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ANALYTICAL REPORT

Eurofins TestAmerica, Canton
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Tel: (330)497-9396

Laboratory Job ID: 240-112939-1
Client Project/Site: Ford LTP Livonia MI - E203631

For:
ARCADIS U.S., Inc.
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Attn: Kristoffer Hinskey

Authorized for release by:
5/31/2019 4:11:15 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. Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
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.
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: 240-112939-1

Laboratory: Eurofins TestAmerica, Canton

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 240-112939-1

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.

Eurofins TestAmerica, Canton attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins 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 Eurofins TestAmerica and its client.

RECEIPT

The samples were received on 5/18/2019 10:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.8º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples MW-79SR_051519 (240-112939-1), MW-79D_051519 (240-112939-2), MW-75D_051519 (240-112939-3) and TRIP BLANK (240-112939-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 05/26/2019 and 05/28/2019.

1,2-Dichloroethane-d4 (Surr) failed the surrogate recovery criteria high for MW-79SR_051519 (240-112939-1), MW-75D_051519 (240-112939-3), TRIP BLANK (240-112939-4) and MB 240-383174/6.

1,2-Dichloroethane-d4 (Surr) and Dibromofluoromethane (Surr) failed the surrogate recovery criteria high for MW-79D_051519 (240-112939-2). Refer to the QC report for details.

Surrogate recovery for the following samples was outside the upper control limit. This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed: MW-79SR_051519 (240-112939-1), MW-79D_051519 (240-112939-2), MW-75D_051519 (240-112939-3), TRIP BLANK (240-112939-4) and (MB 240-383174/6).

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

Job ID: 240-112939-1 (Continued)

Laboratory: Eurofins TestAmerica, Canton (Continued)

VOLATILE ORGANIC COMPOUNDS (GCMS SIM)

Samples MW-79SR_051519 (240-112939-1), MW-79D_051519 (240-112939-2) and MW-75D_051519 (240-112939-3) were analyzed for volatile organic compounds (GCMS SIM) in accordance with EPA SW-846 Method 8260B SIM. The samples were analyzed on 05/22/2019.

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.
Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

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 = Eurofins 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

Job ID: 240-112939-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
240-112939-1	MW-79SR_051519	Water	05/15/19 14:15	05/20/19 10:15	
240-112939-2	MW-79D_051519	Water	05/15/19 15:55	05/20/19 10:15	
240-112939-3	MW-75D_051519	Water	05/15/19 17:35	05/18/19 10:15	
240-112939-4	TRIP BLANK	Water	05/15/19 00:00	05/18/19 10:15	

Detection Summary

Client: ARCADIS U.S., Inc.
Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: MW-79SR_051519 — Lab Sample ID: 240-112939-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.36	J	1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: MW-79D_051519 — Lab Sample ID: 240-112939-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	0.99	J	2.0	0.86	ug/L	1		8260B SIM	Total/NA
Vinyl chloride	2.6		1.0	0.20	ug/L	1		8260B	Total/NA

Client Sample ID: MW-75D_051519 — Lab Sample ID: 240-112939-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,4-Dioxane	1.5	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: TRIP BLANK — Lab Sample ID: 240-112939-4

No Detections.

This Detection Summary does not include radiochemical test results.

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

Job ID: 240-112939-1

Client Sample ID: MW-79SR_051519
Date Collected: 05/15/19 14:15
Date Received: 05/20/19 10:15

Lab Sample ID: 240-112939-1
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			05/22/19 00:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*63 - 125*		*05/22/19 00:33*	*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			05/26/19 19:37	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/26/19 19:37	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/26/19 19:37	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/26/19 19:37	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/26/19 19:37	1
Vinyl chloride	**0.36**	**J**	1.0	0.20	ug/L			05/26/19 19:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*123*	*X*	*70 - 121*		*05/26/19 19:37*	*1*
4-Bromofluorobenzene (Surr)	*77*		*59 - 120*		*05/26/19 19:37*	*1*
Toluene-d8 (Surr)	*102*		*70 - 123*		*05/26/19 19:37*	*1*
Dibromofluoromethane (Surr)	*121*		*75 - 128*		*05/26/19 19:37*	*1*

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

Job ID: 240-112939-1

Client Sample ID: MW-79D_051519
Date Collected: 05/15/19 15:55
Date Received: 05/20/19 10:15

Lab Sample ID: 240-112939-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	0.99	J	2.0	0.86	ug/L			05/22/19 00:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*63 - 125*		*05/22/19 00:58*	*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			05/26/19 19:59	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/26/19 19:59	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/26/19 19:59	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/26/19 19:59	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/26/19 19:59	1
Vinyl chloride	2.6		1.0	0.20	ug/L			05/28/19 20:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*133*	*X*	*70 - 121*		*05/26/19 19:59*	*1*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 121*		*05/28/19 20:13*	*1*
4-Bromofluorobenzene (Surr)	*78*		*59 - 120*		*05/26/19 19:59*	*1*
4-Bromofluorobenzene (Surr)	*99*		*59 - 120*		*05/28/19 20:13*	*1*
Toluene-d8 (Surr)	*104*		*70 - 123*		*05/26/19 19:59*	*1*
Toluene-d8 (Surr)	*89*		*70 - 123*		*05/28/19 20:13*	*1*
Dibromofluoromethane (Surr)	*129*	*X*	*75 - 128*		*05/26/19 19:59*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 128*		*05/28/19 20:13*	*1*

Client Sample ID: MW-75D_051519
Lab Sample ID: 240-112939-3

Date Collected: 05/15/19 17:35
Matrix: Water
Date Received: 05/18/19 10:15

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dioxane	**1.5**	**J**	2.0	0.86	ug/L			05/22/19 01:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*118*		*63 - 125*		*05/22/19 01:23*	*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			05/26/19 20:21	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/26/19 20:21	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/26/19 20:21	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/26/19 20:21	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/26/19 20:21	1
Vinyl chloride	**1.7**		1.0	0.20	ug/L			05/28/19 20:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*125*	*X*	*70 - 121*		*05/26/19 20:21*	*1*
1,2-Dichloroethane-d4 (Surr)	*102*		*70 - 121*		*05/28/19 20:38*	*1*
4-Bromofluorobenzene (Surr)	*77*		*59 - 120*		*05/26/19 20:21*	*1*
4-Bromofluorobenzene (Surr)	*91*		*59 - 120*		*05/28/19 20:38*	*1*
Toluene-d8 (Surr)	*99*		*70 - 123*		*05/26/19 20:21*	*1*
Toluene-d8 (Surr)	*88*		*70 - 123*		*05/28/19 20:38*	*1*
Dibromofluoromethane (Surr)	*124*		*75 - 128*		*05/26/19 20:21*	*1*
Dibromofluoromethane (Surr)	*98*		*75 - 128*		*05/28/19 20:38*	*1*

Client: ARCADIS U.S., Inc.
Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: TRIP BLANK
Lab Sample ID: 240-112939-4
Date Collected: 05/15/19 00:00
Matrix: Water
Date Received: 05/18/19 10:15

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			05/26/19 20:43	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/26/19 20:43	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/26/19 20:43	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/26/19 20:43	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/26/19 20:43	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/26/19 20:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*129*	*X*	*70 - 121*		*05/26/19 20:43*	*1*
4-Bromofluorobenzene (Surr)	*76*		*59 - 120*		*05/26/19 20:43*	*1*
Toluene-d8 (Surr)	*101*		*70 - 123*		*05/26/19 20:43*	*1*
Dibromofluoromethane (Surr)	*128*		*75 - 128*		*05/26/19 20:43*	*1*

Surrogate Summary

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

Job ID: 240-112939-1

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)
240-112740-A-1 MS	Matrix Spike	98	96	92	96
240-112740-A-1 MSD	Matrix Spike Duplicate	95	99	91	102
240-112939-1	MW-79SR_051519	123 X	77	102	121
240-112939-2	MW-79D_051519	133 X	78	104	129 X
240-112939-2	MW-79D_051519	89	99	89	104
240-112939-3	MW-75D_051519	125 X	77	99	124
240-112939-3	MW-75D_051519	102	91	88	98
240-112939-4	TRIP BLANK	129 X	76	101	128
240-112949-D-1 MS	Matrix Spike	111	105	116	112
240-112949-E-1 MSD	Matrix Spike Duplicate	116	110	122	116
LCS 240-383174/4	Lab Control Sample	107	107	116	107
LCS 240-383279/4	Lab Control Sample	94	94	92	106
MB 240-383174/6	Method Blank	123 X	80	104	117
MB 240-383279/6	Method Blank	98	96	96	104

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)
240-112939-1	MW-79SR_051519	112
240-112939-2	MW-79D_051519	115
240-112939-3	MW-75D_051519	118
240-112950-A-1 MS	Matrix Spike	114
240-112950-A-1 MSD	Matrix Spike Duplicate	111
LCS 240-382402/4	Lab Control Sample	109
MB 240-382402/5	Method Blank	105

Surrogate Legend

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

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

Lab Sample ID: MB 240-383174/6
Matrix: Water
Analysis Batch: 383174

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			05/26/19 16:42	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/26/19 16:42	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/26/19 16:42	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/26/19 16:42	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/26/19 16:42	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/26/19 16:42	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*123*	*X*	*70 - 121*		*05/26/19 16:42*	*1*
4-Bromofluorobenzene (Surr)	*80*		*59 - 120*		*05/26/19 16:42*	*1*
Toluene-d8 (Surr)	*104*		*70 - 123*		*05/26/19 16:42*	*1*
Dibromofluoromethane (Surr)	*117*		*75 - 128*		*05/26/19 16:42*	*1*

Lab Sample ID: LCS 240-383174/4
Matrix: Water
Analysis Batch: 383174

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	7.94		ug/L		79	65 - 139
cis-1,2-Dichloroethene	10.0	9.67		ug/L		97	76 - 128
Tetrachloroethene	10.0	8.80		ug/L		88	74 - 130
trans-1,2-Dichloroethene	10.0	10.2		ug/L		102	78 - 133
Trichloroethene	10.0	7.94		ug/L		79	76 - 125
Vinyl chloride	10.0	9.10		ug/L		91	58 - 143

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*70 - 121*
4-Bromofluorobenzene (Surr)	*107*		*59 - 120*
Toluene-d8 (Surr)	*116*		*70 - 123*
Dibromofluoromethane (Surr)	*107*		*75 - 128*

Lab Sample ID: 240-112949-D-1 MS
Matrix: Water
Analysis Batch: 383174

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	8.18		ug/L		82	53 - 140
cis-1,2-Dichloroethene	1.0	U	10.0	9.63		ug/L		96	64 - 130
Tetrachloroethene	1.0	U	10.0	8.42		ug/L		84	51 - 136
trans-1,2-Dichloroethene	1.0	U	10.0	10.3		ug/L		103	68 - 133
Trichloroethene	1.0	U	10.0	7.92		ug/L		79	55 - 131
Vinyl chloride	1.0	U	10.0	8.76		ug/L		88	43 - 154

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*111*		*70 - 121*
4-Bromofluorobenzene (Surr)	*105*		*59 - 120*
Toluene-d8 (Surr)	*116*		*70 - 123*

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

Lab Sample ID: 240-112949-D-1 MS
Matrix: Water
Analysis Batch: 383174

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

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Dibromofluoromethane (Surr)	*112*		*75 - 128*

Lab Sample ID: 240-112949-E-1 MSD
Matrix: Water
Analysis Batch: 383174

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	9.01		ug/L		90	53 - 140	10	35
cis-1,2-Dichloroethene	1.0	U	10.0	10.2		ug/L		102	64 - 130	6	21
Tetrachloroethene	1.0	U	10.0	8.96		ug/L		90	51 - 136	6	23
trans-1,2-Dichloroethene	1.0	U	10.0	11.0		ug/L		110	68 - 133	7	24
Trichloroethene	1.0	U	10.0	8.37		ug/L		84	55 - 131	6	23
Vinyl chloride	1.0	U	10.0	9.62		ug/L		96	43 - 154	9	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*116*		*70 - 121*
4-Bromofluorobenzene (Surr)	*110*		*59 - 120*
Toluene-d8 (Surr)	*122*		*70 - 123*
Dibromofluoromethane (Surr)	*116*		*75 - 128*

Lab Sample ID: MB 240-383279/6
Matrix: Water
Analysis Batch: 383279

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			05/28/19 15:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.16	ug/L			05/28/19 15:16	1
Tetrachloroethene	1.0	U	1.0	0.15	ug/L			05/28/19 15:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.19	ug/L			05/28/19 15:16	1
Trichloroethene	1.0	U	1.0	0.10	ug/L			05/28/19 15:16	1
Vinyl chloride	1.0	U	1.0	0.20	ug/L			05/28/19 15:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 121*		*05/28/19 15:16*	*1*
4-Bromofluorobenzene (Surr)	*96*		*59 - 120*		*05/28/19 15:16*	*1*
Toluene-d8 (Surr)	*96*		*70 - 123*		*05/28/19 15:16*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 128*		*05/28/19 15:16*	*1*

Lab Sample ID: LCS 240-383279/4
Matrix: Water
Analysis Batch: 383279

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	10.8		ug/L		108	65 - 139
cis-1,2-Dichloroethene	10.0	10.1		ug/L		101	76 - 128
Tetrachloroethene	10.0	10.3		ug/L		103	74 - 130
trans-1,2-Dichloroethene	10.0	10.6		ug/L		106	78 - 133
Trichloroethene	10.0	10.8		ug/L		108	76 - 125

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

Lab Sample ID: LCS 240-383279/4
Matrix: Water
Analysis Batch: 383279

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Vinyl chloride			10.0	10.5		ug/L		105	58 - 143		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 121*
4-Bromofluorobenzene (Surr)	*94*		*59 - 120*
Toluene-d8 (Surr)	*92*		*70 - 123*
Dibromofluoromethane (Surr)	*106*		*75 - 128*

Lab Sample ID: 240-112740-A-1 MS
Matrix: Water
Analysis Batch: 383279

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		
cis-1,2-Dichloroethene	15		133	147		ug/L		99	64 - 130		
Tetrachloroethene	13	U	133	131		ug/L		98	51 - 136		
trans-1,2-Dichloroethene	13	U	133	130		ug/L		97	68 - 133		
Trichloroethene	260		133	394		ug/L		97	55 - 131		
Vinyl chloride	13	U	133	148		ug/L		111	43 - 154		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 121*
4-Bromofluorobenzene (Surr)	*96*		*59 - 120*
Toluene-d8 (Surr)	*92*		*70 - 123*
Dibromofluoromethane (Surr)	*96*		*75 - 128*

Lab Sample ID: 240-112740-A-1 MSD
Matrix: Water
Analysis Batch: 383279

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
cis-1,2-Dichloroethene	15		133	150		ug/L		101	64 - 130	2	21
Tetrachloroethene	13	U	133	132		ug/L		99	51 - 136	0	23
trans-1,2-Dichloroethene	13	U	133	131		ug/L		98	68 - 133	1	24
Trichloroethene	260		133	420		ug/L		117	55 - 131	6	23
Vinyl chloride	13	U	133	144		ug/L		108	43 - 154	3	29

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 121*
4-Bromofluorobenzene (Surr)	*99*		*59 - 120*
Toluene-d8 (Surr)	*91*		*70 - 123*
Dibromofluoromethane (Surr)	*102*		*75 - 128*

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

Lab Sample ID: MB 240-382402/5
Matrix: Water
Analysis Batch: 382402

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			05/21/19 16:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*63 - 125*		*05/21/19 16:35*	*1*

Lab Sample ID: LCS 240-382402/4
Matrix: Water
Analysis Batch: 382402

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	11.2		ug/L		112	59 - 131		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*109*		*63 - 125*

Lab Sample ID: 240-112950-A-1 MS
Matrix: Water
Analysis Batch: 382402

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	2.0	U	10.0	10.5		ug/L		105	52 - 129		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*114*		*63 - 125*

Lab Sample ID: 240-112950-A-1 MSD
Matrix: Water
Analysis Batch: 382402

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	2.0	U	10.0	10.7		ug/L		107	52 - 129	1	13

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*111*		*63 - 125*

QC Association Summary

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

Job ID: 240-112939-1

GC/MS VOA

Analysis Batch: 382402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112939-1	MW-79SR_051519	Total/NA	Water	8260B SIM	
240-112939-2	MW-79D_051519	Total/NA	Water	8260B SIM	
240-112939-3	MW-75D_051519	Total/NA	Water	8260B SIM	
MB 240-382402/5	Method Blank	Total/NA	Water	8260B SIM	
LCS 240-382402/4	Lab Control Sample	Total/NA	Water	8260B SIM	
240-112950-A-1 MS	Matrix Spike	Total/NA	Water	8260B SIM	
240-112950-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B SIM	

Analysis Batch: 383174

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112939-1	MW-79SR_051519	Total/NA	Water	8260B	
240-112939-2	MW-79D_051519	Total/NA	Water	8260B	
240-112939-3	MW-75D_051519	Total/NA	Water	8260B	
240-112939-4	TRIP BLANK	Total/NA	Water	8260B	
MB 240-383174/6	Method Blank	Total/NA	Water	8260B	
LCS 240-383174/4	Lab Control Sample	Total/NA	Water	8260B	
240-112949-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
240-112949-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Analysis Batch: 383279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-112939-2	MW-79D_051519	Total/NA	Water	8260B	
240-112939-3	MW-75D_051519	Total/NA	Water	8260B	
MB 240-383279/6	Method Blank	Total/NA	Water	8260B	
LCS 240-383279/4	Lab Control Sample	Total/NA	Water	8260B	
240-112740-A-1 MS	Matrix Spike	Total/NA	Water	8260B	
240-112740-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: MW-79SR_051519
Lab Sample ID: 240-112939-1
Date Collected: 05/15/19 14:15
Matrix: Water
Date Received: 05/20/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383174	05/26/19 19:37	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	382402	05/22/19 00:33	SAM	TAL CAN

Client Sample ID: MW-79D_051519
Lab Sample ID: 240-112939-2
Date Collected: 05/15/19 15:55
Matrix: Water
Date Received: 05/20/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383279	05/28/19 20:13	LRW	TAL CAN
Total/NA	Analysis	8260B		1	383174	05/26/19 19:59	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	382402	05/22/19 00:58	SAM	TAL CAN

Client Sample ID: MW-75D_051519
Lab Sample ID: 240-112939-3
Date Collected: 05/15/19 17:35
Matrix: Water
Date Received: 05/18/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383279	05/28/19 20:38	LRW	TAL CAN
Total/NA	Analysis	8260B		1	383174	05/26/19 20:21	LRW	TAL CAN
Total/NA	Analysis	8260B SIM		1	382402	05/22/19 01:23	SAM	TAL CAN

Client Sample ID: TRIP BLANK
Lab Sample ID: 240-112939-4
Date Collected: 05/15/19 00:00
Matrix: Water
Date Received: 05/18/19 10:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	383174	05/26/19 20:43	LRW	TAL CAN

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

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 240-112939-1
Project/Site: Ford LTP Livonia MI - E203631

Laboratory: Eurofins 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 *
Iowa	State Program	7	421	06-01-21
Kansas	NELAP	7	E-10336	04-30-20
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	03-31-20
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

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: Caitlin O'Neill	Lab Contact: Mike DelMonico	COC No:
Company Name: Arcadis				
Address: 28550 Cabot Drive, Suite 500	Telephone: 248-994-2240	Telephone: 248-722-2411	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	10 DAYS	TAT if different from below: ☐ 3 weeks ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		Walk-in client
Project Name: Ford LTP	Method of Shipment/Carrier:	10 day		Lab sampling
Project Number: MI001454.0004.00003	Shipping/Tracking No:			Job/SDG No
PO # MI001454.0004.00003				

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:
[redacted]																								
[redacted]																								
MW-79SR_051519	5/15/19	1415		X						X					N	G	X	X	X	X	X	X	X	6 VOAS
MW-79D_051519	5/15/19	1555		X						X					N	G	X	X	X	X	X	X	X	6 VOAS
MW-75D_051519	5/15/19	1735		X						X					N	G	X	X	X	X	X	X	X	6 VOAS
Trip Blank				X						X														1 VOA

240-112939 Chain of Custody

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

☐ Return to Client ☐ Disp

(A fee may be assessed if samples are retained longer than 1 month)
Archive For ☐ Months

Special Instructions/QC Requirements & Comments:

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

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
[signature]	Arcadis	5/15/19 1845	NOVI Cold Storage	5/15/19 1845	Arcadis
Caitlin O'Neill	ARCADIS	5/17/19 1200	[signature]	ETA	5-17-19/1224
[signature]	ETA	5-17-19 1530	Received in Laboratory by: [signature]	TA	5-18-19 1015

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TestAmerica Canton Sample Receipt Form/Narrative **Login # : 112939**
Canton Facility

Client Arcadis Site Name

Cooler Received on 5-18-19 Opened on 5-18-19

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 # 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. 3.0 °C Corrected Cooler Temp. 2.8 °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# **HC984738**
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 # ____	(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: ____

WI-NC-099