample ID: MB 680-503006/1
Matrix: Water
Analysis Batch: 503006

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	10	U	10	10	mg/L			11/17/17 08:17	1

Lab Sample ID: LCS 680-503006/2
Matrix: Water
Analysis Batch: 503006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	1000	982		mg/L		98	75 - 125

Lab Sample ID: LCSD 680-503006/3
Matrix: Water
Analysis Batch: 503006

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hardness as calcium carbonate	1000	980		mg/L		98	75 - 125	0	30

Lab Sample ID: 680-145650-1 DU
Matrix: Water
Analysis Batch: 503006

Client Sample ID: ASAND-111517
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	1900		1870		mg/L		0	30

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-503088/1
Matrix: Water
Analysis Batch: 503088

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/17/17 12:31	1

Lab Sample ID: LCS 680-503088/2
Matrix: Water
Analysis Batch: 503088

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	20.0	20.5		mg/L		103	80 - 120

Lab Sample ID: LCSD 680-503088/3
Matrix: Water
Analysis Batch: 503088

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	20.0	21.5		mg/L		108	80 - 120	5	25

General Chemistry

Analysis Batch: 503006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145650-1	ASAND-111517	Total/NA	Water	2340C-2011	
680-145650-2	E-ND-111517	Total/NA	Water	2340C-2011	
680-145650-3	E-MC-111517	Total/NA	Water	2340C-2011	
680-145650-4	E-AD-111517	Total/NA	Water	2340C-2011	
680-145650-5	US-DAM-111517	Total/NA	Water	2340C-2011	
680-145650-6	ICURT-111517	Total/NA	Water	2340C-2011	
680-145650-7	OCURT-111517	Total/NA	Water	2340C-2011	
680-145650-8	GEOEXC-111517	Total/NA	Water	2340C-2011	
MB 680-503006/1	Method Blank	Total/NA	Water	2340C-2011	
LCS 680-503006/2	Lab Control Sample	Total/NA	Water	2340C-2011	
LCSD 680-503006/3	Lab Control Sample Dup	Total/NA	Water	2340C-2011	
680-145650-1 DU	ASAND-111517	Total/NA	Water	2340C-2011	

Analysis Batch: 503088

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-145650-1	ASAND-111517	Total/NA	Water	2540 D-2011	
680-145650-2	E-ND-111517	Total/NA	Water	2540 D-2011	
680-145650-3	E-MC-111517	Total/NA	Water	2540 D-2011	
680-145650-4	E-AD-111517	Total/NA	Water	2540 D-2011	
680-145650-5	US-DAM-111517	Total/NA	Water	2540 D-2011	
680-145650-6	ICURT-111517	Total/NA	Water	2540 D-2011	
680-145650-7	OCURT-111517	Total/NA	Water	2540 D-2011	
680-145650-8	GEOEXC-111517	Total/NA	Water	2540 D-2011	
MB 680-503088/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-503088/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-503088/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Client Sample ID: ASAND-111517
Date Collected: 11/15/17 12:45
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: E-ND-111517
Date Collected: 11/15/17 12:55
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: E-MC-111517
Date Collected: 11/15/17 13:05
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: E-AD-111517
Date Collected: 11/15/17 13:15
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: US-DAM-111517
Date Collected: 11/15/17 13:25
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-145650-1

Client Sample ID: US-DAM-111517
Date Collected: 11/15/17 13:25
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: ICURT-111517
Date Collected: 11/15/17 13:35
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	750 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: OCURT-111517
Date Collected: 11/15/17 13:45
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	1000 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Client Sample ID: GEOEXC-111517
Date Collected: 11/15/17 13:55
Date Received: 11/16/17 09:15

Lab Sample ID: 680-145650-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-2011		1	1 mL	25 mL	503006	11/17/17 08:17	DAM	TAL SAV
	Instrument ID: NOEQUIP									
Total/NA	Analysis	2540 D-2011		1	250 mL	1000 mL	503088	11/17/17 12:31	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

123954

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 11/15/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 978-875-6694	Lab Contact: Jerry Lawler	Carrier: FedEx	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: RobertS
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling:
Project Name: MRC Sediment Remedy	24 HR TAT			
Site: Middle River, MD				PO No.:
PO # Additional water Samples				

680-145650 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals calc Cu, Zn, Pb, Cu, 200.8	TSS - 2540 D	Hardness - 2340 C
ASAND-111517	11/15/17	1245	G	AQ	3			X	X	X
E-ND-111517		1255						X	X	X
E-MC-111517		1305						X	X	X
E-AD-111517		1315						X	X	X
US-DAM-111517		1325						X	X	X
Icurt-111517		1375						X	X	X
Ocurt-111517		1345						X	X	X
GEOEXC-111517		1355						X	X	X
		11/15/17								
								4	1	4

180325
BALTIMORE

Sample Specific Notes:

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

(X) Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client (X) Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * ADDITIONAL SAMPLING FOR MRC Excavation Sediment Project * keir.craigie@tetratech.com

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 1.4	Corr'd: 1.6	Therm ID No.:

	Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
1		Tetra Tech I-C	11/15/17 1410			11/15/17 1410
2			11/15/17 1710			
3				Received in Laboratory by:		11-16-17 9:15

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-145650-1

Login Number: 145650
List Number: 1
Creator: Flanagan, Naomi V

List Source: TestAmerica Savannah

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-145650-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-17
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-17 *
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-17 *
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146039-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Jerry Lanier

Authorized for release by:
11/30/2017 5:56:23 PM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-146039-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-146039-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 11/29/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.7 C.

TOTAL SUSPENDED SOLIDS

Sample DW-32-012817 (680-146039-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 11/30/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146039-1	DW-32-012817	Water	11/28/17 10:30	11/29/17 09:15

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Client Sample ID: DW-32-012817
Date Collected: 11/28/17 10:30
Date Received: 11/29/17 09:15

Lab Sample ID: 680-146039-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	4.8		1.3	1.3	mg/L			11/30/17 12:37	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-504544/1
Matrix: Water
Analysis Batch: 504544

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			11/30/17 12:37	1

Lab Sample ID: LCS 680-504544/2
Matrix: Water
Analysis Batch: 504544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	20.0	18.0		mg/L		90	80 - 120

Lab Sample ID: LCSD 680-504544/3
Matrix: Water
Analysis Batch: 504544

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	20.0	17.0		mg/L		85	80 - 120	6	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

General Chemistry

Analysis Batch: 504544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146039-1	DW-32-012817	Total/NA	Water	2540 D-2011	
MB 680-504544/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-504544/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-504544/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Client Sample ID: DW-32-012817
Date Collected: 11/28/17 10:30
Date Received: 11/29/17 09:15

Lab Sample ID: 680-146039-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	750 mL	1000 mL	504544	11/30/17 12:37	JEC	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Baltimore
7526 Connelley Drive
Suite F
Hanover, MD 21076
Phone: 410.766.2516 Fax:

* TESTAMERICA SAVANNAH *

Chain of Custody Record

000729

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THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 11/28/17	COC No:
Company Name: Tetra Tech Inc.	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lanier	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Roberts
City/State/Zip: Bothell, WA, 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-7647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks 3 DAYS			Lab Sampling:
Project Name: MIRC Sediment Remedy	☐ 1 week			
Site: Middle River, MD	☐ 2 days TSS 24 HRS			Job / SDG No.:
PO# # 6801729	☐ 1 day			

BALTIMORE
180325

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Metals (Cu, Pb, Cd, Zn)	TSS - 2540D	Herdness - 2340C	Sample Specific Notes:
DW-32-0128/17	11/28/17	1030	G	Aq	3			X	X	X	* TSS 24 HR TAT

11/28/17

680-146039 Chain of Custody

180325

BALTIMORE

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ 4 1 4

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment - NPDES sampling (0.5(CF+CC.2)0.7

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: _____ Corr'd: _____	Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech Inc	11/28/17		T-A	11/28/17 13:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	T-A	11/28/17 14:29			
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:
				ASA	11/29/17 0915

11/30/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-146039-1

Login Number: 146039

List Source: TestAmerica Savannah

List Number: 1

Creator: Edwards, Jessica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146039-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-17
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-146157-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
12/7/2017 7:09:21 AM

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-146157-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: Middle River Sediment Remediation

Report Number: 680-146157-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The samples were received on 12/01/2017; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 3.0 C.

TOTAL SUSPENDED SOLIDS

Sample DW-33-113017 (680-146157-1) was analyzed for total suspended solids in accordance with SM 2540D. The samples were analyzed on 12/05/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-146157-1	DW-33-113017	Water	11/30/17 12:40	12/01/17 09:25

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Client Sample ID: DW-33-113017
Date Collected: 11/30/17 12:40
Date Received: 12/01/17 09:25

Lab Sample ID: 680-146157-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	5.0		2.0	2.0	mg/L			12/05/17 17:34	1

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-505155/1
Matrix: Water
Analysis Batch: 505155

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			12/05/17 16:32	1

Lab Sample ID: LCS 680-505155/2
Matrix: Water
Analysis Batch: 505155

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Suspended Solids	20.0	19.0		mg/L		95	80 - 120

Lab Sample ID: LCSD 680-505155/3
Matrix: Water
Analysis Batch: 505155

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids	20.0	18.5		mg/L		93	80 - 120	3	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

General Chemistry

Analysis Batch: 505155

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-146157-1	DW-33-113017	Total/NA	Water	2540 D-2011	
MB 680-505155/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-505155/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-505155/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-146157-1

Client Sample ID: DW-33-113017
Date Collected: 11/30/17 12:40
Date Received: 12/01/17 09:25

Lab Sample ID: 680-146157-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	500 mL	1000 mL	505155	12/05/17 17:34	JER	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TestAmerica Canton
4101 Shuffel Street, N. W.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

TESTAMERICA JAVANNAH

Chain of Custody Record

123957

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager: Kerr Craigie	Site Contact: John Roberts	Date: 11/30/17	COC No:
Company Name: Tetra Tech Inc	Tel/Fax: 978-835-6694	Lab Contact: Jerry Lunar	Carrier: Fed Ex	1 of 1 COCs
Address: 19803 North Creek Pkwy	Analysis Turnaround Time			Sampler: Roberts
City/State/Zip: Bothell, WA 98011	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 425-482-5647	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day (24 HRS)			Lab Sampling:
Project Name: MPC Sediment Remedy				Job / SDG No.:
Site: Middle River MD				
PO # 4680172 9				

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TSS - 25% Δ	Sample Specific Notes:
DW-33-113017	11/30/17	1240	G	AQ	1		X		* 24 Hr TAT

11/30/17

680-146157 Chain of Custody

Preservation Used: (1= Ice,) 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

(X) Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client (X) Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments: * Middle River Sediment - TSS sampling

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:		Cooler Temp. (°C): Obs'd: _____ Corr'd: _____		Therm ID No.: _____
Relinquished by:	Company: Tetra Tech Inc	Date/Time: 11/30/17	Received by:	Company: T-A	Date/Time: 11/30/17 15:46
Relinquished by:	Company: T-A	Date/Time: 11/30/17	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: TASAV	Date/Time: 12-1-17 /925

2.8°C (cf) 3.0°C

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-146157-1

Login Number: 146157

List Source: TestAmerica Savannah

List Number: 1

Creator: Anderson, Jordan K

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc. TestAmerica Job ID: 680-146157-1
Project/Site: Middle River Sediment Remediation

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-17 *
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-17 *
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-17
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
North Carolina (DW)	State Program	4	13701	07-31-18
North Carolina (WW/SW)	State Program	4	269	12-31-17
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Savannah
5102 LaRoche Avenue
Savannah, GA 31404
Tel: (912)354-7858

TestAmerica Job ID: 680-147079-1
Client Project/Site: Middle River Sediment Remediation

For:
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Attn: Keir Craigie

Authorized for release by:
12/21/2017 3:23:04 PM
Jon Lawhon, Project Manager I
(912)354-7858
jon.lawhon@testamericainc.com

Designee for

Jerry Lanier, Project Manager I
(912)354-7858 e.3410
jerry.lanier@testamericainc.com

Table of Contents

Job ID: 680-147079-1

Laboratory: TestAmerica Savannah

Narrative

CASE NARRATIVE
Client: Tetra Tech, Inc.
Project: Middle River Sediment Remediation

Report Number: 680-147079-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In the event of interference or analytes present at high concentrations, samples may be diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

RECEIPT

The sample was received on 12/20/2017 10:20 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.6º C

TOTAL SUSPENDED SOLIDS

Sample DW-36-121917 (680-147079-1) was analyzed for total suspended solids in accordance with SM 2540D. The sample was analyzed on 12/21/2017.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
680-147079-1	DW-36-121917	Water	12/19/17 10:30	12/20/17 10:20

Method Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Method	Method Description	Protocol	Laboratory
2540 D-2011	Total Suspended Solids (Dried at 103-105°C)	SM	TAL SAV

Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Client Sample ID: DW-36-121917
Date Collected: 12/19/17 10:30
Date Received: 12/20/17 10:20

Lab Sample ID: 680-147079-1
Matrix: Water

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.3		1.0	1.0	mg/L			12/21/17 09:09	1

Method: 2540 D-2011 - Total Suspended Solids (Dried at 103-105°C)

Lab Sample ID: MB 680-507333/1
Matrix: Water
Analysis Batch: 507333

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	1.0	U	1.0	1.0	mg/L			12/21/17 09:09	1

Lab Sample ID: LCS 680-507333/2
Matrix: Water
Analysis Batch: 507333

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Suspended Solids			20.0	22.5		mg/L		113	80 - 120		

Lab Sample ID: LCSD 680-507333/3
Matrix: Water
Analysis Batch: 507333

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Suspended Solids			20.0	23.0		mg/L		115	80 - 120	2	25

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

General Chemistry

Analysis Batch: 507333

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-147079-1	DW-36-121917	Total/NA	Water	2540 D-2011	
MB 680-507333/1	Method Blank	Total/NA	Water	2540 D-2011	
LCS 680-507333/2	Lab Control Sample	Total/NA	Water	2540 D-2011	
LCSD 680-507333/3	Lab Control Sample Dup	Total/NA	Water	2540 D-2011	

Lab Chronicle

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Client Sample ID: DW-36-121917
Date Collected: 12/19/17 10:30
Date Received: 12/20/17 10:20

Lab Sample ID: 680-147079-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540 D-2011		1	990 mL	1000 mL	507333	12/21/17 09:09	KLD	TAL SAV
	Instrument ID: NOEQUIP									

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

Savannah
5102 LaRoche Avenue

Savannah, GA 31404
phone 912.354.7858 fax 912.352.0165

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Client Contact	Project Manager: Keir Craigie	Site Contact: John Roberts	Date: 12/19/2017	COC No:
Tetra Tech	Tel/Fax: 425.482.7647 (cell)	Lab Contact: Jerry Lanier	Carrier: Fedex	1 of 1 COCs
19803 North Creek Pkwy	Analysis Turnaround Time			Job No.
Bothell, WA 98011	Calendar (C) or Work Days (W)			
425-482-7647	TAT if different from Below: 3 Days			SDG No.
	☐ 2 weeks			
Project Name: MRC Sediment Remediation Season 2	☐ 1 week			
Site: Middle River NPDES	☐ 2 days			Sampler: Roberts
Project # 6801724	☐ 1 day			

180325
BALTIMORE

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	TSS (2540D)	Hardness (2340C)	Metals (Cu, Cd, Pb) 200.8	Sample Specific Notes:
OW-36-121917	12/19/17	1030	G	AQ	3		x	x	x	**24 hour TAT for TSS

12/19/17

680-147079 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____ | 1 | 4 | 4 |

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant Poison B ☐ Unknown ☐

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments: Middle River Sediment - treatment system sampling, Keir.craigie@tetratech.com

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Tetra Tech Inc	12/19/17 1640		T-A	12/19/17 11:59
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	T-A	12/19/17		TA	12/20/17 1020
Relinquished by:	Company:	Date/Time:	Received by: 3.1(2.6)	Company:	Date/Time:

Form No. CA-C-WI-002, Rev. 2, dated 03/06/2012

12/21/2017

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 680-147079-1

Login Number: 147079

List Source: TestAmerica Savannah

List Number: 1

Creator: Chamberlain, Kim A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Accreditation/Certification Summary

Client: Tetra Tech, Inc.
Project/Site: Middle River Sediment Remediation

TestAmerica Job ID: 680-147079-1

Laboratory: TestAmerica Savannah

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		SAVLAB	
Alabama	State Program	4	41450	06-30-18
Alaska	State Program	10		06-30-18
Alaska (UST)	State Program	10	UST-104	11-05-17 *
Arizona	State Program	9	AZ808	12-14-18
Arkansas DEQ	State Program	6	88-0692	02-01-18
California	State Program	9	2939	06-30-18
Colorado	State Program	8	N/A	12-31-17
Connecticut	State Program	1	PH-0161	03-31-19
Florida	NELAP	4	E87052	06-30-18
GA Dept. of Agriculture	State Program	4	N/A	06-12-18
Georgia	State Program	4	803	06-30-18
Guam	State Program	9	15-005r	04-16-18
Hawaii	State Program	9	N/A	06-30-18
Illinois	NELAP	5	200022	11-30-18
Indiana	State Program	5	N/A	06-30-18
Iowa	State Program	7	353	06-30-19
Kentucky (DW)	State Program	4	90084	12-31-18
Kentucky (UST)	State Program	4	18	06-30-18
Kentucky (WW)	State Program	4	90084	12-31-18 *
L-A-B	DoD ELAP		L2463	09-22-19
L-A-B	ISO/IEC 17025		L2463.01	09-22-19
Louisiana	NELAP	6	30690	06-30-18
Louisiana (DW)	NELAP	6	LA160019	12-31-18
Maine	State Program	1	GA00006	09-24-18
Maryland	State Program	3	250	12-31-17
Massachusetts	State Program	1	M-GA006	06-30-18
Michigan	State Program	5	9925	06-30-18
Mississippi	State Program	4	N/A	06-30-18
Nebraska	State Program	7	TestAmerica-Savannah	06-30-18
New Jersey	NELAP	2	GA769	06-30-18
New Mexico	State Program	6	N/A	06-30-18
New York	NELAP	2	10842	03-31-18
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North Carolina (WW/SW)	State Program	4	269	12-31-18
Oklahoma	State Program	6	9984	08-31-18
Pennsylvania	NELAP	3	68-00474	06-30-18
Puerto Rico	State Program	2	GA00006	12-31-17
South Carolina	State Program	4	98001	06-30-18
Tennessee	State Program	4	TN02961	06-30-18
Texas	NELAP	6	T104704185-16-9	11-30-18
Texas	State Program	6	T104704185	06-30-18
US Fish & Wildlife	Federal		LE058448-0	07-31-18
USDA	Federal		SAV 3-04	06-14-20 *
Virginia	NELAP	3	460161	06-14-18
Washington	State Program	10	C805	06-10-18
West Virginia (DW)	State Program	3	9950C	12-31-17
West Virginia DEP	State Program	3	094	06-30-18
Wisconsin	State Program	5	999819810	08-31-18
Wyoming	State Program	8	8TMS-L	06-30-16 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

ATTACHMENT C

Martin, Michael

From: Myers, Paul
Sent: Friday, October 27, 2017 5:22 PM
To: marjorie.mewbourn@maryland.gov
Cc: Thomas Johnson -MDE-; tom.d.blackman@lmco.com; Martin, Michael; Ashley, Ernest
Subject: Lockheed NPDES No. MD0071935 Monthly Average Cadmium Exceedance
Attachments: Lockheed NPDES MD0071935 Monthly Average Cadmium Exceedance Report.docx

Marjorie/Thomas,

Attached is a report on the exceedance of the monthly average limit for cadmium at the Cow Pen Creek Sediment Remediation project in Middle River, Maryland. As we discussed earlier this week, the elevated cadmium concentration that was recorded on August 9th and that caused the monthly average to be exceeded coincided with the severe storm events in late July and early August and associated elevated level of TSS. Cadmium (as well as TSS) concentrations have been well below permitted levels since the storm event and subsequent corrective actions taken on the treatment system.

The attached report is being provided to accompany and supplement the DMR being submitted to the NetDMR system for 3rd quarter 2017. If you have any questions please don't hesitate to call me. Thanks again,

Paul

Paul Myers

Senior Environmental Scientist

paul.myers@tetratech.com | www.tetratech.com

Tetra Tech | Complex World, **Clear Solutions™**

288 Dexter Road | Garland, Maine 04939

Direct: 207-299-0594

Report on the Monthly Average Exceedance for Cadmium

State Permit No. 17-DP-3843 NPDES Permit No. MD0071935

Lockheed Martin Corporation – Cow Pen Creek Sediment Remediation Surface Water Discharge

The following is a report on the recent monthly average exceedance for cadmium during third quarter 2017 monitoring of the Cow Pen Creek Sediment Remediation NPDES wastewater discharge permit cited above. This includes details of the exceedance of the monthly average, a discussion of the likely cause of the exceedance, and proposed actions to address the situation.

Maximum Daily Limit

The maximum daily limit for cadmium is 5.0 µg/L. The maximum daily limit was not exceeded at any time during the third quarter (July through September). The following table presents the results for cadmium during July, August, and September 2017.

Concentrations of TSS and Cadmium by Date – 3rd Quarter (July, August, September) 2017						
Constituent	**7/20**	**7/25**	**8/9**	**8/28**	**9/5**	**9/20**
Cadmium (µg/L)	0.043	0.99	**3.1**	0.42	0.15	0.43
TSS (mg/L)	1.0	14	**49**	1.1	1.7	1.9

Note: Bolded values represent elevated concentrations

Monthly Average Exceedance for Cadmium

The monthly average limit for cadmium as currently set for the existing NPDES permit is 0.45 micrograms per liter (µg/L). This monthly average limit was exceeded during July and August 2017. The monthly average limit was not exceeded during the month of September.

The monthly average for July was 0.88 µg/L, while the monthly average for August was 0.53 µg/L. Note that these are flow-weighted averages and are based on the daily flow for each sample date. These monthly average values are both above the monthly average limit of 0.45 µg/L set by the current permit. The monthly average values are based on two samples collected for each month. In July the first sample taken on July 20 indicated cadmium concentration at 0.43 µg/L (the reporting limit for a non-detect result), while the second sample taken on July 25 was 0.99 µg/L. In August the first sample taken on August 9 was 3.1 µg/L, while the second sample taken on August 28 was 0.42 µg/L.

Potential Cause of Exceedance

The above results clearly show that only one sample was found to be significantly elevated over other data point. The August 9th sample was found to have a cadmium concentration of 3.1 µg/L. This result is related to a series of storm events in late July and August that overwhelmed the watershed, temporary dam, and treatment system. The storm events during this period resulted in a large volume of highly turbid water entering the stream channel and the need to perform extended maintenance on the treatment system between July 31st and September 4th. TSS levels were also elevated during this period and the cadmium concentration of 3.1 µg/L recorded on August 9th coincided with the highest

recorded TSS reading of 49 mg/L (see table above). A report on the TSS exceedance during this period was submitted to MDE and corrective action was taken to address the higher levels of TSS. Corrective actions taken have been successful at reducing TSS concentrations to permitted levels. Because cadmium is typically associated with particulates/suspended solids it is likely that the elevated cadmium concentration recorded on August 9th is likewise related to the storm event and subsequent treatment system issues experienced during the month of August.

Subsequent results from samples taken in September for both TSS and cadmium have been below both the daily and average monthly maximum limits specified in the current discharge permit. This indicates that the treatment system has been functioning properly and maintaining concentrations within permitted limits under normal conditions following rehabilitation of the system after the storm events. .

Recommended Actions

Based on the analysis of both sample data and the timeline of storm events, it is likely that the elevated cadmium concentration of 3.1 µg/L that led to an exceedance of the monthly average limit was due to the severe storm event at the site in late July and August. Lockheed Martin proposes two recommended actions, the first of which has already been completed:

1) Perform rehabilitation of the treatment system after major storm events by changing out the carbon and sand filtration media; also adding a solids settling weir (completed by early September 2017); and
2) Conduct two additional sampling events beginning in November. This will result in a total of four samples taken each month for the remainder of the permitted discharge period. The additional data should provide a more robust set of data for more accurately evaluating the actual average concentrations for cadmium throughout each month. It is expected that the additional data will demonstrate that during normal operation the discharge criteria as specified in the permit are being met.