

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton  
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TestAmerica Job ID: 240-108565-1

Client Project/Site: Ford LTP Livonia MI - E203631

For:

ARCADIS U.S., Inc.  
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Novi, Michigan 48377

Attn: Kristoffer Hinskey



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Authorized for release by:  
3/11/2019 2:57:12 PM

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*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits
X	Surrogate is outside control limits
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
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.
α	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)

# Case Narrative

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Job ID: 240-108565-1**

**Laboratory: TestAmerica Canton**

**Narrative**

## CASE NARRATIVE

**Client: ARCADIS U.S., Inc.**

**Project: Ford LTP Livonia MI - E203631**

**Report Number: 240-108565-1**

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 some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

### **RECEIPT**

The samples were received on 2/27/2019 8:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.8° C.

### **VOLATILE ORGANIC COMPOUNDS (GCMS)**

Samples MW-102\_022519 (240-108565-1), MW-102S\_022519 (240-108565-2), MW-105S\_022519 (240-108565-3) and TRIP BLANK (240-108565-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/01/2019 and 03/04/2019.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for MW-102S\_022519 (240-108565-2). 4-Bromofluorobenzene (Surr) failed the surrogate recovery criteria high for 240-108509-B-4 MSD. Refer to the QC report for details.

Surrogate recovery for the following sample was outside the upper control limit: MW-102S\_022519 (240-108565-2). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

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

### **VOLATILE ORGANIC COMPOUNDS (GCMS SIM)**

Samples MW-102\_022519 (240-108565-1), MW-102S\_022519 (240-108565-2) and MW-105S\_022519 (240-108565-3) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 03/02/2019.

# Case Narrative

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

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**Job ID: 240-108565-1 (Continued)**

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**Laboratory: TestAmerica Canton (Continued)**

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

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# Method Summary

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8260B SIM	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396



# Sample Summary

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-108565-1	MW-102_022519	Water	02/25/19 12:56	02/27/19 08:20
240-108565-2	MW-102S_022519	Water	02/25/19 14:05	02/27/19 08:20
240-108565-3	MW-105S_022519	Water	02/25/19 16:05	02/27/19 08:20
240-108565-4	TRIP BLANK	Water	02/25/19 00:00	02/27/19 08:20

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- 7
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- 9
- 10
- 11
- 12
- 13
- 14

# Detection Summary

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Client Sample ID: MW-102\_022519

## Lab Sample ID: 240-108565-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.3	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA
Vinyl chloride	1.7		1.0	0.20	ug/L	1		8260B	Total/NA

## Client Sample ID: MW-102S\_022519

## Lab Sample ID: 240-108565-2

No Detections.

## Client Sample ID: MW-105S\_022519

## Lab Sample ID: 240-108565-3

No Detections.

## Client Sample ID: TRIP BLANK

## Lab Sample ID: 240-108565-4

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Canton



# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Client Sample ID: MW-102\_022519**

**Lab Sample ID: 240-108565-1**

**Date Collected: 02/25/19 12:56**

**Matrix: Water**

**Date Received: 02/27/19 08:20**

**Method: 8260B SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	1.3	J	2.0	0.86	ug/L			03/02/19 16:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	82		63 - 125					03/02/19 16:28	1

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/04/19 17:17	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/04/19 17:17	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/04/19 17:17	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/04/19 17:17	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/04/19 17:17	1
Vinyl chloride	1.7		1.0	0.20	ug/L			03/04/19 17:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	95		70 - 121					03/04/19 17:17	1
4-Bromofluorobenzene (Surr)	68		59 - 120					03/04/19 17:17	1
Toluene-d8 (Surr)	74		70 - 123					03/04/19 17:17	1
Dibromofluoromethane (Surr)	93		75 - 128					03/04/19 17:17	1

# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Client Sample ID: MW-102S\_022519**

**Lab Sample ID: 240-108565-2**

**Date Collected: 02/25/19 14:05**

**Matrix: Water**

**Date Received: 02/27/19 08:20**

**Method: 8260B SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			03/02/19 16:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	83		63 - 125					03/02/19 16:53	1

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 16:15	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/01/19 16:15	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/01/19 16:15	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 16:15	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/01/19 16:15	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/01/19 16:15	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	124	X	70 - 121					03/01/19 16:15	1
4-Bromofluorobenzene (Surr)	75		59 - 120					03/01/19 16:15	1
Toluene-d8 (Surr)	111		70 - 123					03/01/19 16:15	1
Dibromofluoromethane (Surr)	111		75 - 128					03/01/19 16:15	1

# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Client Sample ID: MW-105S\_022519**

**Lab Sample ID: 240-108565-3**

**Date Collected: 02/25/19 16:05**

**Matrix: Water**

**Date Received: 02/27/19 08:20**

**Method: 8260B SIM - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			03/02/19 17:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	84		63 - 125					03/02/19 17:18	1

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 16:38	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/01/19 16:38	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/01/19 16:38	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 16:38	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/01/19 16:38	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/01/19 16:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	111		70 - 121					03/01/19 16:38	1
4-Bromofluorobenzene (Surr)	85		59 - 120					03/01/19 16:38	1
Toluene-d8 (Surr)	95		70 - 123					03/01/19 16:38	1
Dibromofluoromethane (Surr)	106		75 - 128					03/01/19 16:38	1

# Client Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Client Sample ID: TRIP BLANK**

**Lab Sample ID: 240-108565-4**

**Date Collected: 02/25/19 00:00**

**Matrix: Water**

**Date Received: 02/27/19 08:20**

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 17:00	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/01/19 17:00	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/01/19 17:00	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 17:00	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/01/19 17:00	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/01/19 17:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		70 - 121		03/01/19 17:00	1
4-Bromofluorobenzene (Surr)	75		59 - 120		03/01/19 17:00	1
Toluene-d8 (Surr)	83		70 - 123		03/01/19 17:00	1
Dibromofluoromethane (Surr)	101		75 - 128		03/01/19 17:00	1

# Surrogate Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCA (70-121)	BFB (59-120)	TOL (70-123)	DBFM (75-128)
240-108509-B-4 MS	Matrix Spike	77	64	102	76
240-108509-B-4 MSD	Matrix Spike Duplicate	78	135 X	104	82
240-108565-1	MW-102_022519	95	68	74	93
240-108565-2	MW-102S_022519	124 X	75	111	111
240-108565-3	MW-105S_022519	111	85	95	106
240-108565-4	TRIP BLANK	102	75	83	101
240-108804-H-1 MSD	Matrix Spike Duplicate	83	75	74	90
240-108804-K-1 MS	Matrix Spike	87	77	74	92
LCS 240-369932/4	Lab Control Sample	97	94	113	105
LCS 240-370116/4	Lab Control Sample	85	76	77	92
MB 240-369932/6	Method Blank	107	88	118	118
MB 240-370116/6	Method Blank	90	67	72	92

#### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)  
 BFB = 4-Bromofluorobenzene (Surr)  
 TOL = Toluene-d8 (Surr)  
 DBFM = Dibromofluoromethane (Surr)

## Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA
		(63-125)
240-108565-1	MW-102_022519	82
240-108565-2	MW-102S_022519	83
240-108565-3	MW-105S_022519	84
240-108589-B-1 MS	Matrix Spike	82
240-108589-B-1 MSD	Matrix Spike Duplicate	82
LCS 240-370005/4	Lab Control Sample	84
MB 240-370005/5	Method Blank	80

#### Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)

# QC Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 240-369932/6**

**Matrix: Water**

**Analysis Batch: 369932**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 12:56	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/01/19 12:56	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/01/19 12:56	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/01/19 12:56	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/01/19 12:56	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/01/19 12:56	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	107		70 - 121		03/01/19 12:56	1
4-Bromofluorobenzene (Surr)	88		59 - 120		03/01/19 12:56	1
Toluene-d8 (Surr)	118		70 - 123		03/01/19 12:56	1
Dibromofluoromethane (Surr)	118		75 - 128		03/01/19 12:56	1

**Lab Sample ID: LCS 240-369932/4**

**Matrix: Water**

**Analysis Batch: 369932**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	9.74		ug/L		97	65 - 139
cis-1,2-Dichloroethene	10.0	10.8		ug/L		108	76 - 128
Tetrachloroethene	10.0	9.80		ug/L		98	74 - 130
trans-1,2-Dichloroethene	10.0	7.99		ug/L		80	78 - 133
Trichloroethene	10.0	9.38		ug/L		94	76 - 125
Vinyl chloride	10.0	7.58		ug/L		76	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	97		70 - 121
4-Bromofluorobenzene (Surr)	94		59 - 120
Toluene-d8 (Surr)	113		70 - 123
Dibromofluoromethane (Surr)	105		75 - 128

**Lab Sample ID: MRL 240-369932/5**

**Matrix: Water**

**Analysis Batch: 369932**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	0.00100	0.000776	J	ng/uL		78	10 - 150

**Lab Sample ID: 240-108509-B-4 MS**

**Matrix: Water**

**Analysis Batch: 369932**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	200	U F2	2000	1060		ug/L		53	53 - 140
cis-1,2-Dichloroethene	1600	F1	2000	2820	F1	ug/L		63	64 - 130
Tetrachloroethene	200	U F2	2000	1330		ug/L		67	51 - 136
trans-1,2-Dichloroethene	430	F1 F2	2000	1210	F1	ug/L		39	68 - 133
Trichloroethene	2700		2000	4030		ug/L		68	55 - 131

TestAmerica Canton

# QC Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 240-108509-B-4 MS**  
**Matrix: Water**  
**Analysis Batch: 369932**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	200	U F1 F2	2000	573	F1	ug/L		29	43 - 154
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS Qualifier</b>	<b>MS Limits</b>						
1,2-Dichloroethane-d4 (Surr)	77		70 - 121						
4-Bromofluorobenzene (Surr)	64		59 - 120						
Toluene-d8 (Surr)	102		70 - 123						
Dibromofluoromethane (Surr)	76		75 - 128						

**Lab Sample ID: 240-108509-B-4 MSD**  
**Matrix: Water**  
**Analysis Batch: 369932**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	200	U F2	2000	2140	F2	ug/L		107	53 - 140	68	35
cis-1,2-Dichloroethene	1600	F1	2000	3260		ug/L		84	64 - 130	14	21
Tetrachloroethene	200	U F2	2000	1850	F2	ug/L		92	51 - 136	32	23
trans-1,2-Dichloroethene	430	F1 F2	2000	1870	F2	ug/L		72	68 - 133	43	24
Trichloroethene	2700		2000	4340		ug/L		83	55 - 131	7	23
Vinyl chloride	200	U F1 F2	2000	1280	F2	ug/L		64	43 - 154	77	29
<b>Surrogate</b>	<b>%Recovery</b>	<b>MSD Qualifier</b>	<b>MSD Limits</b>								
1,2-Dichloroethane-d4 (Surr)	78		70 - 121								
4-Bromofluorobenzene (Surr)	135	X	59 - 120								
Toluene-d8 (Surr)	104		70 - 123								
Dibromofluoromethane (Surr)	82		75 - 128								

**Lab Sample ID: MB 240-370116/6**  
**Matrix: Water**  
**Analysis Batch: 370116**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/04/19 11:28	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/04/19 11:28	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/04/19 11:28	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/04/19 11:28	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/04/19 11:28	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/04/19 11:28	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>MB Qualifier</b>	<b>MB Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
1,2-Dichloroethane-d4 (Surr)	90		70 - 121					03/04/19 11:28	1
4-Bromofluorobenzene (Surr)	67		59 - 120					03/04/19 11:28	1
Toluene-d8 (Surr)	72		70 - 123					03/04/19 11:28	1
Dibromofluoromethane (Surr)	92		75 - 128					03/04/19 11:28	1

TestAmerica Canton

# QC Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: LCS 240-370116/4**

**Matrix: Water**

**Analysis Batch: 370116**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	10.0	9.73		ug/L		97	65 - 139
cis-1,2-Dichloroethene	10.0	11.6		ug/L		116	76 - 128
Tetrachloroethene	10.0	10.8		ug/L		108	74 - 130
trans-1,2-Dichloroethene	10.0	12.2		ug/L		122	78 - 133
Trichloroethene	10.0	11.6		ug/L		116	76 - 125
Vinyl chloride	10.0	8.87		ug/L		89	58 - 143

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	85		70 - 121
4-Bromofluorobenzene (Surr)	76		59 - 120
Toluene-d8 (Surr)	77		70 - 123
Dibromofluoromethane (Surr)	92		75 - 128

**Lab Sample ID: MRL 240-370116/5**

**Matrix: Water**

**Analysis Batch: 370116**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	0.00100	0.00104		ng/uL		104	10 - 150

**Lab Sample ID: 240-108804-H-1 MSD**

**Matrix: Water**

**Analysis Batch: 370116**

**Client Sample ID: Matrix Spike Duplicate**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1-Dichloroethene	1.0	U	10.0	9.37		ug/L		94	53 - 140	1	35
cis-1,2-Dichloroethene	1.0	U	10.0	11.2		ug/L		112	64 - 130	1	21
Tetrachloroethene	1.0	U	10.0	9.83		ug/L		98	51 - 136	2	23
trans-1,2-Dichloroethene	1.0	U	10.0	11.5		ug/L		115	68 - 133	2	24
Trichloroethene	0.14	J	10.0	11.2		ug/L		110	55 - 131	1	23
Vinyl chloride	1.0	U	10.0	9.89		ug/L		99	43 - 154	10	29

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	83		70 - 121
4-Bromofluorobenzene (Surr)	75		59 - 120
Toluene-d8 (Surr)	74		70 - 123
Dibromofluoromethane (Surr)	90		75 - 128

**Lab Sample ID: 240-108804-K-1 MS**

**Matrix: Water**

**Analysis Batch: 370116**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.0	U	10.0	9.28		ug/L		93	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	11.3		ug/L		113	64 - 130
Tetrachloroethene	1.0	U	10.0	9.64		ug/L		96	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	11.3		ug/L		113	68 - 133
Trichloroethene	0.14	J	10.0	11.0		ug/L		109	55 - 131

TestAmerica Canton



# QC Sample Results

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 240-108804-K-1 MS**  
**Matrix: Water**  
**Analysis Batch: 370116**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Vinyl chloride	1.0	U	10.0	8.92		ug/L		89	43 - 154
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS Qualifier</b>	<b>Limits</b>						
1,2-Dichloroethane-d4 (Surr)	87		70 - 121						
4-Bromofluorobenzene (Surr)	77		59 - 120						
Toluene-d8 (Surr)	74		70 - 123						
Dibromofluoromethane (Surr)	92		75 - 128						

## Method: 8260B SIM - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 240-370005/5**  
**Matrix: Water**  
**Analysis Batch: 370005**

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	2.0	U	2.0	0.86	ug/L			03/02/19 13:07	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>MB Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
1,2-Dichloroethane-d4 (Surr)	80		63 - 125					03/02/19 13:07	1

**Lab Sample ID: LCS 240-370005/4**  
**Matrix: Water**  
**Analysis Batch: 370005**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	10.0	11.8		ug/L		118	59 - 131
<b>Surrogate</b>	<b>%Recovery</b>	<b>LCS Qualifier</b>	<b>Limits</b>				
1,2-Dichloroethane-d4 (Surr)	84		63 - 125				

**Lab Sample ID: 240-108589-B-1 MS**  
**Matrix: Water**  
**Analysis Batch: 370005**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	11		10.0	22.7		ug/L		119	52 - 129
<b>Surrogate</b>	<b>%Recovery</b>	<b>MS Qualifier</b>	<b>Limits</b>						
1,2-Dichloroethane-d4 (Surr)	82		63 - 125						

**Lab Sample ID: 240-108589-B-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 370005**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,4-Dioxane	11		10.0	21.2		ug/L		104	52 - 129	7	13

TestAmerica Canton

# QC Sample Results

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Method: 8260B SIM - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 240-108589-B-1 MSD

Matrix: Water

Analysis Batch: 370005

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Surrogate	MSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	82		63 - 125

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14

# QC Association Summary

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## GC/MS VOA

### Analysis Batch: 369932

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108565-2	MW-102S_022519	Total/NA	Water	8260B	
240-108565-3	MW-105S_022519	Total/NA	Water	8260B	
240-108565-4	TRIP BLANK	Total/NA	Water	8260B	
MB 240-369932/6	Method Blank	Total/NA	Water	8260B	
LCS 240-369932/4	Lab Control Sample	Total/NA	Water	8260B	
MRL 240-369932/5	Lab Control Sample	Total/NA	Water	8260B	
240-108509-B-4 MS	Matrix Spike	Total/NA	Water	8260B	
240-108509-B-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 370005

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108565-1	MW-102_022519	Total/NA	Water	8260B SIM	
240-108565-2	MW-102S_022519	Total/NA	Water	8260B SIM	
240-108565-3	MW-105S_022519	Total/NA	Water	8260B SIM	
MB 240-370005/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-370005/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-108589-B-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-108589-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

### Analysis Batch: 370116

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108565-1	MW-102_022519	Total/NA	Water	8260B	
MB 240-370116/6	Method Blank	Total/NA	Water	8260B	
LCS 240-370116/4	Lab Control Sample	Total/NA	Water	8260B	
MRL 240-370116/5	Lab Control Sample	Total/NA	Water	8260B	
240-108804-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
240-108804-K-1 MS	Matrix Spike	Total/NA	Water	8260B	

# Lab Chronicle

Client: ARCADIS U.S., Inc.  
Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

**Client Sample ID: MW-102\_022519**

**Date Collected: 02/25/19 12:56**

**Date Received: 02/27/19 08:20**

**Lab Sample ID: 240-108565-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	370116	03/04/19 17:17	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370005	03/02/19 16:28	SAM	TAL CAN

**Client Sample ID: MW-102S\_022519**

**Date Collected: 02/25/19 14:05**

**Date Received: 02/27/19 08:20**

**Lab Sample ID: 240-108565-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369932	03/01/19 16:15	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370005	03/02/19 16:53	SAM	TAL CAN

**Client Sample ID: MW-105S\_022519**

**Date Collected: 02/25/19 16:05**

**Date Received: 02/27/19 08:20**

**Lab Sample ID: 240-108565-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369932	03/01/19 16:38	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370005	03/02/19 17:18	SAM	TAL CAN

**Client Sample ID: TRIP BLANK**

**Date Collected: 02/25/19 00:00**

**Date Received: 02/27/19 08:20**

**Lab Sample ID: 240-108565-4**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	369932	03/01/19 17:00	LEE	TAL CAN

**Laboratory References:**

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

# Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.  
 Project/Site: Ford LTP Livonia MI - E203631

TestAmerica Job ID: 240-108565-1

## Laboratory: TestAmerica Canton

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
California	State Program	9	2927	02-23-20
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	04-30-19 *
Kentucky (UST)	State Program	4	58	02-23-20
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19 *
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-20
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State Program	3	210	12-31-19

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

1.0 / CO. 8

Chain of Custody Record

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

MICHIGAN

190  
MICHIGAN  
TestAmerica Laboratory location: Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-223-2763

Regulatory program:  DW  NPDES  RCRA  Other

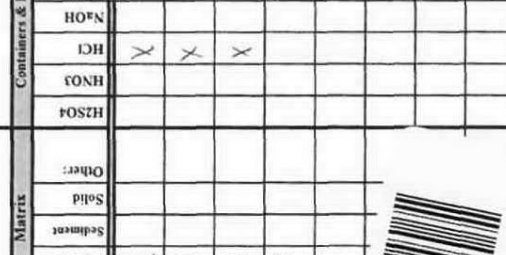
Client Contact: Arcadis  
Company Name: Arcadis  
Address: 28550 Cabot Drive, Suite 500  
City/State/Zip: Novi, MI, 48377  
Phone: 248-994-2240

Client Project Manager: Kris Hinsky  
Site Contact: Angela DeGrandis  
Telephone: 248-994-2240  
Email: kristoffer.hinsky@arcadis.com

Project Name: Ford LTP  
Project Number: M1001454-0004-0002  
M I 0 0 1 4 5 4 . 0 0 0 4 . 0 0 0 2  
PO # M1001454-0004-0002  
M I 0 0 1 4 5 4 . 0 0 0 4 . 0 0 0 2

Method of Shipment/Carrier:   
Shipping/Tracking No:   
Analysis Turnaround Time:   
TAT if different from below:   
 3 weeks   
 2 weeks   
 10 day   
 1 week   
 2 days   
 1 day

Sample Date	Sample Time	Matrix				Containers & Preservatives										Filtered Sample (Y / N)	Composite C / Grab G	Analyses										Sample Specific Notes / Special Instructions:
		Air	Aqueous	Sediment	Solid	Other:	H2SO4	HNO3	HCl	NaOH	ZnAc	NiPr	Other:	1,1-DCE 8260B	Cis-1,2-DCE 8260B			Trans-1,2-DCE 8260B	PCE 8260B	TCE 8260B	Vinyl Chloride 8260B	1,4-Dioxane 8260B SIM						
MMW-102-022519	1256	X					X						X	X	X	X	X	X	X	X	X	3 for B260B 3 for B260B SIM 6 total VOCs 1 for each well						
MMW-1025-022519	1405	X					X						X	X	X	X	X	X	X	X	X	TP19 BLANK						
MMW-1055-022519	1605	X					X						X	X	X	X	X	X	X	X	X	TP19 BLANK						
TP19 BLANK		X																										



Possible Hazard Identification  
 Non-Hazard  Flammable  Irritant  Poison B  Unknown

Special Instructions/OC Requirements & Comments:  
Submit all results through Cadena at jim.tomalia@cadena.com, Cadena #E203631  
Level IV Reporting.

Received by: NOV1 COLD STORAGE  
Received by: TESTAMERICA  
Received in Laboratory by: [Signature]

Company	Date/Time	Company	Date/Time	Company	Date/Time
ARCADIS	2/25/19 12:56	ARCADIS	2/25/19 18:12	ARCADIS	2/25/19 18:12
ARCADIS	2/25/19 14:05	ARCADIS	02/26/19 14:15	TESTAMERICA	2/26/19 14:15
TESTAMERICA	2/26/19 15:53	TESTAMERICA	2/26/19 15:53	TESTAMERICA	2/26/19 15:53



**TestAmerica Canton Sample Receipt Form/Narrative**  
**Canton Facility**

Login # : 108565

Client ArCADIS Site Name \_\_\_\_\_ Cooler unpacked by: \_\_\_\_\_  
 Cooler Received on 2/27/19 Opened on 2/27/19  
 FedEx: 1<sup>st</sup>  Grd  Exp  UPS  FAS  Clipper Client Drop Off  TestAmerica Courier  Other

Receipt After-hours: Drop-off Date/Time \_\_\_\_\_ Storage Location \_\_\_\_\_

TestAmerica Cooler # TA Foam Box  Client Cooler  Box  Other \_\_\_\_\_  
 Packing material used:  Bubble Wrap  Foam  Plastic Bag  None  Other \_\_\_\_\_  
 COOLANT:  Wet Ice  Blue Ice  Dry Ice  Water  None

1. Cooler temperature upon receipt  See Multiple Cooler Form  
 IR GUN# IR-8 (CF **-0.2** °C) Observed Cooler Temp. 1.0 °C Corrected Cooler Temp. 0.8 °C  
 IR GUN #36 (CF **+0.7** °C) Observed Cooler Temp. \_\_\_\_\_ °C Corrected Cooler Temp. \_\_\_\_\_ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes  No   
 -Were the seals on the outside of the cooler(s) signed & dated? Yes  No  NA   
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes  No   
 -Were tamper/custody seals intact and uncompromised? Yes  No  NA
3. Shippers' packing slip attached to the cooler(s)?  Yes  No
4. Did custody papers accompany the sample(s)?  Yes  No
5. Were the custody papers relinquished & signed in the appropriate place?  Yes  No
6. Was/were the person(s) who collected the samples clearly identified on the COC?  Yes  No
7. Did all bottles arrive in good condition (Unbroken)?  Yes  No
8. Could all bottle labels be reconciled with the COC?  Yes  No
9. Were correct bottle(s) used for the test(s) indicated?  Yes  No
10. Sufficient quantity received to perform indicated analyses?  Yes  No
11. Are these work share samples?  Yes  No   
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes  No  NA  pH Strip Lot# HC861525
13. Were VOAs on the COC?  Yes  No
14. Were air bubbles >6 mm in any VOA vials?  Yes  No  NA  Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # 831701  Yes  No
16. Was a LL Hg or Me Hg trip blank present?  Yes  No

Tests that are not checked for pH by Receiving:  
  
VOAs  
Oil and Grease  
TOC

Contacted PM \_\_\_\_\_ Date \_\_\_\_\_ by \_\_\_\_\_ via Verbal Voice Mail Other \_\_\_\_\_

Concerning \_\_\_\_\_

**17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES**

Samples processed by: JR

**18. SAMPLE CONDITION**

Sample(s) \_\_\_\_\_ were received after the recommended holding time had expired.  
 Sample(s) \_\_\_\_\_ were received in a broken container.  
 Sample(s) \_\_\_\_\_ were received with bubble >6 mm in diameter. (Notify PM)

**19. SAMPLE PRESERVATION**

Sample(s) \_\_\_\_\_ were further preserved in the laboratory.  
 Time preserved: \_\_\_\_\_ Preservative(s) added/Lot number(s): \_\_\_\_\_

VOA Sample Preservation - Date/Time VOAs Frozen: \_\_\_\_\_