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ANALYTICAL REPORT

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Laboratory Job ID: 460-196215-1
Client Project/Site: Ford LTP Livonia MI - E203631

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

Attn: Kristoffer Hinskey

Authorized for release by:
11/22/2019 1:50:04 PM

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Definitions/Glossary

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
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Qualifiers

GC/MS VOA

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

Glossary

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

Job ID: 460-196215-1

Laboratory: Eurofins TestAmerica, Edison

Narrative

CASE NARRATIVE

Client: ARCADIS U.S., Inc.

Project: Ford LTP Livonia MI - E203631

Report Number: 460-196215-1

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, Edison 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 11/9/2019 11:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5º C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples Trip Blank (460-196215-1), MW-81_110719 (460-196215-2), MW-81S_110719 (460-196215-3), MW-82D_110719 (460-196215-4), MW-82SR_110719 (460-196215-5), MW-133S_110719 (460-196215-6) and DUP-01 (460-196215-7) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260C. The samples were analyzed on 11/17/2019.

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

VOLATILE ORGANIC COMPOUNDS (GC/MS)

Samples MW-81_110719 (460-196215-2), MW-81S_110719 (460-196215-3), MW-82D_110719 (460-196215-4), MW-82SR_110719 (460-196215-5), MW-133S_110719 (460-196215-6) and DUP-01 (460-196215-7) were analyzed for Volatile organic compounds (GC/MS) in accordance with SW-846 Method 8260C SIM. The samples were analyzed on 11/16/2019.

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

Detection Summary

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: Trip Blank — Lab Sample ID: 460-196215-1

No Detections.

Client Sample ID: MW-81_110719 — Lab Sample ID: 460-196215-2

No Detections.

Client Sample ID: MW-81S_110719 — Lab Sample ID: 460-196215-3

No Detections.

Client Sample ID: MW-82D_110719 — Lab Sample ID: 460-196215-4

No Detections.

Client Sample ID: MW-82SR_110719 — Lab Sample ID: 460-196215-5

No Detections.

Client Sample ID: MW-133S_110719 — Lab Sample ID: 460-196215-6

No Detections.

Client Sample ID: DUP-01 — Lab Sample ID: 460-196215-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: Trip Blank
Lab Sample ID: 460-196215-1
Date Collected: 11/07/19 14:57
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 01:18	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 01:18	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 01:18	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 01:18	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 01:18	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 01:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*74 - 132*		*11/17/19 01:18*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*11/17/19 01:18*	*1*
Dibromofluoromethane (Surr)	*101*		*72 - 131*		*11/17/19 01:18*	*1*
4-Bromofluorobenzene	*99*		*77 - 124*		*11/17/19 01:18*	*1*

Client Sample ID: MW-81_110719
Lab Sample ID: 460-196215-2
Date Collected: 11/07/19 10:32
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 11:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*94*		*72 - 133*		*11/16/19 11:06*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 03:54	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 03:54	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 03:54	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 03:54	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 03:54	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 03:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*74 - 132*		*11/17/19 03:54*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*11/17/19 03:54*	*1*
Dibromofluoromethane (Surr)	*102*		*72 - 131*		*11/17/19 03:54*	*1*
4-Bromofluorobenzene	*100*		*77 - 124*		*11/17/19 03:54*	*1*

Client Sample ID: MW-81S_110719
Lab Sample ID: 460-196215-3
Date Collected: 11/07/19 11:22
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 11:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*93*		*72 - 133*		*11/16/19 11:29*	*1*

Client Sample ID: MW-81S_110719
Lab Sample ID: 460-196215-3
Date Collected: 11/07/19 11:22
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 04:16	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 04:16	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 04:16	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 04:16	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 04:16	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 04:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*74 - 132*		*11/17/19 04:16*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*11/17/19 04:16*	*1*
Dibromofluoromethane (Surr)	*99*		*72 - 131*		*11/17/19 04:16*	*1*
4-Bromofluorobenzene	*96*		*77 - 124*		*11/17/19 04:16*	*1*

Client Sample ID: MW-82D_110719
Lab Sample ID: 460-196215-4
Date Collected: 11/07/19 12:32
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 09:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*110*		*72 - 133*		*11/16/19 09:56*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 04:38	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 04:38	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 04:38	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 04:38	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 04:38	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 04:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*74 - 132*		*11/17/19 04:38*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*11/17/19 04:38*	*1*
Dibromofluoromethane (Surr)	*103*		*72 - 131*		*11/17/19 04:38*	*1*
4-Bromofluorobenzene	*104*		*77 - 124*		*11/17/19 04:38*	*1*

Client Sample ID: MW-82SR_110719
Lab Sample ID: 460-196215-5
Date Collected: 11/07/19 13:32
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 11:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*97*		*72 - 133*		*11/16/19 11:53*	*1*

Client Sample ID: MW-82SR_110719
Lab Sample ID: 460-196215-5
Date Collected: 11/07/19 13:32
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 05:01	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 05:01	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 05:01	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 05:01	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 05:01	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 05:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*74 - 132*		*11/17/19 05:01*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*11/17/19 05:01*	*1*
Dibromofluoromethane (Surr)	*98*		*72 - 131*		*11/17/19 05:01*	*1*
4-Bromofluorobenzene	*95*		*77 - 124*		*11/17/19 05:01*	*1*

Client Sample ID: MW-133S_110719
Lab Sample ID: 460-196215-6
Date Collected: 11/07/19 14:57
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 12:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*94*		*72 - 133*		*11/16/19 12:16*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 05:23	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 05:23	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 05:23	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 05:23	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 05:23	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 05:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*74 - 132*		*11/17/19 05:23*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*11/17/19 05:23*	*1*
Dibromofluoromethane (Surr)	*99*		*72 - 131*		*11/17/19 05:23*	*1*
4-Bromofluorobenzene	*99*		*77 - 124*		*11/17/19 05:23*	*1*

Client Sample ID: DUP-01
Lab Sample ID: 460-196215-7
Date Collected: 11/07/19 00:00
Matrix: Water
Date Received: 11/09/19 11:30

Method: 8260C 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	0.33	ug/L			11/16/19 12:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene	*94*		*72 - 133*		*11/16/19 12:39*	*1*

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

Job ID: 460-196215-1

Client Sample ID: DUP-01
Date Collected: 11/07/19 00:00
Date Received: 11/09/19 11:30

Lab Sample ID: 460-196215-7
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	1.0	U	1.0	0.26	ug/L			11/17/19 05:45	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 05:45	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 05:45	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 05:45	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 05:45	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 05:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*74 - 132*		*11/17/19 05:45*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*11/17/19 05:45*	*1*
Dibromofluoromethane (Surr)	*98*		*72 - 131*		*11/17/19 05:45*	*1*
4-Bromofluorobenzene	*99*		*77 - 124*		*11/17/19 05:45*	*1*

Surrogate Summary

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

Job ID: 460-196215-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(74-132)	(80-120)	(72-131)	(77-124)
460-196215-1	Trip Blank	101	102	101	99
460-196215-2	MW-81_110719	100	103	102	100
460-196215-3	MW-81S_110719	96	99	99	96
460-196215-4	MW-82D_110719	100	106	103	104
460-196215-4 MS	MW-82D-MS_110719	95	99	97	98
460-196215-4 MSD	MW-82D-MSD_110719	98	102	101	103
460-196215-5	MW-82SR_110719	94	98	98	95
460-196215-6	MW-133S_110719	97	102	99	99
460-196215-7	DUP-01	86	106	98	99
LCS 460-655939/4	Lab Control Sample	96	105	102	100
MB 460-655939/9	Method Blank	98	103	101	100

Surrogate Legend

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

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

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(72-133)
460-196215-2	MW-81_110719	94
460-196215-3	MW-81S_110719	93
460-196215-4	MW-82D_110719	110
460-196215-4 MS	MW-82D-MS_110719	101
460-196215-4 MSD	MW-82D-MSD_110719	97
460-196215-5	MW-82SR_110719	97
460-196215-6	MW-133S_110719	94
460-196215-7	DUP-01	94
LCS 460-655852/4	Lab Control Sample	93
MB 460-655852/8	Method Blank	91

Surrogate Legend

BFB = 4-Bromofluorobenzene

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 460-655939/9
Matrix: Water
Analysis Batch: 655939

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	0.26	ug/L			11/17/19 00:12	1
cis-1,2-Dichloroethene	1.0	U	1.0	0.22	ug/L			11/17/19 00:12	1
Tetrachloroethene	1.0	U	1.0	0.25	ug/L			11/17/19 00:12	1
trans-1,2-Dichloroethene	1.0	U	1.0	0.24	ug/L			11/17/19 00:12	1
Trichloroethene	1.0	U	1.0	0.31	ug/L			11/17/19 00:12	1
Vinyl chloride	1.0	U	1.0	0.17	ug/L			11/17/19 00:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*74 - 132*		*11/17/19 00:12*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*11/17/19 00:12*	*1*
Dibromofluoromethane (Surr)	*101*		*72 - 131*		*11/17/19 00:12*	*1*
4-Bromofluorobenzene	*100*		*77 - 124*		*11/17/19 00:12*	*1*

Lab Sample ID: LCS 460-655939/4
Matrix: Water
Analysis Batch: 655939

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	20.0	20.1		ug/L		101	74 - 123
cis-1,2-Dichloroethene	20.0	18.7		ug/L		94	80 - 120
Tetrachloroethene	20.0	19.6		ug/L		98	78 - 122
trans-1,2-Dichloroethene	20.0	19.6		ug/L		98	79 - 120
Trichloroethene	20.0	19.3		ug/L		97	77 - 120
Vinyl chloride	20.0	23.1		ug/L		116	62 - 138

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*74 - 132*
Toluene-d8 (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*72 - 131*
4-Bromofluorobenzene	*100*		*77 - 124*

Lab Sample ID: 460-196215-4 MS
Matrix: Water
Analysis Batch: 655939

Client Sample ID: MW-82D-MS_110719
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	20.0	19.5		ug/L		98	74 - 123
cis-1,2-Dichloroethene	1.0	U	20.0	18.9		ug/L		94	80 - 120
Tetrachloroethene	1.0	U	20.0	18.8		ug/L		94	78 - 122
trans-1,2-Dichloroethene	1.0	U	20.0	20.1		ug/L		101	79 - 120
Trichloroethene	1.0	U	20.0	19.0		ug/L		95	77 - 120
Vinyl chloride	1.0	U	20.0	23.3		ug/L		117	62 - 138

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*74 - 132*
Toluene-d8 (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*72 - 131*

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

Lab Sample ID: 460-196215-4 MS
Matrix: Water
Analysis Batch: 655939

Client Sample ID: MW-82D-MS_110719
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene	*98*		*77 - 124*

Lab Sample ID: 460-196215-4 MSD
Matrix: Water
Analysis Batch: 655939

Client Sample ID: MW-82D-MSD_110719
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	20.0	18.6		ug/L		93	74 - 123	5	30
cis-1,2-Dichloroethene	1.0	U	20.0	17.8		ug/L		89	80 - 120	6	30
Tetrachloroethene	1.0	U	20.0	18.8		ug/L		94	78 - 122	0	30
trans-1,2-Dichloroethene	1.0	U	20.0	18.9		ug/L		95	79 - 120	6	30
Trichloroethene	1.0	U	20.0	19.0		ug/L		95	77 - 120	0	30
Vinyl chloride	1.0	U	20.0	22.4		ug/L		112	62 - 138	4	30

Surrogate	MSD %Recovery	MSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	*98*		*74 - 132*
Toluene-d8 (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*72 - 131*
4-Bromofluorobenzene	*103*		*77 - 124*

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

Lab Sample ID: MB 460-655852/8
Matrix: Water
Analysis Batch: 655852

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	0.33	ug/L			11/16/19 09:10	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	*91*		*72 - 133*		*11/16/19 09:10*	*1*

Lab Sample ID: LCS 460-655852/4
Matrix: Water
Analysis Batch: 655852

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0500	0.10	U	ug/L		102	10 - 150
Chloroform	0.0500	0.10	U	ug/L		113	59 - 150
1,2,3-Trichloropropane	0.0500	0.0472		ug/L		94	63 - 133

Surrogate	LCS %Recovery	LCS Qualifier	Limits
4-Bromofluorobenzene	*93*		*72 - 133*

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

Job ID: 460-196215-1

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

Lab Sample ID: 460-196215-4 MS
Matrix: Water
Analysis Batch: 655852

Client Sample ID: MW-82D-MS_110719
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene	0.10	U	0.0500	0.10	U	ug/L		NC	10 - 150		
Chloroform	0.10	U	0.0500	0.10	U	ug/L		NC	59 - 150		
1,2,3-Trichloropropane	0.030	U	0.0500	0.0515		ug/L		103	63 - 133		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene	*101*		*72 - 133*

Lab Sample ID: 460-196215-4 MSD
Matrix: Water
Analysis Batch: 655852

Client Sample ID: MW-82D-MSD_110719
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	0.10	U	0.0500	0.10	U	ug/L		NC	10 - 150	NC	30
Chloroform	0.10	U	0.0500	0.10	U	ug/L		NC	59 - 150	NC	30
1,2,3-Trichloropropane	0.030	U	0.0500	0.0554		ug/L		111	63 - 133	7	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene	*97*		*72 - 133*

GC/MS VOA

Analysis Batch: 655852

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-196215-2	MW-81_110719	Total/NA	Water	8260C SIM	
460-196215-3	MW-81S_110719	Total/NA	Water	8260C SIM	
460-196215-4	MW-82D_110719	Total/NA	Water	8260C SIM	
460-196215-5	MW-82SR_110719	Total/NA	Water	8260C SIM	
460-196215-6	MW-133S_110719	Total/NA	Water	8260C SIM	
460-196215-7	DUP-01	Total/NA	Water	8260C SIM	
MB 460-655852/8	Method Blank	Total/NA	Water	8260C SIM	
LCS 460-655852/4	Lab Control Sample	Total/NA	Water	8260C SIM	
460-196215-4 MS	MW-82D-MS_110719	Total/NA	Water	8260C SIM	
460-196215-4 MSD	MW-82D-MSD_110719	Total/NA	Water	8260C SIM	

Analysis Batch: 655939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-196215-1	Trip Blank	Total/NA	Water	8260C	
460-196215-2	MW-81_110719	Total/NA	Water	8260C	
460-196215-3	MW-81S_110719	Total/NA	Water	8260C	
460-196215-4	MW-82D_110719	Total/NA	Water	8260C	
460-196215-5	MW-82SR_110719	Total/NA	Water	8260C	
460-196215-6	MW-133S_110719	Total/NA	Water	8260C	
460-196215-7	DUP-01	Total/NA	Water	8260C	
MB 460-655939/9	Method Blank	Total/NA	Water	8260C	
LCS 460-655939/4	Lab Control Sample	Total/NA	Water	8260C	
460-196215-4 MS	MW-82D-MS_110719	Total/NA	Water	8260C	
460-196215-4 MSD	MW-82D-MSD_110719	Total/NA	Water	8260C	

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: Trip Blank
Lab Sample ID: 460-196215-1
Date Collected: 11/07/19 14:57
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 01:18	VBP	TAL EDI

Client Sample ID: MW-81_110719
Lab Sample ID: 460-196215-2
Date Collected: 11/07/19 10:32
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 03:54	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 11:06	KLB	TAL EDI

Client Sample ID: MW-81S_110719
Lab Sample ID: 460-196215-3
Date Collected: 11/07/19 11:22
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 04:16	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 11:29	KLB	TAL EDI

Client Sample ID: MW-82D_110719
Lab Sample ID: 460-196215-4
Date Collected: 11/07/19 12:32
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 04:38	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 09:56	KLB	TAL EDI

Client Sample ID: MW-82SR_110719
Lab Sample ID: 460-196215-5
Date Collected: 11/07/19 13:32
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 05:01	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 11:53	KLB	TAL EDI

Client Sample ID: MW-133S_110719
Lab Sample ID: 460-196215-6
Date Collected: 11/07/19 14:57
Matrix: Water
Date Received: 11/09/19 11:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 05:23	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 12:16	KLB	TAL EDI

Lab Chronicle

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
Project/Site: Ford LTP Livonia MI - E203631

Client Sample ID: DUP-01
Date Collected: 11/07/19 00:00
Date Received: 11/09/19 11:30

Lab Sample ID: 460-196215-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	655939	11/17/19 05:45	VBP	TAL EDI
Total/NA	Analysis	8260C SIM		1	655852	11/16/19 12:39	KLB	TAL EDI

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
Project/Site: Ford LTP Livonia MI - E203631

Laboratory: Eurofins TestAmerica, Edison

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

Authority	Program	Identification Number	Expiration Date
Connecticut	State	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State	<cert No.>	12-31-21
Georgia	State	12028 (NJ)	06-30-20
New Jersey	NELAP	12028	06-30-20
New York	NELAP	11452	04-01-20
Pennsylvania	NELAP	68-00522	02-28-20
Rhode Island	State	LAO00132	12-30-19
USDA	US Federal Programs	P330-18-00135	05-03-21

Laboratory: Eurofins TestAmerica, Canton

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

Authority	Program	Identification Number	Expiration Date
California	State	2927	02-23-20
Connecticut	State	PH-0590	12-31-19
Florida	NELAP	E87225	06-30-20
Georgia	State	4062	02-23-20
Illinois	NELAP	004498	07-31-20
Iowa	State	421	06-01-20
Kansas	NELAP	E-10336	04-30-20
Kentucky (UST)	State	112225	02-23-20
Kentucky (WW)	State	KY98016	12-31-19
Minnesota	NELAP	OH00048	12-31-19
Minnesota (Petrofund)	State Program	3506	07-31-21
New Jersey	NELAP	OH001	06-30-20
New York	NELAP	10975	03-31-20
Ohio VAP	State	CL0024	06-05-21
Oregon	NELAP	4062	02-23-20
Pennsylvania	NELAP	68-00340	08-31-20
Texas	NELAP	T104704517-18-10	08-31-20
USDA	US Federal Programs	P330-16-00404	12-28-19
Virginia	NELAP	010101	09-14-20
Washington	State	C971	01-12-20
West Virginia DEP	State	210	12-31-19

Method Summary

Client: ARCADIS U.S., Inc.
Job ID: 460-196215-1
Project/Site: Ford LTP Livonia MI - E203631

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

Protocol References:

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

Laboratory References:

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

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

Job ID: 460-196215-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
460-196215-1	Trip Blank	Water	11/07/19 14:57	11/09/19 11:30	
460-196215-2	MW-81_110719	Water	11/07/19 10:32	11/09/19 11:30	
460-196215-3	MW-81S_110719	Water	11/07/19 11:22	11/09/19 11:30	
460-196215-4	MW-82D_110719	Water	11/07/19 12:32	11/09/19 11:30	
460-196215-5	MW-82SR_110719	Water	11/07/19 13:32	11/09/19 11:30	
460-196215-6	MW-133S_110719	Water	11/07/19 14:57	11/09/19 11:30	
460-196215-7	DUP-01	Water	11/07/19 00:00	11/09/19 11:30	

MICHIGAN 190

Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

11/22/2019

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

TestAmerica Laboratories, Inc.

Regulatory program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other

Client Contact	Client Project Manager: Kris Hinskey	Site Contact: Rachel Bielak	Lab Contact: Mike DelMonico	COC No: 19615
Company Name: Arcadis				(of COCs
Address: 28550 Cabot Drive, Suite 500	Telephone: 248-994-2240	Telephone: 248-946-6331	Telephone: 330-497-9396	For lab use only
City/State/Zip: Novi, MI, 48377	Email: kristoffer.hinskey@arcadis.com	Analysis Turnaround Time		Walk-in client
Phone: 248-994-2240	Sampler Name: HEATHER WOODRUM	TAT if different from below: ☐ 3 weeks ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day		Lab sampling
Project Name: Ford LTP Off-Site	Method of Shipment/Carrier:	10 day		Job/SDG No:
Project Number: 30016346.0002B	Shipping/Tracking No:			
PO # 30016346.0002B				

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	Analyses: 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:
TRIP BLANK	—	—		X						X					N	G	X	X	X	X	X	X	X					1
MW-81_110719	11/7/19	1032		X						X					N	G	X	X	X	X	X	X	X					2
MW-81S_110719	11/7/19	1122		X						X					N	G	X	X	X	X	X	X	X					3
MW-82D_110719	11/7/19	1232		X						X					N	G	X	X	X	X	X	X	X					4
MW-82D_MS_110719	11/7/19	1232		X						X					N	G	X	X	X	X	X	X	X					4
MW-82D_MSD_110719	11/7/19	1232		X						X					N	G	X	X	X	X	X	X	X					4
MW-82SR_110719	11/7/19	1532		X						X					N	G	X	X	X	X	X	X	X					5
MW-1335_110719	11/7/19	1457		X						X					N	G	X	X	X	X	X	X	X					6
DUP-01	11/7/19	—		X						X					N	G	X	X	X	X	X	X	X					7

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 requested.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Heather Woodrum	Arcadis	11/7/19 1625	Novi Cold Storage	ARCADIS	11/7/19 1625
Rachel Bielak	ARCADIS	11/8/19 1226	Jen Hardy	ETA	11-8-19 1226
Jen Hardy	ETA	11-8-19 1341	Received in Laboratory by: Usarch D	ETA	Date/Time: 11-8-19 1130

VIA Fedex IR9 25°C

1093508

460-196215 Chain of Custody

Eurofins TestAmerica Edison
Receipt Temperature and pH Log

Job Number: 196215

Number of Coolers: 1 IR Gun # 9

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	2.5 ℃	2.5 ℃	Cooler #4:	℃	℃	Cooler #7:	℃	℃
Cooler #2:	℃	℃	Cooler #5:	℃	℃	Cooler #8:	℃	℃
Cooler #3:	℃	℃	Cooler #6:	℃	℃	Cooler #9:	℃	℃

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals* (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

* *Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.*

Initials: SD Date: 11/9/19

Login Sample Receipt Checklist

Client: ARCADIS U.S., Inc.

Job Number: 460-196215-1

Login Number: 196215
List Number: 1
Creator: DiGuardia, Joseph L

List Source: Eurofins TestAmerica, Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	CS# 1093508
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	