TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Canton
4101 Shuffel Street NW
North Canton, OH 44720
Tel: (330)497-9396

TestAmerica Job ID: 240-108737-1
Client Project/Site: Ford LTP Livonia MI - E203631

For:
ARCADIS U.S., Inc.
28550 Cabot Drive
Suite 500
Novi, Michigan 48377

Attn: Kristoffer Hinskey

Authorized for release by:
3/14/2019 10:36:07 AM

Michael DelMonico, Project Manager I
(330)497-9396
michael.delmonico@testamericainc.com

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Definitions/Glossary

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

TestAmerica Job ID: 240-108737-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
X	Surrogate is outside control limits

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)

Job ID: 240-108737-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-108737-1

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 3/1/2019 8:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.4º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-100S_022719 (240-108737-1), MW-107S_022719 (240-108737-2), MW-106S_022719 (240-108737-3), MW-96S_022719 (240-108737-4) and TRIP BLANK (240-108737-5) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/07/2019 and 03/11/2019.

There was an MS/MSD analyzed in batch 240-370691 but could not be reported because the associated sample needed reanalyzed in a different batch: TRIP BLANK (240-108737-5).

The continuing calibration verification (CCV) associated with batch 371049 recovered above the upper control limit for Vinyl Chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The following samples are impacted: MW-100S_022719 (240-108737-1), MW-107S_022719 (240-108737-2), MW-106S_022719 (240-108737-3) and MW-96S_022719 (240-108737-4).

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

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Job ID: 240-108737-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

Samples MW-100S_022719 (240-108737-1), MW-107S_022719 (240-108737-2), MW-106S_022719 (240-108737-3) and MW-96S_022719 (240-108737-4) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 03/06/2019.

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

Method Summary

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

TestAmerica Job ID: 240-108737-1

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: 240-108737-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-108737-1	MW-100S_022719	Water	02/27/19 16:15	03/01/19 08:15
240-108737-2	MW-107S_022719	Water	02/27/19 10:28	03/01/19 08:15
240-108737-3	MW-106S_022719	Water	02/27/19 12:05	03/01/19 08:15
240-108737-4	MW-96S_022719	Water	02/27/19 14:37	03/01/19 08:15
240-108737-5	TRIP BLANK	Water	02/27/19 00:00	03/01/19 08:15

Detection Summary

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-100S_022719 — Lab Sample ID: 240-108737-1

No Detections.

Client Sample ID: MW-107S_022719 — Lab Sample ID: 240-108737-2

No Detections.

Client Sample ID: MW-106S_022719 — Lab Sample ID: 240-108737-3

No Detections.

Client Sample ID: MW-96S_022719 — Lab Sample ID: 240-108737-4

No Detections.

Client Sample ID: TRIP BLANK — Lab Sample ID: 240-108737-5

No Detections.

This Detection Summary does not include radiochemical test results.

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-100S_022719
Date Collected: 02/27/19 16:15
Date Received: 03/01/19 08:15

Lab Sample ID: 240-108737-1
Matrix: Water

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			03/06/19 14:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*63 - 125*		*03/06/19 14:37*	*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			03/11/19 13:10	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/11/19 13:10	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/11/19 13:10	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/11/19 13:10	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/11/19 13:10	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/11/19 13:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*118*		*70 - 121*		*03/11/19 13:10*	*1*
4-Bromofluorobenzene (Surr)	*98*		*59 - 120*		*03/11/19 13:10*	*1*
Toluene-d8 (Surr)	*111*		*70 - 123*		*03/11/19 13:10*	*1*
Dibromofluoromethane (Surr)	*103*		*75 - 128*		*03/11/19 13:10*	*1*

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-107S_022719
Date Collected: 02/27/19 10:28
Date Received: 03/01/19 08:15

Lab Sample ID: 240-108737-2
Matrix: Water

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			03/06/19 15:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*63 - 125*		*03/06/19 15:02*	*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			03/11/19 13:33	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/11/19 13:33	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/11/19 13:33	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/11/19 13:33	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/11/19 13:33	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/11/19 13:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*117*		*70 - 121*		*03/11/19 13:33*	*1*
4-Bromofluorobenzene (Surr)	*96*		*59 - 120*		*03/11/19 13:33*	*1*
Toluene-d8 (Surr)	*109*		*70 - 123*		*03/11/19 13:33*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 128*		*03/11/19 13:33*	*1*

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-106S_022719
Date Collected: 02/27/19 12:05
Date Received: 03/01/19 08:15

Lab Sample ID: 240-108737-3
Matrix: Water

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			03/06/19 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*63 - 125*		*03/06/19 15:27*	*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			03/11/19 13:55	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/11/19 13:55	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/11/19 13:55	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/11/19 13:55	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/11/19 13:55	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/11/19 13:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*116*		*70 - 121*		*03/11/19 13:55*	*1*
4-Bromofluorobenzene (Surr)	*98*		*59 - 120*		*03/11/19 13:55*	*1*
Toluene-d8 (Surr)	*111*		*70 - 123*		*03/11/19 13:55*	*1*
Dibromofluoromethane (Surr)	*109*		*75 - 128*		*03/11/19 13:55*	*1*

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-96S_022719
Date Collected: 02/27/19 14:37
Date Received: 03/01/19 08:15

Lab Sample ID: 240-108737-4
Matrix: Water

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			03/06/19 15:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*83*		*63 - 125*		*03/06/19 15:52*	*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			03/11/19 14:17	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/11/19 14:17	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/11/19 14:17	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/11/19 14:17	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/11/19 14:17	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/11/19 14:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*70 - 121*		*03/11/19 14:17*	*1*
4-Bromofluorobenzene (Surr)	*95*		*59 - 120*		*03/11/19 14:17*	*1*
Toluene-d8 (Surr)	*109*		*70 - 123*		*03/11/19 14:17*	*1*
Dibromofluoromethane (Surr)	*96*		*75 - 128*		*03/11/19 14:17*	*1*

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: TRIP BLANK
Date Collected: 02/27/19 00:00
Date Received: 03/01/19 08:15

Lab Sample ID: 240-108737-5
Matrix: Water

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			03/07/19 16:39	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/07/19 16:39	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/07/19 16:39	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/07/19 16:39	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/07/19 16:39	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/07/19 16:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*70 - 121*		*03/07/19 16:39*	*1*
4-Bromofluorobenzene (Surr)	*90*		*59 - 120*		*03/07/19 16:39*	*1*
Toluene-d8 (Surr)	*94*		*70 - 123*		*03/07/19 16:39*	*1*
Dibromofluoromethane (Surr)	*99*		*75 - 128*		*03/07/19 16:39*	*1*

Surrogate Summary

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

TestAmerica Job ID: 240-108737-1

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

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(70-121)	(59-120)	(70-123)	(75-128)
240-108737-1	MW-100S_022719	118	98	111	103
240-108737-2	MW-107S_022719	117	96	109	107
240-108737-3	MW-106S_022719	116	98	111	109
240-108737-4	MW-96S_022719	111	95	109	96
240-108737-5	TRIP BLANK	109	90	94	99
240-108820-C-1 MS	Matrix Spike	112	115	125 X	105
240-108820-C-1 MSD	Matrix Spike Duplicate	101	109	117	93
LCS 240-370691/4	Lab Control Sample	99	110	101	91
LCS 240-371049/4	Lab Control Sample	103	111	119	95
MB 240-370691/6	Method Blank	112	90	93	98
MB 240-371049/6	Method Blank	119	102	114	112

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)
		DCA
Lab Sample ID	Client Sample ID	(63-125)
240-108737-1	MW-100S_022719	85
240-108737-2	MW-107S_022719	83
240-108737-3	MW-106S_022719	83
240-108737-4	MW-96S_022719	83
240-108737-4 MS	MW-96S_022719	83
240-108737-4 MSD	MW-96S_022719	84
LCS 240-370526/4	Lab Control Sample	83
MB 240-370526/5	Method Blank	87

Surrogate Legend

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

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

Lab Sample ID: MB 240-370691/6
Matrix: Water
Analysis Batch: 370691

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			03/07/19 14:24	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/07/19 14:24	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/07/19 14:24	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/07/19 14:24	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/07/19 14:24	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/07/19 14:24	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*70 - 121*		*03/07/19 14:24*	*1*
4-Bromofluorobenzene (Surr)	*90*		*59 - 120*		*03/07/19 14:24*	*1*
Toluene-d8 (Surr)	*93*		*70 - 123*		*03/07/19 14:24*	*1*
Dibromofluoromethane (Surr)	*98*		*75 - 128*		*03/07/19 14:24*	*1*

Lab Sample ID: LCS 240-370691/4
Matrix: Water
Analysis Batch: 370691

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	10.3		ug/L		103	65 - 139
cis-1,2-Dichloroethene	10.0	9.63		ug/L		96	76 - 128
Tetrachloroethene	10.0	8.86		ug/L		89	74 - 130
trans-1,2-Dichloroethene	10.0	9.95		ug/L		100	78 - 133
Trichloroethene	10.0	8.63		ug/L		86	76 - 125
Vinyl chloride	10.0	10.9		ug/L		109	58 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 121*
4-Bromofluorobenzene (Surr)	*110*		*59 - 120*
Toluene-d8 (Surr)	*101*		*70 - 123*
Dibromofluoromethane (Surr)	*91*		*75 - 128*

Lab Sample ID: MRL 240-370691/5
Matrix: Water
Analysis Batch: 370691

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	0.00126		ng/uL		126	10 - 150

Lab Sample ID: MB 240-371049/6
Matrix: Water
Analysis Batch: 371049

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			03/11/19 12:02	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			03/11/19 12:02	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			03/11/19 12:02	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			03/11/19 12:02	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			03/11/19 12:02	1

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

Lab Sample ID: MB 240-371049/6
Matrix: Water
Analysis Batch: 371049

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.0	U	1.0	0.20	ug/L			03/11/19 12:02	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*119*		*70 - 121*		*03/11/19 12:02*	*1*
4-Bromofluorobenzene (Surr)	*102*		*59 - 120*		*03/11/19 12:02*	*1*
Toluene-d8 (Surr)	*114*		*70 - 123*		*03/11/19 12:02*	*1*
Dibromofluoromethane (Surr)	*112*		*75 - 128*		*03/11/19 12:02*	*1*

Lab Sample ID: LCS 240-371049/4
Matrix: Water
Analysis Batch: 371049

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	10.2		ug/L		102	65 - 139		
cis-1,2-Dichloroethene			10.0	9.78		ug/L		98	76 - 128		
Tetrachloroethene			10.0	8.14		ug/L		81	74 - 130		
trans-1,2-Dichloroethene			10.0	10.1		ug/L		101	78 - 133		
Trichloroethene			10.0	8.29		ug/L		83	76 - 125		
Vinyl chloride			10.0	11.9		ug/L		119	58 - 143		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*70 - 121*
4-Bromofluorobenzene (Surr)	*111*		*59 - 120*
Toluene-d8 (Surr)	*119*		*70 - 123*
Dibromofluoromethane (Surr)	*95*		*75 - 128*

Lab Sample ID: 240-108820-C-1 MS
Matrix: Water
Analysis Batch: 371049

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	50	U	500	495		ug/L		99	53 - 140		
cis-1,2-Dichloroethene	50	U	500	466		ug/L		93	64 - 130		
Tetrachloroethene	50	U	500	345		ug/L		69	51 - 136		
trans-1,2-Dichloroethene	50	U	500	469		ug/L		94	68 - 133		
Trichloroethene	50	U	500	336		ug/L		67	55 - 131		
Vinyl chloride	50	U	500	624		ug/L		125	43 - 154		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*112*		*70 - 121*
4-Bromofluorobenzene (Surr)	*115*		*59 - 120*
Toluene-d8 (Surr)	*125*	*X*	*70 - 123*
Dibromofluoromethane (Surr)	*105*		*75 - 128*

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

Lab Sample ID: 240-108820-C-1 MSD
Matrix: Water
Analysis Batch: 371049

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	50	U	500	559		ug/L		112	53 - 140	12	35
cis-1,2-Dichloroethene	50	U	500	484		ug/L		97	64 - 130	4	21
Tetrachloroethene	50	U	500	421		ug/L		84	51 - 136	20	23
trans-1,2-Dichloroethene	50	U	500	504		ug/L		101	68 - 133	7	24
Trichloroethene	50	U	500	402		ug/L		80	55 - 131	18	23
Vinyl chloride	50	U	500	726		ug/L		145	43 - 154	15	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 121*
4-Bromofluorobenzene (Surr)	*109*		*59 - 120*
Toluene-d8 (Surr)	*117*		*70 - 123*
Dibromofluoromethane (Surr)	*93*		*75 - 128*

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

Lab Sample ID: MB 240-370526/5
Matrix: Water
Analysis Batch: 370526

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			03/06/19 12:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*63 - 125*		*03/06/19 12:53*	*1*

Lab Sample ID: LCS 240-370526/4
Matrix: Water
Analysis Batch: 370526

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	11.9		ug/L		119	59 - 131

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*63 - 125*

Lab Sample ID: 240-108737-4 MS
Matrix: Water
Analysis Batch: 370526

Client Sample ID: MW-96S_022719
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,4-Dioxane	2.0	U	10.0	11.1		ug/L		111	52 - 129

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*83*		*63 - 125*

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

Lab Sample ID: 240-108737-4 MSD
Matrix: Water
Analysis Batch: 370526

Client Sample ID: MW-96S_022719
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	2.0	U	10.0	11.9		ug/L		119	52 - 129	7	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*63 - 125*

QC Association Summary

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

TestAmerica Job ID: 240-108737-1

GC/MS VOA

Analysis Batch: 370526

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108737-1	MW-100S_022719	Total/NA	Water	8260B SIM	
240-108737-2	MW-107S_022719	Total/NA	Water	8260B SIM	
240-108737-3	MW-106S_022719	Total/NA	Water	8260B SIM	
240-108737-4	MW-96S_022719	Total/NA	Water	8260B SIM	
MB 240-370526/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-370526/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-108737-4 MS	MW-96S_022719	Total/NA	Water	8260B SIM	
240-108737-4 MSD	MW-96S_022719	Total/NA	Water	8260B SIM	

Analysis Batch: 370691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108737-5	TRIP BLANK	Total/NA	Water	8260B	
MB 240-370691/6	Method Blank	Total/NA	Water	8260B	
LCS 240-370691/4	Lab Control Sample	Total/NA	Water	8260B	
MRL 240-370691/5	Lab Control Sample	Total/NA	Water	8260B	

Analysis Batch: 371049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-108737-1	MW-100S_022719	Total/NA	Water	8260B	
240-108737-2	MW-107S_022719	Total/NA	Water	8260B	
240-108737-3	MW-106S_022719	Total/NA	Water	8260B	
240-108737-4	MW-96S_022719	Total/NA	Water	8260B	
MB 240-371049/6	Method Blank	Total/NA	Water	8260B	
LCS 240-371049/4	Lab Control Sample	Total/NA	Water	8260B	
240-108820-C-1 MS	Matrix Spike	Total/NA	Water	8260B	
240-108820-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

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

TestAmerica Job ID: 240-108737-1

Client Sample ID: MW-100S_022719
Lab Sample ID: 240-108737-1
Date Collected: 02/27/19 16:15
Matrix: Water
Date Received: 03/01/19 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	371049	03/11/19 13:10	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370526	03/06/19 14:37	SAM	TAL CAN

Client Sample ID: MW-107S_022719
Lab Sample ID: 240-108737-2
Date Collected: 02/27/19 10:28
Matrix: Water
Date Received: 03/01/19 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	371049	03/11/19 13:33	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370526	03/06/19 15:02	SAM	TAL CAN

Client Sample ID: MW-106S_022719
Lab Sample ID: 240-108737-3
Date Collected: 02/27/19 12:05
Matrix: Water
Date Received: 03/01/19 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	371049	03/11/19 13:55	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370526	03/06/19 15:27	SAM	TAL CAN

Client Sample ID: MW-96S_022719
Lab Sample ID: 240-108737-4
Date Collected: 02/27/19 14:37
Matrix: Water
Date Received: 03/01/19 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	371049	03/11/19 14:17	LEE	TAL CAN
Total/NA	Analysis	8260B SIM		1	370526	03/06/19 15:52	SAM	TAL CAN

Client Sample ID: TRIP BLANK
Lab Sample ID: 240-108737-5
Date Collected: 02/27/19 00:00
Matrix: Water
Date Received: 03/01/19 08:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	370691	03/07/19 16:39	LRW	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: 240-108737-1

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.

MICHIGAN
190

2.C/C2.4

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

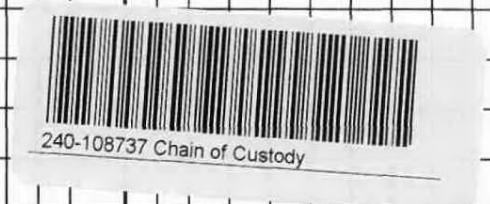
TestAmerica Laboratory location: Brighton — 10448 Citation Drive, Suite 200 / Brighton, MI 48116 / 810-229-2763

Regulatory program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

TestAmerica Laboratories, Inc.

Client Contact	Client Project Manager: Kris Hinskey	Site Contact: Angela DeGrandis	Lab Contact: Mike DelMonico	COC No:
Company Name: Arcadis				
Address: 28550 Cabot Drive, Suite 500	Telephone: 248-994-2240	Telephone: 734-320-0065	Telephone: 330-497-9396	1 of 1 COCs
City/State/Zip: Novi, MI, 48377	Email: kristoffer.hinskey@arcadis.com	Analysis Turnaround Time	Analyses	For lab use only
Phone: 248-994-2240		TAT if different from below: ☐ 3 weeks ☑ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		Walk-in client:
Project Name: Ford LTP		10 day		Lab sampling:
Project Number: ~~MI001454.0004.00002~~ MI001454.0006.00003	Method of Shipment/Carrier:			Job/SDG No:
PO # ~~MI001454.0004.00002~~ MI001454.0006.00003	Shipping/Tracking No:			

Sample Identification	Sample Date	Sample Time	Matrix: Air	Aqueous	Sediment	Solid	Other:	Containers & Preservatives: H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Unpres	Other:	Filtered Sample (Y/N)	Composite=C / Grab=G	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				Sample Specific Notes / Special Instructions:
MW-100S_022719	2/27/19	1615		X						X					N	G	X	V	X	V	X	X	3				3 VOAS FOR 8260SIM 3 VOAS FOR 8260B 6 VOAS TOTAL FOR EACH WELL
MW-107S_022719	2/27/19	1028		X						X					N	G	X	X	X	X	X	X	3				
MW-106S_022719	2/27/19	1205		X						X					N	G	X	X	X	X	X	X	3				
MW-96S_022719	2/27/19	1437		X						X					N	G	X	X	X	X	X	X	3				
TRIP BLANK				X																							



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:

Submit all results through Cadena at jim.tomalia@cadena.com. Cadena #E203631
Level IV Reporting.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
RACHEL BIELAK Paul Bielak	ARCADIS	2/27/19 1815	NOVI COLD STORAGE	ARCADIS	2/27/19 1815
Caitlin O'Neill	ARCADIS	02/28/19 13:45		TESTAMERICA	2/28/19 1345
	TESTAMERICA	2/28/19 16:10	Received in Laboratory by:	TAL	3-1-19 815

TestAmerica Canton Sample Receipt Form/Narrative **Login # :** 108737
Canton Facility

Client Arcadis Site Name

Cooler Received on 3-1-19 Opened on 3-1-19

Cooler unpacked by:

FedEx: 1st (Grd) Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

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

TestAmerica Cooler # 7A 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. 2.6 °C Corrected Cooler Temp. 2.4 °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? ● ⬅ Larger than this. Yes No (NA)
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # A837707VB (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: MS

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: ____