FULCRUM
environmental consulting

MEMORANDUM

DATE	November 11, 2015
TO	Rodger Noel, Noel Corporation
FROM	Ryan K. Mathews, CIH, CHMM, Principal
RE	**Southgate Shopping Center – Vapor Intrusion Monitoring**
SUBJECT	Indoor Air Quality Sampling In-Progress Summary

Fulcrum Environmental Consulting, Inc. (Fulcrum) has completed five Indoor Air Sampling events during 2015 of localized areas of the Southgate Shopping Center located in Yakima, Washington. The purpose of sampling was to evaluate indoor air concentrations for tetrachloroethene (PCE) and associated breakdown or daughter products connected to the former Southgate Laundry.

Background

Sub-slab concentrations were evaluated during the initial 1990s site investigation. For comparative purposes, Fulcrum reviewed the historic sub-slab data and determined that the 1990s data represented worst-case concentrations. Sub-slab sampling was followed by initial indoor air sampling in April 2014 which identified elevated levels of tetrachloroethene (PCE), trichloroethene (TCE), and trans-1,2-Dichloroethene, with the maximum PCE concentration measured at 25.5 $\mu g/m^3$.

No building areas lay immediately downgradient of the tenant spaces with respect to reported groundwater flow. Similarly, no utilities at the three tenant spaces are known to have changed since completion of the investigation and interim actions in the 1990s.

Routes of potential vapor intrusion into the indoor air include releases from the concrete slab, movement through cracks and seams in the concrete slabs, and around piping penetrations, etc. During Spring 2015, the former Southgate Laundry space was renovated prior to occupancy by Boost Mobile. As a portion of the agreed new tenant improvements, existing carpet floor coverings were removed and replaced. Following good practices, noticeable cracks were sealed and a concrete sealant was applied prior to the installation of the new floor coverings.

Sampling Approach

The vapor intrusion monitoring approach consist of testing air quality with the former Southgate Laundry tenant space on a monthly schedule and adjacent spaces quarterly. Fulcrum April 2014 testing did not identify presence of contaminants in the adjacent spaces above applicable Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Method B Cancer based risk level for indoor air.

Air Sampling Events

Sampling events were completed on June 24, July 23, August 25, September 29, and November 10, 2015. Fulcrum utilized industry standard of care, including those of the industrial hygiene and indoor air quality

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406 North 2nd Street
Yakima, Washington 98901
efulcrum.net

industry and as specified in the U.S. Environmental Protection Agency Method TO-151, for the collection of 24-hour air samples.[1]

Air samples were collected with 6-liter Summa canisters with an approximate 24-hour sampling regulator per the sampling process specified in EPA's TO-15 methodology. A Summa canister is used to maintain a sub-atmospheric pressure resulting in vacuum sampling wherein the canister is opened to the atmosphere; the differential pressure causes the sample air to flow into the canister. The Summa canisters are reusable stainless steel containment vessels that are certified clean and purged with nitrogen prior to reuse.

The Summa canister sampling process consists of attaching the sampling regulator to the canister, recording the starting pressure on the regulator, opening the valve, allowing the air sample to be collected, recording the ending pressure, closing the valve, and removing the regulator from the canister. The canisters are each uniquely labeled with a manufacturer's serial number to aid in identification.

Air sampling was completed during standard operation of the tenant. No effort was made to modify the heating, ventilation, and air conditioning (HVAC) system operations from their settings and schedules with the exception of Fulcrum's recommendation to complete a recent change to a pleated activated charcoal filter installed in the former Southgate Laundry central ventilation system prior to the June 24, 2015 sampling event. Filters are scheduled for replacement on about a quarterly basis. Fulcrum has not notified facility maintenance staff of the sampling schedule or requested replaced of charcoal filters prior to the sample event(s).

Results

Samples were submitted by commercial carrier under chain-of-custody to Fremont Analytical, Inc. (Fremont) of Seattle, Washington for analysis by EPA Method TO-15. All laboratory results and regulatory criteria are reported in micrograms per cubic meter ($\mu g/m^3$). No 1,1-Dichloroetlene (DCE), cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, or Vinyl Chloride have been identified in any of the collected air samples.

Concentration of tetrachloroethene (PCE) and trichloroethene (TCE) have been below the MTCA Method B Cancer based risk level for indoor air, including the MTCA levels for PCE of 9.62 $\mu g/m^3$ and TCE of 0.37 $\mu g/m^3$, during each of the five 2015 sampling events. See Table 1 for a summary of all laboratory results.

Furthermore, as compared to the 2014 sampling results, indoor air concentrations of PCE have dropped 99.9% since the April 2014 sampling event. TCE, previously present in both the former Southgate Laundry and the Wray's spaces was not detected during all three events at the method reporting limit.

If you have any questions, please contact me at 509.574.0839.

[1] *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*, Second Edition, (EPA/625/R-96/010b), *Compendium Method TO-15, Denervation of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed y Gas Chromatography/Mass Spectrometry (GC/MS)*, Center for Environmental research Information, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio, January 1999.

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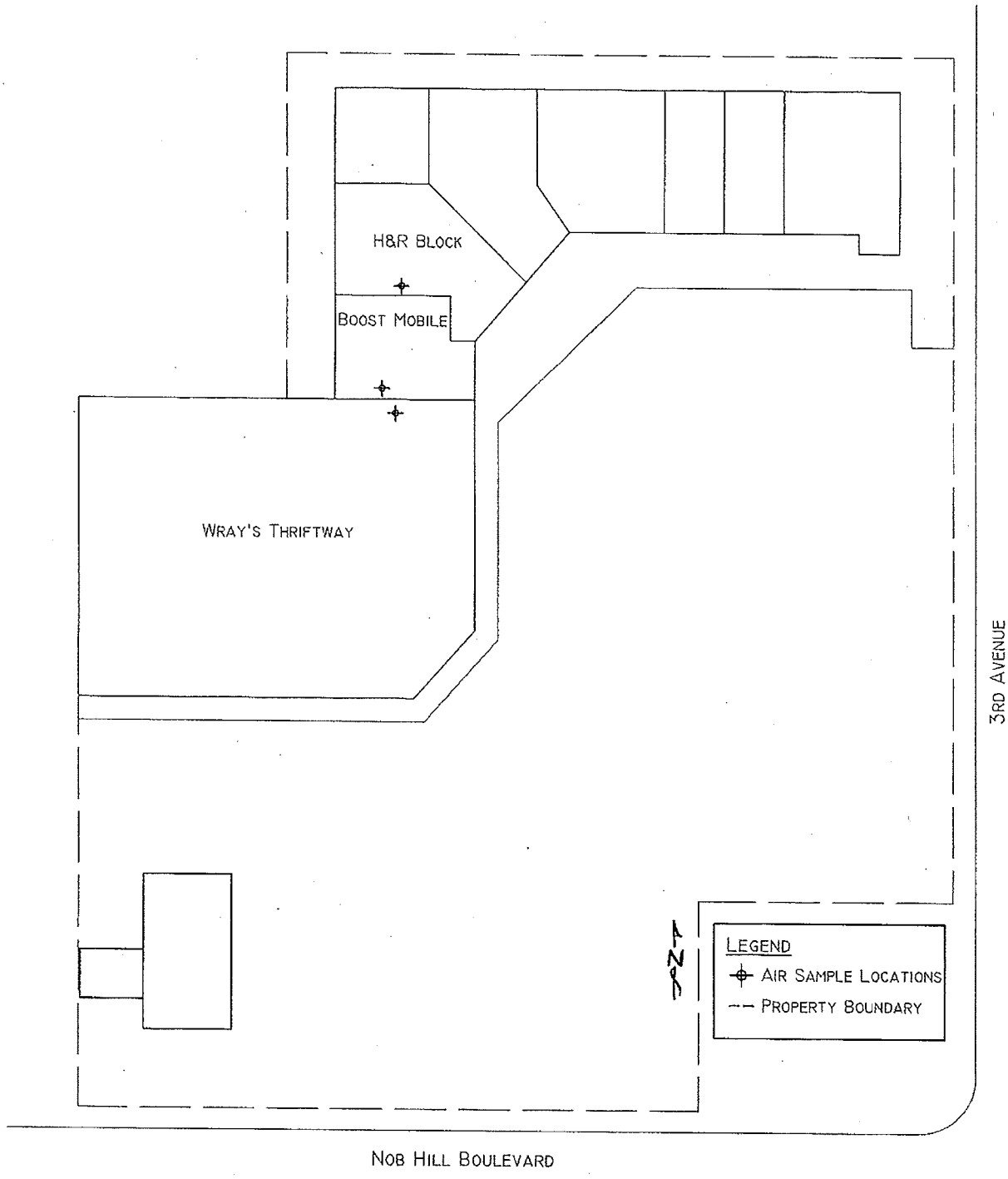
FULCRUM environmental consulting



Fulcrum Environmental Consulting, Inc. 5 North Second Street, Yakima, Washington 98901 t: 509.574.0839 f: 509.575.8453 efulcrum.net Southgate Shopping Center. 141205. ALS. 022515	Southgate Shopping Center 1320 South 3rd Street Yakima, Washington	Site Sampling Locations Map	FIGURE 1

Table 1. Laboratory Analytical Summary

Constituent		1,1-Dichloro ethene (DCE)	cis-1,2-Dichloro ethene	Tetrachloro ethene (PCE)	trans-1,2-Dichloro ethene	Trichloro ethene (TCE)	Vinyl chloride
CAS		*75-35-4*	*156-59-2*	*127-18-4*	*156-60-5*	*79-01-6*	*75-01-4*
June 25, 2015	062515-02 (Boost)	<0.0357	<0.0793	0.594	<0.0238	<0.0914	<0.217
	062515-03 (H&R)	<0.0357	<0.0793	4.48	<0.0238	<0.0914	<0.217
	062515-01 (Wray's)	<0.0357	<0.0793	4.5	<0.0238	<0.0914	<0.217
July 23, 2015	072315-01 (Boost)	<0.0357	<0.0793	0.407	<0.0238	<0.0914	<0.217
August 25, 2015	082515-01 (Boost)	<0.0357	<0.0793	0.356	<0.0238	<0.0914	<0.217
September 29, 2015	092915-01 (Boost)	<0.0357	<0.0793	0.95	<0.0238	<0.0914	<0.217
	092915-02 (H&R)	<0.0357	<0.0793	0.543	<0.0238	<0.0914	<0.217
	092915-03 (Wray's)	<0.0357	<0.0793	3.05	<0.0238	<0.0914	<0.217
November 10, 2015	103015-01 (Boost)	<0.0357	<0.0793	0.543	<0.0238	<0.0914	<0.217
MTCA Method B Cancer Level		-	-	**9.62**	-	**0.37**	**2.8**

3600 Fremont Ave. N.
Seattle, WA 98103
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F: (206) 352-7178
info@fremontanalytical.com

Fulcrum Environmental
Ryan Mathews
406 N. 2nd Street
Yakima, WA 98901

RE: Southgate
Lab ID: 1506306

July 02, 2015

Attention Ryan Mathews:

Fremont Analytical, Inc. received 3 sample(s) on 6/26/2015 for the analyses presented in the following report.

Volatile Organic Compounds-EPA Method TO-15 (SIM)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

Fremont Analytical

Date: *07/02/2015*

CLIENT: Fulcrum Environmental
Project: Southgate
Lab Order: 1506306

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1506306-001	062515-02 (Boost)	06/25/2015 2:06 PM	06/26/2015 2:51 PM
1506306-002	062515-03 (H+R)	06/25/2015 2:11 PM	06/26/2015 2:51 PM
1506306-003	062515-01 (Wrays)	06/25/2015 1:55 PM	06/26/2015 2:51 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below LOQ
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1506306
Project: Southgate

Client Sample ID: 062515-02 (Boost)
Lab ID: 1506306-001A
Sample Type: Summa Canister

Date Sampled: 6/25/2015
Date Received: 6/26/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		TO-15	06/27/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		TO-15	06/27/2015	JY
Tetrachloroethene (PCE)	0.0875	0.594	0.0500	0.339		TO-15	06/27/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		TO-15	06/27/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		TO-15	06/27/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		TO-15	06/27/2015	JY
Surr: 4-Bromofluorobenzene	97.5 %Rec	--	70-130	--		TO-15	06/27/2015	JY

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1506306
Project: Southgate

Client Sample ID: 062515-03 (H+R)
Lab ID: 1506306-002A
Sample Type: Summa Canister

Date Sampled: 6/25/2015
Date Received: 6/26/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst
Volatile Organic Compounds-EPA Method TO-15 (SIM)							
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)			
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		TO-15	06/27/2015 JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		TO-15	06/27/2015 JY
Tetrachloroethene (PCE)	0.660	4.48	0.0500	0.339		TO-15	06/27/2015 JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		TO-15	06/27/2015 JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		TO-15	06/27/2015 JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		TO-15	06/27/2015 JY
Surr: 4-Bromofluorobenzene	94.4 %Rec	--	70-130	--		TO-15	06/27/2015 JY

Client: Fulcrum Environmental
WorkOrder: 1506306
Project: Southgate

Client Sample ID: 062515-01 (Wrays)
Lab ID: 1506306-003A
Sample Type: Summa Canister

Date Sampled: 6/25/2015
Date Received: 6/26/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		TO-15	06/27/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		TO-15	06/27/2015	JY
Tetrachloroethene (PCE)	0.664	4.50	0.0500	0.339		TO-15	06/27/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		TO-15	06/27/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		TO-15	06/27/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		TO-15	06/27/2015	JY
Surr: 4-Bromofluorobenzene	93.5 %Rec	--	70-130	--		TO-15	06/27/2015	JY

Work Order: 1506306
CLIENT: Fulcrum Environmental
Project: Southgate

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID 1506306-001AREP	SampType: REP			Units: ppbv		Prep Date: 6/27/2015		RunNo: 23349		
Client ID: 062515-02 (Boost)	Batch ID: R23349					Analysis Date: 6/27/2015		SeqNo: 442243		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850						0		30	
1,1-Dichloroethene (DCE)	ND	0.00900						0		30	
trans-1,2-Dichloroethene	ND	0.00600						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0170						0		30	
Tetrachloroethene (PCE)	0.0868	0.0500						0.08750	0.803	30	
Surr: 4-Bromofluorobenzene	9.56		10.00		95.6	70	130		0		

Sample ID LCS-R23349	SampType: LCS			Units: ppbv		Prep Date: 6/27/2015		RunNo: 23349		
Client ID: LCSW	Batch ID: R23349					Analysis Date: 6/27/2015		SeqNo: 442247		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.63	0.0850	2.500	0	105	70	130				
1,1-Dichloroethene (DCE)	2.61	0.00900	2.500	0	105	70	130				
trans-1,2-Dichloroethene	2.52	0.00600	2.500	0	101	70	130				
cis-1,2-Dichloroethene	2.66	0.0200	2.500	0	107	70	130				
Trichloroethene (TCE)	2.59	0.0170	2.500	0	104	70	130				
Tetrachloroethene (PCE)	2.71	0.0500	2.500	0	108	70	130				
Surr: 4-Bromofluorobenzene	10.4		10.00		104	70	130				

Sample ID MB-R23349	SampType: MBLK			Units: ppbv		Prep Date: 6/27/2015		RunNo: 23349		
Client ID: MBLKW	Batch ID: R23349					Analysis Date: 6/27/2015		SeqNo: 442248		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850									
1,1-Dichloroethene (DCE)	ND	0.00900									
trans-1,2-Dichloroethene	ND	0.00600									
cis-1,2-Dichloroethene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0170									
Tetrachloroethene (PCE)	ND	0.0500									

Fremont Analytical

Date: 7/2/2015

Work Order: 1506306
CLIENT: Fulcrum Environmental
Project: Southgate

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID	MB-R23349	SampType:	MBLK		Units:	ppbv	Prep Date:	6/27/2015	RunNo:	23349		
Client ID:	MBLKW	Batch ID:	R23349				Analysis Date:	6/27/2015	SeqNo:	442248		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Surr: 4-Bromofluorobenzene	9.74		10.00		97.4	70	130					

Fremont Analytical

Sample Log-In Check List

Client Name:	FE	Work Order Number:	1506306
Logged by:	Erica Silva	Date Received:	6/26/2015 2:51:00 PM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air samples		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical

Air Chain of Custody Record - Whole Air Sample

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Laboratory Project No (internal): 1506306

Date: 6/25/2015

Page: 1 of: 1

Client: Fulcrum Environmental Consulting, Inc.
Address: 4806 North 2nd Street
City, State, Zip: Yakima, WA 98901
Telephone: 509.574.0859 Fax:

Project Name: Southgate
Project No: 141285
Collected by: A. Steffen
Location: Yakima, WA
Report To (PM): Ryan Mathews
PM Email: rmathews@efulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Plume Mapping Q = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag 8V = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HI = Glass Headspace Jar

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Internal: Evacuation Pressure (mtorr)	Internal: Pressure at Time of Pick-up (" Hg)	Internal: Equipment Certification Code	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis Requested	Internal: Receipt Date	Internal: Final (psi)
1	062515-02 (Boost)	12669	6.25.15	I	23 hr	6L	Summa	10mtorr			29	3	1,1-Dichloroethene (DCE)	6/26/15	-4
		FR8-01	1400					5/27/15 10:30			1526	1406	cis-1,2 Dichloroethene Tetrachloroethene (PCE)		
2	062515-03 (HHP)	13973	6.25.15	I	23 hr	6L	Summa	10mtorr			28.5	0	trans-1,2 Dichloroethene Trichloroethene (TCE) Vinyl chloride	6/26/15	-2
		FR8-03	1411					5/27/15 10:30			1541	1411			
3	062515-01 (Wraps)	17244	6.25.15	I	23 hr	6L	Summa	10mtorr			29.5	0	by EPA Method TO-15 (SIM)	6/26/15	0
		FR8-07	1355					5/27/15 10:30			1514	1355			
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags (Canisters) (Flow Controllers) Helium Cylinder Floundated Tubing (Wrench)

Condition:

Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks:
Please cc results to:
nhepner@efulcrum.net

Relinquished x: Billy Steffe Date/Time: 6.25.15 @ 1600

Relinquished x: Date/Time:

Relinquished x: Date/Time: 6/26/15 1451

TAT → (STD) Rush (specify)

3600 Fremont Ave. N.
Seattle, WA 98103
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F: (206) 352-7178
info@fremontanalytical.com

Fulcrum Environmental
Ryan Mathews
406 N. 2nd Street
Yakima, WA 98901

RE: Southgate Shopping Center Vapor Intrusion
Lab ID: 1507258

July 31, 2015

Attention Ryan Mathews:

Fremont Analytical, Inc. received 1 sample(s) on 7/24/2015 for the analyses presented in the following report.

Volatile Organic Compounds-EPA Method TO-15 (SIM)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

CC:
Norm Hepner

Fremont Analytical

Date: *07/31/2015*

CLIENT: Fulcrum Environmental
Project: Southgate Shopping Center Vapor Intrusion
Lab Order: 1507258

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1507258-001	072315-01 (Boost)	07/22/2015 3:40 PM	07/24/2015 1:06 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Fulcrum Environmental
Project: Southgate Shopping Center Vapor Intrusion

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below LOQ
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1507258
Project: Southgate Shopping Center Vapor Intrusion

Client Sample ID: 072315-01 (Boost)
Lab ID: 1507258-001A
Sample Type: Summa Canister

Date Sampled: 7/22/2015
Date Received: 7/24/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		TO-15	07/28/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		TO-15	07/28/2015	JY
Tetrachloroethene (PCE)	0.0600	0.407	0.0500	0.339		TO-15	07/28/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		TO-15	07/28/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		TO-15	07/28/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		TO-15	07/28/2015	JY
Surr: 4-Bromofluorobenzene	104 %Rec	--	70-130	--		TO-15	07/28/2015	JY

Fremont Analytical

Date: 7/31/2015

Work Order: 1507258
CLIENT: Fulcrum Environmental
Project: Southgate Shopping Center Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID 1507214-001AREP	SampType: REP	Units: ppbv	Prep Date: 7/28/2015	RunNo: 23864
Client ID: BATCH	Batch ID: R23864		Analysis Date: 7/28/2015	SeqNo: 452043

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850						0		30	
1,1-Dichloroethene (DCE)	ND	0.00900						0		30	
trans-1,2-Dichloroethene	ND	0.00600						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0170						0		30	
Tetrachloroethene (PCE)	0.210	0.0500						0.2100	0	30	
Surr: 4-Bromofluorobenzene	10.3		10.00		103	70	130		0		

Sample ID LCS-R23864	SampType: LCS	Units: ppbv	Prep Date: 7/28/2015	RunNo: 23864
Client ID: LCSW	Batch ID: R23864		Analysis Date: 7/28/2015	SeqNo: 452045

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.91	0.0850	2.500	0	116	70	130				
1,1-Dichloroethene (DCE)	3.03	0.00900	2.500	0	121	70	130				
trans-1,2-Dichloroethene	3.09	0.00600	2.500	0	124	70	130				
cis-1,2-Dichloroethene	3.07	0.0200	2.500	0	123	70	130				
Trichloroethene (TCE)	3.19	0.0170	2.500	0	128	70	130				
Tetrachloroethene (PCE)	2.98	0.0500	2.500	0	119	70	130				
Surr: 4-Bromofluorobenzene	9.78		10.00		97.8	70	130				

Sample ID MB 400 2-2	SampType: MBLK	Units: ppbv	Prep Date: 7/28/2015	RunNo: 23864
Client ID: MBLKW	Batch ID: R23864		Analysis Date: 7/28/2015	SeqNo: 452046

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850									
1,1-Dichloroethene (DCE)	ND	0.00900									
trans-1,2-Dichloroethene	ND	0.00600									
cis-1,2-Dichloroethene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0170									
Tetrachloroethene (PCE)	ND	0.0500									

Fremont Analytical

Date: 7/31/2015

Work Order: 1507258
CLIENT: Fulcrum Environmental
Project: Southgate Shopping Center Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID	MB 400 2-2	SampType:	MBLK			Units:	ppbv	Prep Date:	7/28/2015		RunNo:	23864	
Client ID:	MBLKW	Batch ID:	R23864					Analysis Date:	7/28/2015		SeqNo:	452046	
Analyte		Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Surr: 4-Bromofluorobenzene		9.81		10.00		98.1	70	130					

Fremont Analytical

Sample Log-In Check List

Client Name:	FE	Work Order Number:	1507258
Logged by:	Erica Silva	Date Received:	7/24/2015 1:06:00 PM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air sample		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103

Tel: 206-352-3790
Fax: 206-352-7178

Air Chain of Custody Record - Whole Air Sample

Laboratory Project No (internal): 1507258

Date: 7.23.15

Page: 1 of: 1

Client: Fulcrum Environmental Consulting, Inc.
Address: 406 N. 2nd St.
City, State, Zip: Yakima, WA
Telephone: 509.574.0839
Fax:

Project Name: Southgate Shopping Center Vapor Intrusion
Project No: 14120S
Collected by: A. Steffen
Location: Yakima WA
Reports To (PM): Ryan Mathews
Email (PM): rmathews@efulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Plume Mapping Q = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag BV = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HJ = Glass Headspace Jar

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Evacuation Pressure (mtorr) (Internal)	Pressure at Time of Pick-up ("Hg) (Internal)	Equipment Certification Code (Internal)	Field Initial Sample Pressure ("Hg)	Field Final Sample Pressure ("Hg)	Analysis Requested	Receipt Date (Internal)	Final Pressure ("Hg) (Internal)
1	072315-01 (Boost)	17238 FR6-25	7/22/15 15:40 7/24/15	I	24hr	6L	Summa	10 mtorr 7/20/15 0:00			30	2	1,1-Dichloroethene (DCE) cis-1,2 Dichloroethene Tetrachloroethene (PCE) trans-1,2 Dichloroethene Trichloroethene (TCE) Vinyl Chloride by EPA Method TO-15 (SIM)	07/24/15	-4-
2															
3															
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags (Canisters) (Flow Controllers) Helium Cylinder Flouridated Tubing (Wrench)

Condition:

Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks: Fill time = 23 hrs 40 min
Please cc: nhepner@efulcrum.net

Relinquished: x [signature] Date/Time: 7.23.15 @ 1600
Relinquished: x [signature] Date/Time: 07/24/15 1306
Relinquished: x Date/Time:
Relinquished: x Date/Time:

TAT → (STD) Rush (specify): ____

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Fulcrum Environmental
Ryan Mathews
406 N. 2nd Street
Yakima, WA 98901

RE: Southgate Vapor Intrusion
Lab ID: 1508293

August 28, 2015

Attention Ryan Mathews:

Fremont Analytical, Inc. received 1 sample(s) on 8/26/2015 for the analyses presented in the following report.

Volatile Organic Compounds-EPA Method TO-15 (SIM)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

Fremont Analytical

Date: *08/28/2015*

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion
Lab Order: 1508293

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1508293-001	082515-01 (Boost)	08/25/2015 2:55 PM	08/26/2015 2:00 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Fremont Analytical

Case Narrative

WO#: **1508293**
Date: **8/28/2015**

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below LOQ
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1508293
Project: Southgate Vapor Intrusion

Client Sample ID: 082515-01 (Boost)
Lab ID: 1508293-001A
Sample Type: Summa Canister

Date Sampled: 8/25/2015
Date Received: 8/26/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		TO-15	08/27/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		TO-15	08/27/2015	JY
Tetrachloroethene (PCE)	0.0525	0.356	0.0500	0.339		TO-15	08/27/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		TO-15	08/27/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		TO-15	08/27/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		TO-15	08/27/2015	JY
Surr: 4-Bromofluorobenzene	119 %Rec	--	70-130	--		TO-15	08/27/2015	JY

Work Order: 1508293
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID: LCS-R24574	SampType: LCS			Units: ppbv		Prep Date: 8/27/2015		RunNo: 24574		
Client ID: LCSW	Batch ID: R24574					Analysis Date: 8/27/2015		SeqNo: 463154		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.47	0.0850	2.500	0	98.7	70	130				
1,1-Dichloroethene (DCE)	2.61	0.00900	2.500	0	104	70	130				
trans-1,2-Dichloroethene	2.26	0.00600	2.500	0	90.3	70	130				
cis-1,2-Dichloroethene	2.55	0.0200	2.500	0	102	70	130				
Trichloroethene (TCE)	2.76	0.0170	2.500	0	111	70	130				
Tetrachloroethene (PCE)	2.46	0.0500	2.500	0	98.6	70	130				
Surr: 4-Bromofluorobenzene	11.8		10.00		118	70	130				

Sample ID: MB-R24574	SampType: MBLK			Units: ppbv		Prep Date: 8/27/2015		RunNo: 24574		
Client ID: MBLKW	Batch ID: R24574					Analysis Date: 8/27/2015		SeqNo: 463155		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850									
1,1-Dichloroethene (DCE)	ND	0.00900									
trans-1,2-Dichloroethene	ND	0.00600									
cis-1,2-Dichloroethene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0170									
Tetrachloroethene (PCE)	ND	0.0500									
Surr: 4-Bromofluorobenzene	11.7		10.00		117	70	130				

Sample ID: 1508262-001AREP	SampType: REP			Units: ppbv		Prep Date: 8/27/2015		RunNo: 24574		
Client ID: BATCH	Batch ID: R24574					Analysis Date: 8/27/2015		SeqNo: 463148		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850						0		30	
1,1-Dichloroethene (DCE)	ND	0.00900						0		30	
trans-1,2-Dichloroethene	ND	0.00600						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0170						0		30	
Tetrachloroethene (PCE)	ND	0.0500						0		30	

Work Order: 1508293
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID: 1508262-001AREP	SampType: REP			Units: ppbv		Prep Date: 8/27/2015		RunNo: 24574		
Client ID: BATCH	Batch ID: R24574					Analysis Date: 8/27/2015		SeqNo: 463148		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	10.5		10.00		105	70	130		0		

Fremont Analytical

Sample Log-In Check List

Client Name:	FE	Work Order Number:	1508293
Logged by:	Clare Griggs	Date Received:	8/26/2015 2:00:00 PM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air Sample		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Air Chain of Custody Record - Whole Air Sample

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 8.25.15

Laboratory Project No (Internal): 1508293

Page: 1 of: 1

Client: Fulcrum Environmental
Address: 406 North 2nd Street
City, State, Zip: Yakima, WA 98901
Telephone: 509.574.0839 Fax:

Project Name: Eastingate Vapor Intrusion
Project No: 141205.00 Collected by: A. Steffen
Location: Yakima
Reports To (PM): R. Mathews
Email (PM): rmathews@fulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Plume Mapping Q = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag 1V = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HJ = Glass Headspace Jar

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Internal: Evacuation Pressure (inHg)	Internal: Pressure at Time of Pick-up (" Hg)	Internal: Equipment Certification Code	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis Requested	Internal: Receipt Date	Internal: Final Pressure (" Hg)
1	082515-01 (Boost)	17636	8.25.15	I	24hr	6L	Summa	10 inHg			30	0.5	1,1 - Dichloroethene (DCE) cis - 1,2 Dichloroethene Tetrachloroethene (PCE)		-1
		FR8-14	14:55					8/17/15 9:30			15:22	14:55			
2													Vinyl chloride trans-1,2 Dichloroethene Trichloroethene (TCE) by EPA Method TO-15 (SIM)		
3															
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags Canisters Flow Controllers Helium Cylinder Flourinated Tubing Wrench

Condition:

Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks:
Please cc results to:
mhepner@efulcrum.net
asteffen

Relinquished	Date/Time	Relinquished	Date/Time
x [signature]	8/25/15 @ 1600	x [signature]	8/26 @ 1800
Relinquished	Date/Time	Relinquished	Date/Time
x		x	

TAT → STD Rush (specify)

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Fulcrum Environmental
Ryan Mathews
406 N. 2nd Street
Yakima, WA 98901

RE: Southgate Vapor Intrusion
Lab ID: 1510016

October 08, 2015

Attention Ryan Mathews:

Fremont Analytical, Inc. received 3 sample(s) on 10/1/2015 for the analyses presented in the following report.

Volatile Organic Compounds-EPA Method TO-15 (SIM)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

CC:
Ashley Steffen
Norm Hepner

Fremont Analytical

Date: *10/09/2015*

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion
Lab Order: 1510016

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1510016-001	092915-03 (Wrays)	09/29/2015 5:00 PM	10/01/2015 1:16 PM
1510016-002	092915-02 (H&R)	09/29/2015 5:15 PM	10/01/2015 1:16 PM
1510016-003	092915-01 (Boost)	09/29/2015 4:55 PM	10/01/2015 1:16 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Fremont Analytical

Case Narrative

WO#: **1510016**
Date: **10/8/2015**

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below LOQ
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Fulcrum Environmental
WorkOrder: 1510016
Project: Southgate Vapor Intrusion

Client Sample ID: 092915-03 (Wrays)
Lab ID: 1510016-001A
Sample Type: Summa Canister

Date Sampled: 9/29/2015
Date Received: 10/1/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		EPA-TO-15SIM	10/07/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		EPA-TO-15SIM	10/07/2015	JY
Tetrachloroethene (PCE)	0.450	3.05	0.0500	0.339		EPA-TO-15SIM	10/07/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		EPA-TO-15SIM	10/07/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		EPA-TO-15SIM	10/07/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		EPA-TO-15SIM	10/07/2015	JY
Surr: 4-Bromofluorobenzene	92.6 %Rec	--	70-130	--		EPA-TO-15SIM	10/07/2015	JY

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1510016
Project: Southgate Vapor Intrusion

Client Sample ID: 092915-02 (H&R)
Lab ID: 1510016-002A
Sample Type: Summa Canister

Date Sampled: 9/29/2015
Date Received: 10/1/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst
Volatile Organic Compounds-EPA Method TO-15 (SIM)							
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)			
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		EPA-TO-15SIM	10/07/2015 JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		EPA-TO-15SIM	10/07/2015 JY
Tetrachloroethene (PCE)	0.0800	0.543	0.0500	0.339		EPA-TO-15SIM	10/07/2015 JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		EPA-TO-15SIM	10/07/2015 JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		EPA-TO-15SIM	10/07/2015 JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		EPA-TO-15SIM	10/07/2015 JY
Surr: 4-Bromofluorobenzene	93.7 %Rec	--	70-130	--		EPA-TO-15SIM	10/07/2015 JY

Client: Fulcrum Environmental
WorkOrder: 1510016
Project: Southgate Vapor Intrusion

Client Sample ID: 092915-01 (Boost)
Lab ID: 1510016-003A
Sample Type: Summa Canister

Date Sampled: 9/29/2015
Date Received: 10/1/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		EPA-TO-15SIM	10/07/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		EPA-TO-15SIM	10/07/2015	JY
Tetrachloroethene (PCE)	0.140	0.950	0.0500	0.339		EPA-TO-15SIM	10/07/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		EPA-TO-15SIM	10/07/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		EPA-TO-15SIM	10/07/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		EPA-TO-15SIM	10/07/2015	JY
Surr: 4-Bromofluorobenzene	90.3 %Rec	--	70-130	--		EPA-TO-15SIM	10/07/2015	JY

Work Order: 1510016
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID LCS-R25367	SampType: LCS			Units: ppbv		Prep Date: 10/7/2015		RunNo: 25367		
Client ID: LCSW	Batch ID: R25367					Analysis Date: 10/7/2015		SeqNo: 478644		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	2.37	0.0850	2.500	0	94.8	70	130				
1,1-Dichloroethene (DCE)	2.40	0.00900	2.500	0	96.0	70	130				
trans-1,2-Dichloroethene	2.37	0.00600	2.500	0	94.8	70	130				
cis-1,2-Dichloroethene	2.39	0.0200	2.500	0	95.6	70	130				
Trichloroethene (TCE)	2.45	0.0170	2.500	0	98.0	70	130				
Tetrachloroethene (PCE)	2.42	0.0500	2.500	0	96.8	70	130				
Surr: 4-Bromofluorobenzene	10.2		10.00		102	70	130				

Sample ID MB-R25367	SampType: MBLK			Units: ppbv		Prep Date: 10/7/2015		RunNo: 25367		
Client ID: MBLKW	Batch ID: R25367					Analysis Date: 10/7/2015		SeqNo: 478645		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850									
1,1-Dichloroethene (DCE)	ND	0.00900									
trans-1,2-Dichloroethene	ND	0.00600									
cis-1,2-Dichloroethene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0170									
Tetrachloroethene (PCE)	ND	0.0500									
Surr: 4-Bromofluorobenzene	9.17		10.00		91.7	70	130				

Sample ID 1510016-001AREP	SampType: REP			Units: ppbv		Prep Date: 10/7/2015		RunNo: 25367		
Client ID: 092915-03 (Wrays)	Batch ID: R25367					Analysis Date: 10/7/2015		SeqNo: 478636		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850						0		30	
1,1-Dichloroethene (DCE)	ND	0.00900						0		30	
trans-1,2-Dichloroethene	ND	0.00600						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0170						0		30	
Tetrachloroethene (PCE)	0.460	0.0500						0.4500	2.20	30	

Fremont Analytical

Date: *10/8/2015*

Work Order: 1510016
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID **1510016-001AREP**	SampType: **REP**	Units: **ppbv**	Prep Date: **10/7/2015**	RunNo: **25367**
Client ID: **092915-03 (Wrays)**	Batch ID: **R25367**		Analysis Date: **10/7/2015**	SeqNo: **478636**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	9.34		10.00		93.4	70	130		0		

Fremont Analytical

Sample Log-In Check List

Client Name:	FE	Work Order Number:	1510016
Logged by:	Erica Silva	Date Received:	10/1/2015 1:16:00 PM

Chain of Custody

1. Is Chain of Custody complete?	Yes ☐	No ☑	Not Present ☐
2. How was the sample delivered?	UPS		

Log In

3. Coolers are present?	Yes ☐	No ☑	NA ☐
	Air Samples		
4. Shipping container/cooler in good condition?	Yes ☑	No ☐	
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6. Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7. Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8. Sample(s) in proper container(s)?	Yes ☑	No ☐	
9. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10. Are samples properly preserved?	Yes ☑	No ☐	
11. Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12. Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13. Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14. Does paperwork match bottle labels?	Yes ☑	No ☐	
15. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16. Is it clear what analyses were requested?	Yes ☑	No ☐	
17. Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☑ No ☐ NA ☐

Person Notified:	Ahsley Steffen	Date	10/1/2015
By Whom:	Erica Silva	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Sampling dates/times		
Client Instructions:	9/29/15, 16:55, 17:15, and 17:00		

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Air Chain of Custody Record - Whole Air Sample

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: _____

Laboratory Project No (Internal): 1510016

Page: 1 of: 1

Client: Fulcrum Environmental Consulting, Inc.
Address: 406 N. 2nd St.
City, State, Zip: Yakima, WA 98901
Telephone: 509.574.0839 Fax: _____

Project Name: Southgate Vapor Intrusion
Project No: 14205 Collected by: _____
Location: Yakima, WA
Reports To (PM): Ryan Mathews
Email (PM): rmathews@fulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Plume Mapping O = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag BV = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HJ = Glass Headspace Jar

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Internal: Evacuation Pressure (mtorr)	Internal: Pressure at Time of Pick-up (" Hg)	Internal: Equipment Certification Code	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis Requested	Internal: Receipt Date	Internal: Final Pressure ("Hg)
1	092915-01 (Boost)	15422		I	24hr	6L	Summa	10 mtorr			30	2	1,1-Dichloroethene (DCE) cis-1,2 Dichloroethene Tetrachloroethene (PCE)	10/1/15	-10
		FR8-07						9/29/15 12:30			1935	1655			
2	092915-02 (H+R)	15898		I	24hr	6L	Summa	10 mtorr			30	4	trans-1,2 Dichloroethene Trichloroethene (TCE) Vinyl Chloride	10/1/15	-6
		FR8-14						9/29/15 12:30			1809	1715			
3	092915-03 (Wraps)	17242		I	24hr	6L	Summa	10 mtorr			30	9	by EPA Method TO-15 (SIM)	10/1/15	-4
		FR8-25						9/29/15 12:30			1745	1700			
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags Canisters Flow Controllers Helium Cylinder Floundated Tubing Wrench

Conditions: Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks: Please cc: results to: nhepner@fulcrum.net asteffan@fulcrum.net

Relinquished	Date/Time	Received	Date/Time
x Ashley Stoffe	9.30.15 @	x	10/1/15 13:10
Relinquished	Date/Time	Received	Date/Time
x		x	

TAT --> STD Rush (specify)

Updated COC - 10.8.15 ALS

Fremont Analytical

Air Chain of Custody Record - Whole Air Sample

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Laboratory Project No (internal): 1510016

Date:

Page: 1 of: 1

Client: Fulcrum Environmental Consulting, Inc.
Address: 406 N. 2nd St.
City, State, Zip: Yakima, WA 98901
Telephone: 509.574.0839 Fax:

Project Name: Southgate Vapor Intrusion
Project No: 14205 Collected by:
Location: Yakima, WA
Reports To (PM): Ryan Mathews
Email (PM): rmathews@efulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Mixture Matching O = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag BV = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder H = Glass Headspace Jar

Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Evacuation Pressure (Internal)	Pressure at Time of Pick-up ("Hg) (Internal)	Equipment Certification Code (Internal)	Field Initial Sample Pressure ("Hg)	Field Final Sample Pressure ("Hg)	Analysis Requested	Receipt Date (Internal)	Final Pressure ("Hg) (Internal)
1 092915 -01 (Boost)	17242 FR8-25	9.29.15 4:55 pm	I	24hr	6L	Summa	10 mtorr 9/9/15 12:30			30 1735	2 1055	1,1-Dichloroethene (DCE) cis-1,2 Dichloroethene Tetrachloroethene (PCE)	10/1/15	-10
2 092915 -02 (H+R)	15898 FR8-14	9.29.15 5:15 pm	I	24hr	6L	Summa	10 mtorr 9/9/15 12:30			30 1809	4 1715	trans-1,2 Dichloroethene Trichloroethene (TCE) Vinyl Chloride	10/1/15	-6
3 092915 -03 (Wraps)	15422 FR8-07	9.29.15 5:20 pm	I	24hr	6L	Summa	10 mtorr 9/9/15 12:30			30 1745	9 1700	by EPA Method TO-15 (SIM)	10/1/15	-4
4														
5														

Rental equipment (Circle all that apply): Manifold Rain-cap Fittings Tedlar Bags Canisters Flow Controllers Vacuum Cylinder Fluoridated Tubing Wrench

Condition: Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day

Relinquished: Kelly Sapp Date/Time: 9.30.15 @
Received: [signature] Date/Time: 10/1/15 1310
Relinquished: Date/Time:
Received: Date/Time:

Special Remarks:
Please cc results to:
nhepner@efulcrum.net
asteffen

TAT -> STD / Rush specify:

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Air Chain of Custody Record - Whole Air Sample

Laboratory Project No (internal): 1510016

Date: ______

Page: 1 of: 1

Client: Fulcrum Environmental Consulting Inc.
Address: 406 N. 2nd St.
City, State, Zip: Yakima, WA 98901
Telephone: 509.574.0839
Fax:

Project Name: Southgate Vapor Intrusion
Project No: 14205
Collected by:
Location: Yakima, WA
Reports To (PM): Ryan Mathews
Email (PM): rmathews@efulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas VI = Plume Mapping D = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag BV = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HJ = Glass Headspace Jar

#	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Evacuation Pressure (mtorr) (Internal)	Pressure at Time of Pick-up ("Hg) (Internal)	Equipment Certification Code (Internal)	Field Initial Sample Pressure ("Hg)	Field Final Sample Pressure ("Hg)	Analysis Requested	Receipt Date (Internal)	Final Pressure ("Hg) (Internal)
1	092915-03 ~~(Boost)~~ Wraps	15422 / FRB-07	9/29/15 5:00pm	I	24hr	6L	Summa	10 mtorr / 9/9/15 12:30			30 / 1745 ~~1735~~	7 / ~~1655~~ 1700	1,1-Dichloroethene (DCE) cis-1,2 Dichloroethene	10/1/15	-10
2	092915-02 (H+R)	15898 / FRB-14	9/29/15 5:15pm	I	24hr	6L	Summa	10 mtorr / 9/9/15 12:30			30 / 1809	4 / 1715	Tetrachloroethene (PCE) trans-1,2 Dichloroethene Trichloroethene (TCE) Vinyl Chloride	10/1/15	-6
3	092915-03 Boost ~~(Wraps)~~	17242 / FRB-26	9/29/15 4:55pm	I	24hr	6L	Summa	10 mtorr / 9/9/15 12:30			30 / 1755 ~~1745~~	2 / ~~1700~~ 1655	by EPA Method TO-15 (SIM)	10/1/15	-4
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags Canisters Flow Controllers Helium Cylinder Flourinated Tubing Wrench

Condition:

Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Relinquished: x Ashley Sags Date/Time: 9.30.15 @

Received: x [signature] Date/Time: 10/1/15 1310

Relinquished: x Date/Time:

Received: x Date/Time:

Special Remarks: Please cc results to: nhepner@efulcrum.net asteffan

TAT → STD Rush (specify)

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Fulcrum Environmental
Ryan Mathews
406 N. 2nd Street
Yakima, WA 98901

RE: Southgate Vapor Intrusion
Lab ID: 1511105

November 11, 2015

Attention Ryan Mathews:

Fremont Analytical, Inc. received 1 sample(s) on 11/11/2015 for the analyses presented in the following report.

Volatile Organic Compounds-EPA Method TO-15 (SIM)

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Chelsea Ward
Project Manager

Fremont Analytical

Date: *11/11/2015*

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion
Lab Order: 1511105

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1511105-001	111015-01 (Boost)	11/10/2015 12:00 AM	11/11/2015 9:53 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Fremont Analytical

Case Narrative

WO#: **1511105**
Date: **11/11/2015**

CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3.

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Fremont Analytical

Client: Fulcrum Environmental
WorkOrder: 1511105
Project: Southgate Vapor Intrusion

Client Sample ID: 111015-01 (Boost)
Lab ID: 1511105-001A
Sample Type: Summa Canister

Date Sampled: 11/10/2015
Date Received: 11/11/2015

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Volatile Organic Compounds-EPA Method TO-15 (SIM)								
	(ppbv)	(ug/m³)	(ppbv)	(ug/m³)				
1,1-Dichloroethene (DCE)	<0.00900	<0.0357	0.00900	0.0357		EPA-TO-15SIM	11/11/2015	JY
cis-1,2-Dichloroethene	<0.0200	<0.0793	0.0200	0.0793		EPA-TO-15SIM	11/11/2015	JY
Tetrachloroethene (PCE)	0.0800	0.543	0.0500	0.339		EPA-TO-15SIM	11/11/2015	JY
trans-1,2-Dichloroethene	<0.00600	<0.0238	0.00600	0.0238		EPA-TO-15SIM	11/11/2015	JY
Trichloroethene (TCE)	<0.0170	<0.0914	0.0170	0.0914		EPA-TO-15SIM	11/11/2015	JY
Vinyl chloride	<0.0850	<0.217	0.0850	0.217		EPA-TO-15SIM	11/11/2015	JY
Surr: 4-Bromofluorobenzene	102 %Rec	--	70-130	--		EPA-TO-15SIM	11/11/2015	JY

Work Order: 1511105
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID LCS-R26038	SampType: LCS			Units: ppbv		Prep Date: 11/11/2015		RunNo: 26038		
Client ID: LCSW	Batch ID: R26038					Analysis Date: 11/11/2015		SeqNo: 491834		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	1.78	0.0850	2.500	0	71.2	70	130				
1,1-Dichloroethene (DCE)	1.95	0.00900	2.500	0	78.0	70	130				
trans-1,2-Dichloroethene	2.29	0.00600	2.500	0	91.6	70	130				
cis-1,2-Dichloroethene	2.30	0.0200	2.500	0	92.0	70	130				
Trichloroethene (TCE)	2.47	0.0170	2.500	0	98.8	70	130				
Tetrachloroethene (PCE)	2.69	0.0500	2.500	0	108	70	130				
Surr: 4-Bromofluorobenzene	9.84		10.00		98.4	70	130				

Sample ID MB-R26038	SampType: MBLK			Units: ppbv		Prep Date: 11/11/2015		RunNo: 26038		
Client ID: MBLKW	Batch ID: R26038					Analysis Date: 11/11/2015		SeqNo: 491835		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850									
1,1-Dichloroethene (DCE)	ND	0.00900									
trans-1,2-Dichloroethene	ND	0.00600									
cis-1,2-Dichloroethene	ND	0.0200									
Trichloroethene (TCE)	ND	0.0170									
Tetrachloroethene (PCE)	ND	0.0500									
Surr: 4-Bromofluorobenzene	9.85		10.00		98.5	70	130				

Sample ID 1511105-001AREP	SampType: REP			Units: ppbv		Prep Date: 11/11/2015		RunNo: 26038		
Client ID: 111015-01 (Boost)	Batch ID: R26038					Analysis Date: 11/11/2015		SeqNo: 491833		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Vinyl chloride	ND	0.0850						0		30	
1,1-Dichloroethene (DCE)	ND	0.00900						0		30	
trans-1,2-Dichloroethene	ND	0.00600						0		30	
cis-1,2-Dichloroethene	ND	0.0200						0		30	
Trichloroethene (TCE)	ND	0.0170						0		30	
Tetrachloroethene (PCE)	0.0800	0.0500						0.08000	0	30	

Fremont Analytical

Date: *11/11/2015*

Work Order: 1511105
CLIENT: Fulcrum Environmental
Project: Southgate Vapor Intrusion

QC SUMMARY REPORT

Volatile Organic Compounds-EPA Method TO-15 (SIM)

Sample ID **1511105-001AREP**	SampType: **REP**			Units: **ppbv**		Prep Date: **11/11/2015**		RunNo: **26038**		
Client ID: **111015-01 (Boost)**	Batch ID: **R26038**					Analysis Date: **11/11/2015**		SeqNo: **491833**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	10.1		10.00		101	70	130		0		

Fremont Analytical

Sample Log-In Check List

Client Name:	FE	Work Order Number:	1511105
Logged by:	Erica Silva	Date Received:	11/11/2015 9:53:00 AM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	UPS		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air Sample		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☑	Not Required ☐
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Air Chain of Custody Record - Whole Air Sample

Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Laboratory Project No (Internal): 1511105

Date: 11.10.15

Page: 1 of 1

Client: Fulcrum Environmental
Address: 406 North 2nd Street
City, State, Zip: Yakima, WA 98908
Telephone: 509.574.0639 Fax:

Project Name: Southgate Vapor Intrusion
Project No: 141205 Collected by: ALY
Location: Yakima, WA
Reports To (PM): Ryan Mathews
Email (PM): rmathews@efulcrum.net

* Gas Matrix Codes: I = Indoor SS = Subslab L = Landfill SG = Soil Gas M = Plume Mapping Q = Fuel Gas Quality L = LEED (Consult Client Services)

** Container Codes: 6L = Six Liter Canister (Summa) TB = Tedlar Bag 1BV = 1 Liter Bottle Vac MC = 1 Liter MiniCan HP = High Pressure Cylinder HJ = Glass Headspace Jar

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Gas Matrix Code *	Anticipated Fill Time	Sample Volume	Container Type **	Internal: Evacuation Pressure (mtorr)	Internal: Pressure at Time of Pick-up (" Hg)	Internal: Equipment Certification Code	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis Requested	Internal: Receipt Date	Internal: Final Pressure ("Hg)
1	111015-01 (Boost)	15424	11.10.15	I	24hr	6L	Summa	10 mtorr			30	1	1,1 - Dichloroethene (DCE) cis - 1,2 Dichloroethene Tetrachloroethene (PCE)	11/11/15	-2
		FR8-01						10/30/15 10:00			1458	1440			
2													Trans - 1,2 Dichloroethene Trichloroethene (TCE) Vinyl Chloride by EPA Method TO-15 (SIM)		
3															
4															
5															

Rental Equipment (Circle all that apply): Manifold Mini-Pump Fittings Tedlar Bags Canisters Flow Controllers Helium Cylinder Fluoridated Tubing Wrench

Condition:

Seals Intact: Y N N/A

Turn-around times for samples received after 4:00pm will begin on the following business day.

Special Remarks: Please cc results to nhepner@efulcrum.net asteffen

Relinquished: Date/Time: 11.10.15 @1600

Received: Date/Time: 11/11/15 09:53

Relinquished: Date/Time:

Received:

TAT → STD Rush (specify) Same day