

# WHITMAN Environmental Sciences

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November 15, 2019

FedEx Freight, Inc.  
3405 Victor St.  
Santa Clara, CA 95054

Attention: Mr. Chong Lee

Subject: Groundwater Monitoring Summary Report  
Former FedEx Freight, Inc. Seattle Area Terminal  
18221 E. Valley Highway  
Kent, Washington

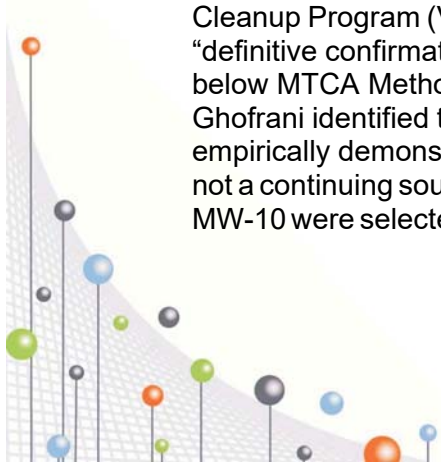
Dear Mr. Lee:

As you requested, Whitman Environmental Sciences (WES) has conducted additional investigation of groundwater conditions at the former FedEx Freight terminal in Kent, Washington (Figure 1). This has included additional groundwater sampling from three of the existing wells at the site and a pump test to evaluate the response to groundwater withdrawal from one of the former recovery wells. This summary letter report is to document the monitoring and testing procedures as well as the laboratory analytical results of our sampling.

## ***Site Background***

The former FedEx Freight terminal in Kent was originally constructed and operated by another trucking company in about 1969. A fueling facility, including underground storage tanks for diesel fuel and gasoline was located near the southern end of the truck shop (Figure 2). Four of the tanks were removed in about 1988 and a release of petroleum to soil and groundwater was discovered at that time. The release was reported to the Washington Department of Ecology. Viking Freight, a predecessor company to FedEx, began occupying the site in about 1992. Extensive site investigation and cleanup efforts were conducted from about 1988 to 1998, including removal of the final diesel fuel tank in 1997. There are no readily available records of activities after 1998, although features on the site that are not documented in the available reports make it clear that further cleanup was conducted.

In 2011, WES was contracted to assess the existing groundwater monitoring wells and obtain groundwater samples. Eleven wells were located and sampled. Four quarterly rounds of groundwater sampling was conducted in 2011 and 2012. After completing the four quarters of monitoring, the site information was submitted to the Washington Department of Ecology Voluntary Cleanup Program (VCP). Ecology issued an opinion letter dated October 23, 2012 and requested "definitive confirmation that the soil and groundwater at the Site are cleaned up to concentrations below MTCA Method A cleanup levels". A subsequent meeting with Ecology site manager Toraj Ghofrani identified the need for additional groundwater monitoring on a limited number of wells to empirically demonstrate that natural attenuation was occurring and that the former tank area was not a continuing source of groundwater contamination. At that meeting, monitoring wells MW-2 and MW-10 were selected as downgradient wells that could be used to demonstrate natural attenuation.



During the 2011-2012 quarterly sampling events, an additional undocumented recovery well was found in a utility vault along the south boundary of the site. For sampling purposes, that well has been designated RW-2, although any prior well I.D. remains unknown.

RW-2 was added to sampling events beginning in December 2012. Since then, at each sampling event, RW-2, MW-2 and MW-10 have been purged and sampled, as wells that are at or downgradient of the former underground storage tank area.

At the time RW-2 was found, it was partially filled with sediment and biological slime. In March 2014 the well was developed using a vacuum truck to remove sediment and improve communication with the surrounding formation. Approximately 5,000 gallons of water was removed from the well and samples were obtained at three stages during the development. This action was documented in WES' April 7, 2014 Well Development and Groundwater Monitoring Report.

Prior groundwater monitoring was last documented in a report dated August 12, 2016, addressing five rounds of testing conducted between March 2015 and March 2016. Since the date of that report WES has conducted additional monitoring, but access to the property has been limited. The site is now owned by BNSF, who removed all of the site buildings and installed new lighting and security infrastructure for their intended uses. Now that construction is complete, WES has again been granted access.

### ***Current Scope of Work***

Beginning in November 2016, WES conducted five additional rounds of sampling, purging and sampling recovery well RW-2 and downgradient monitoring wells MW-2 and MW-10. One additional sampling event limited to RW-2 was also conducted, and the above referenced pump test. In three of the events, samples were taken from RW-2 after different volumes of purge to evaluate the response to pumping.

### ***Groundwater Level Measurements***

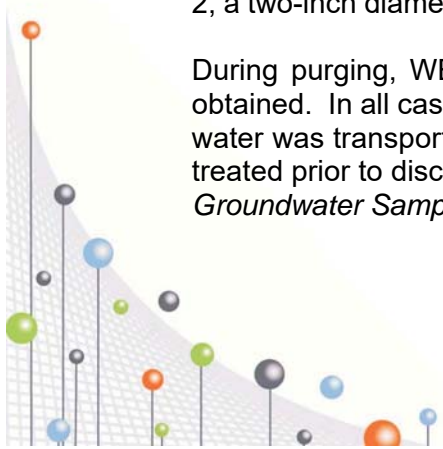
During each round of sampling, water level measurements were taken on the three sampled wells. In November 2016, March 2017 and August 2019 water level measurements were obtained from additional accessible on-site monitoring wells prior to any pumping. Table 1 summarizes the depth to groundwater, the measured total depth of the wells, the reported top-of-pipe elevation and calculated elevation of groundwater at each well during the sampling events. The elevations are relative to an on-site reference point assigned an elevation of 100.00.

### ***Well Purging***

In preparation for sampling, each of the three wells were purged of standing water to obtain a sample representative of the surrounding formation. For RW-2 and MW-10, six-inch and four-inch diameter wells, respectively, a 2-inch submersible pump was installed in the upper third of the water column and a minimum of three well volumes were removed during each sampling event. For MW-2, a two-inch diameter well, a peristaltic pump was used to purge approximately six to 12 gallons.

During purging, WES measured the temperature and pH until stabilized measurements were obtained. In all cases, the water parameters stabilized well before purging was complete. Purge water was transported to Marine Vacuum Services, a permitted disposal facility where the water treated prior to discharge to sanitary sewer.

### ***Groundwater Sampling and Analyses***



After purging, each of the monitoring wells were sampled. For RW-2, samples were obtained with new, disposable polyethylene bailers while pumping continued. In monitoring well MW-2 the samples were obtained directly from the peristaltic pump discharge. All samples were taken following proper environmental sampling techniques and protocols, placed in laboratory prepared bottles, chilled and held under chain of custody until delivered to the laboratory.

The samples were submitted to Friedman & Bruya, Inc., a Washington State accredited laboratory, for testing. Each sample was analyzed by Washington accepted methods NWTPH-G for total petroleum hydrocarbons (TPH) in the gasoline range, as well as the volatile aromatic compounds benzene, toluene, ethylbenzene and xylenes (BTEX), commonly associated with gasoline, using EPA Method 8021B or 8260D. Most samples were also tested for total petroleum hydrocarbons in the diesel and oil ranges by Washington accepted method NWTPH-D(x), following a silica gel cleanup to remove organic materials that could bias the testing results. For some sampling events, the diesel samples were analyzed without silica gel cleanup to demonstrate the influence of organic materials.

The site is at low elevation in the Kent Valley, an area with highly organic soils that are known to influence the NWTPH-D(x) method. In most of these samples the data was flagged by the analytical laboratory, indicating the sample chromatograms did not resemble the diesel standard use for quantitation by the test method. This is typically interpreted to indicate native organic material in the sample or crossover from a different range of petroleum.

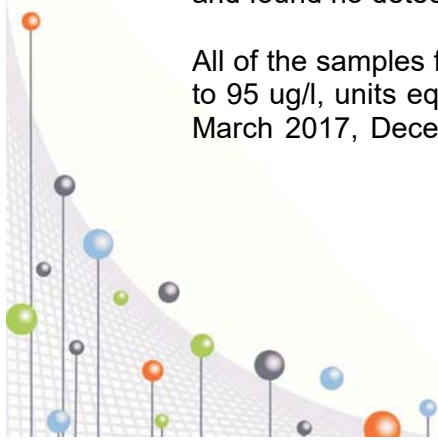
### **Laboratory Analytical Results**

The results of laboratory testing on the groundwater samples and Washington State cleanup criteria are summarized in Table 2. The laboratory reports of the analytical results are attached. All laboratory quality assurance/quality control criteria were met by the analyses and the laboratory reporting limits are low enough that the data can be compared to appropriate regulatory cleanup levels.

None of the samples from MW-2 in any of the five sampling events contained detectable concentrations of TPH-G or BTEX compounds. Three of the samples, from November 2016, March 2017 and August 2018 contained detectable concentrations of TPH-D below applicable cleanup criteria. All of those samples were analyzed without silica gel cleanup and two of them were flagged by the laboratory as not resembling the laboratory standards used to quantitate diesel.

None of the samples from MW-10 in any of the five sampling events contained TPH-G or BTEX compounds at levels exceeding MTCA cleanup criteria. In three samples, TPH-D exceeded the MTCA Method A cleanup level of 500 ug/l, with reported concentrations of 740, 540 and 1,000 ug/l, in November 2016, March 2017 and August 2018, respectively. All of the reported TPH-D concentrations were in samples that did not undergo silica gel cleanup as part of the laboratory analyses. In November 2016 and March 2017 these samples were also analyzed with silica gel and found no detectable TPH-D or TPH-O concentrations.

All of the samples from RW-2 contained detectable concentrations of benzene, ranging from 1.2 to 95 ug/l, units equivalent to parts per billion (ppb). In sampling events from November 2016, March 2017, December 2017 and August 2018, the initial benzene concentrations in the well



samples showed a steady increase from 3.3 to 95 ug/l. Sampling in May and August 2019 showed decreasing initial concentrations of 55 and 23 ug/l, respectively.

The samples from RW-2 also contained TPH-G at concentrations ranging from 150 to 650 ug/l, with the exception of the November 2016 sampling, which contained no detectable TPH-G. Low levels of TPH-D, toluene, ethylbenzene and xylenes were detected in several samples, but showed no consistent trends and no other parameters approached applicable MTCA Method A cleanup levels. The detections of TPH-D were all flagged by the laboratory as not resembling the laboratory standards.

Of the detected compounds in RW-2, only the benzene concentration exceeded the respective Washington Model Toxics Control Act (MTCA) Method A groundwater cleanup criteria of 5 ug/l.

During RW-2 events when additional samples were taken following further purging, the reported benzene concentrations were routinely lower. However, in the August 2018 and May 2019 sampling the additional volume removed was relatively limited and the reported final concentrations still exceeded the MTCA groundwater cleanup level. As a result, WES recommended a more extensive pump test to remove a higher volume of water and measure the aquifer response.

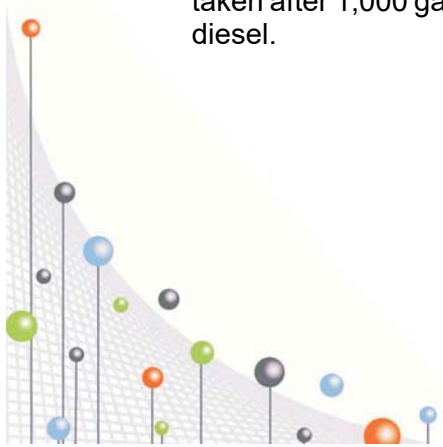
### **Pump Test**

On August 27, 2019, WES conducted a limited pump test on well RW-2, measuring draw-down in the well using an electronic pressure transducer and data logger. The well was pumped using a vacuum truck operated by Marine Vacuum Service, Inc., who managed and disposed of all withdrawn groundwater. A transducer was also installed in MW-10 to record potential water level changes, but any area of influence from the pumping did not extend to that distance.

The pump test lasted for five hours and removed approximately 2,500 gallons of water from the well. Although the vacuum truck created a somewhat irregular withdrawal rate over the time the pump test operated, the overall average rate was 8.3 gallons per minute. Although much of the water level data from the data logger shows the irregularities of the pumping method, the well maintained a draw-down of approximately 14.3 feet over a sustained period near the end of the test. Recovery data collected as the well recharged may be suited to a Theis Method analysis to determine aquifer transmissivity characteristics, if needed in the future.

Samples were taken from the well after pumping approximately 200 gallons, 1,000 gallons and 2,500 gallons. The initial sample contained benzene at a concentration of 23 ug/l and TPH-G at 190 ug/l. TPH-D was detected at 79 ug/l, flagged as not resembling the laboratory standard. No other parameters were detected.

Subsequent tests showed benzene at concentrations of 3.9 and 1.2 ug/l, respectively. No other analyzed parameter was detected in these samples with the exception of TPH-D in the sample taken after 1,000 gallons; reported at 91 ug/l, flagged as not resembling the laboratory standard for diesel.



## **Conclusions and Recommendations**

### *Groundwater Level Measurements*

The water level measurements were used to calculate the inferred groundwater surface contours, as shown in Figures 3 through 5, for the three larger sets of water level data. The contours imply a general trend of groundwater migration toward the west and northwest, consistent with prior sets of measurements conducted at the site. The measurements fall within the range of water level depths recorded throughout the history of sampling at this site.

### *Groundwater Analytical Results*

In the five sampling events documented with this report, the samples from monitoring wells RW-2 consistently contained elevated concentrations of benzene. No other analyzed parameters were detected in RW-2 at concentrations approaching MTCA groundwater cleanup criteria. Benzene is often observed as a “leading edge” constituent in groundwater plumes, as a relatively soluble petroleum compound. After the pump test, benzene concentrations in the water were reduced to levels below MTCA cleanup criteria.

Three samples from MW-10 contained TPH-D concentrations exceeding MTCA Method A groundwater cleanup criteria. However, these samples were not subjected to silica gel cleanup and there is clear influence from non-petroleum organic materials. Two splits of these same samples analyzed after silica gel cleanup did not contain detectable TPH-D concentrations, and most TPH-D analyses were flagged as not resembling the laboratory diesel standard.

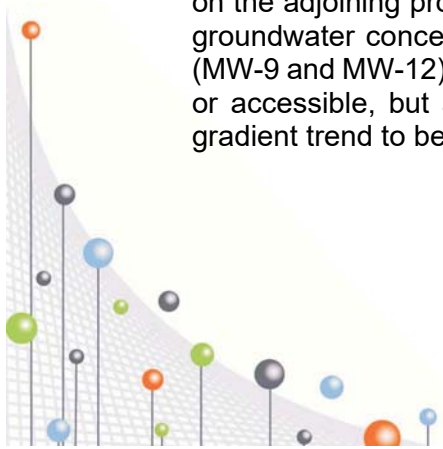
The samples from MW-2 show no detectable concentrations of TPH-G or BTEX compounds and only low levels of TPH-D that was consistently flagged as not resembling the diesel fuel laboratory standard.

The downgradient wells MW-2 and MW-10 indicate natural attenuation is occurring, contaminants are not migrating any appreciable distance from the former tank area with groundwater and any petroleum contaminated soil that remains in the former tank areas is not a continuing source of groundwater contaminants.

### *Potential for Off-Site Sources*

As noted in our previous monitoring reports, it is increasingly apparent that the source of benzene contamination is most likely from adjoining property to the south. As previously documented, the adjoining property was formerly an aviation scrap yard from about 1968 to at least 1973, then an auto body repair shop until the late 1980s. Aerial photographs of the site show the adjoining property to have been cluttered with scrap materials prior to the current developments. After the new buildings were constructed, and engine rebuilder was a tenant in the building directly upgradient from the impacted groundwater area.

In the earlier cleanup efforts for Viking Freight at this site, there were four upgradient wells installed on the adjoining property to the south which confirmed a gradient toward the subject parcel and groundwater concentrations of gasoline-range petroleum and BTEX in off-site monitoring wells (MW-9 and MW-12) that exceeded any on-site concentrations. These wells are no longer present or accessible, but all of the subsequent measurements from the remaining wells confirm the gradient trend to be from the southeast.





RW-2 samples show groundwater contaminants are benzene and TPH-G, but it is located near the area of former diesel on-site tanks. Prior soil sampling from the tank area identified primarily TPH-D. The identified gasoline components in groundwater would not be expected from the potential on-site sources.

Based on the findings, WES recommends a limited pumping response as a means to limit the extent of migration of any groundwater-borne contaminant plume. Well RW-2 appears to be appropriately located to intersect impacted groundwater flowing toward the site from the southern adjoining property, or limit the extent of future migration from any on-site residual soil contamination in the former tank area. Pumping has shown that groundwater contaminants can be temporarily reduced, but the concentrations appear to rebound before the next sampling event.

WES recommends additional quarterly pumping events from RW-2, to be conducted at the beginning of the next four quarters. Approximately 2,500 to 4,000 gallons should be removed at each event. Sampling will be conducted before and during the pumping, and again at approximately mid-quarter. This should allow evaluation of the response to pumping and rebound rate. Quarterly samples will also be taken from MW-2 and MW-10, as downgradient wells, to identify any migration of contaminants beyond the former tank area.

**Closure**

Thank you for the opportunity to be of service to you in this matter. If you have any questions regarding this letter, or if I may be of any further assistance, please feel free to contact me at your convenience.

Respectfully submitted,  
**Whitman Environmental Sciences**

Daniel S. Whitman L.G.  
Principal



**DANIEL S. WHITMAN**

Attachments: Table 1 - 2016 - 2019 Groundwater Level Measurements  
Table 2 - 2016 - 2019 Groundwater Sample Analytical Results

Figure 1 - Site Location Map

Figure 2 - Site Plan

Figure 3 - Inferred Groundwater Contours - 11/1/2016

Figure 4 - Inferred Groundwater Contours - 3/16/2017

Figure 5 - Inferred Groundwater Contours - 8/27/2019

Laboratory Analytical Reports - Friedman & Bruya, Inc.

**Table 1**  
**Summary of Groundwater Level Data**  
**FedEx Freight, Inc. Former Seattle Area Terminal**  
**Kent, Washington**

**Project No. WES-1276**

Date	Monitoring Well	Water Level Relative to Top of Pipe (ft)	Total Depth of Well (ft)	Top of Pipe Elevation*	Groundwater Elevation*
11-1-2016	MW-1	-6.09	15.2	98.68	92.59
	MW-3	-6.89	18.5	99.01	92.12
	MW-5	-5.07	18.8	98.33	93.26
	MW-6	-4.12	21.6	98.02**	93.90
	MW-7	-6.96	18.2	99.14**	92.18
	MW-8	-6.78	18.4	98.47**	91.69
	MW-10	-5.83	25.6	97.63	91.80
	RW-1	-5.15	19.6	98.11	92.96
	RW-2	-5.96	30.0	97.96	92.00
3-16-2017	MW-1	-4.75	15.2	98.68	93.93
	MW-2	-6.14	17.0	99.15	93.01
	MW-3	-6.06	18.5	99.01	92.95
	MW-5	-4.36	18.8	98.33	93.97
	MW-6	-3.09	21.6	98.02**	94.93
	MW-7	-4.38	18.2	99.14**	94.76
	MW-8	-6.15	18.4	98.47**	92.32
	MW-10	-5.04	25.6	97.63	92.59
	RW-1	-5.60	19.6	98.11	92.51
	RW-2	-5.31	30.0	97.96	92.65

**TABLE 1 (Continued)**  
**Summary of Groundwater Level Data**  
**FedEx Freight, Inc. Former Seattle Area Terminal**  
**Kent, Washington**

**Project No. WES-1276**

12-28-2017	MW-2	-7.44	17.0	99.15	91.71
	MW-10	-6.11	25.6	97.63	91.52
	RW-2	-6.07	30.0	97.96	91.89
8-21-2018	MW-2	-9.42	17.0	99.15	89.73
	MW-10	-8.04	25.6	97.63	89.59
	RW-2	-8.03	30.0	97.96	89.93
8-27-2019	MW-1	-8.15	15.2	98.68	90.53
	MW-2	-8.96	17.0	99.15	90.19
	MW-3	-8.98	18.5	99.01	90.03
	MW-5	-7.60	18.8	98.33	90.73
	MW-6	-6.68	21.6	98.02**	91.34
	MW-7	-8.90	18.2	99.14**	90.24
	MW-8	-8.47	18.4	98.47**	90.00
	MW-10	-7.90	25.6	97.63	89.73
	MW-13	-9.90	19.15	99.45	89.55
	RW-1	-7.57	19.6	98.11	90.54
	RW-2	-7.78	30.0	97.96	90.18

Table 1 Notes:

\* Top of Pipe and Groundwater Elevations relative to an on-site reference point assigned elevation of 100.00 for the purposes of this study.

\*\* Top of pipe raised with new piece of PVC riser during reconstruction of monuments for well security. Elevation based on prior survey, plus measured distance above old top of pipe.

Not Accessible - Top of pipe elevation not measured, so groundwater elevation cannot be calculated.



Table 2

Project No. WES-1276

**FedEx Freight, Inc., Former Seattle Area Terminal  
November 2016 to August 2019 Summary of Groundwater Analytical Results**

Sample I.D.	Sample Date	Volume Purged (gallons)	Laboratory Analytical Results in ug/l (ppb)						
			NWTPH-D(x)		NWTPH-G	Benzene	Toluene	Ethyl-benzene	Total Xylenes
			Diesel	Oil	Gasoline				
RW-2*	11/1/2016	380	ND(<51)	ND(<260)	ND (<100)	3.3	ND (<1)	ND (<1)	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	3/16/2017	370	ND(<50)	ND(<250)	150	<b>12</b>	ND (<1)	1.5	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	12/28/2017	400	ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>	290	<b>39</b>	1.3	5.1	3.2
	8/21/2018	65	NA	NA	620	<b>95</b>	1.6	ND (<1)	4.4
		140	NA	NA	230	<b>40</b>	ND (<1)	ND (<1)	ND (<3)
	5/2/2019	65	NA	NA	360	<b>55</b>	ND (<1)	9.7	6.3
		140	52 <sup>X SG</sup>	ND(<250) <sup>SG</sup>	220	<b>25</b>	ND (<1)	4.1	2.9
	8/27/2019	200	79 <sup>X SG</sup>	ND(<250) <sup>SG</sup>	190	<b>23</b>	ND (<1)	ND (<1)	ND (<3)
		1,000	91 <sup>X SG</sup>	ND(<250) <sup>SG</sup>	ND (<100)	3.9	ND (<1)	ND (<1)	ND (<3)
		2,500	ND (<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>	ND (<100)	1.2	ND (<1)	ND (<1)	ND (<3)

Table 2 (Continued)

Project No. WES-1276

FedEx Freight, Inc., Former Seattle Area Terminal

## November 2016 to August 2019 Summary of Groundwater Sample Analytical Results

Sample I.D.	Sample Date	Volume Purged (gallons)	Laboratory Analytical Results in ug/l (ppb)						
			NWTPH-D(x)		NWTPH-G	Benzene	Toluene	Ethyl-benzene	Total Xylenes
			Diesel	Oil	Gasoline				
MW-2	11/1/2016	12	360	ND(<260)	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	3/16/2017	12	300 <sup>X</sup>	ND(<250)	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	12/28/2017	8	ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
	8/21/2018	8	300 <sup>X</sup>	ND(<250)	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
	8/27/2019	6	ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
MW-10	11/1/2016	38	<b>740</b>	290 <sup>X</sup>	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	3/16/2017	40	<b>540<sup>X</sup></b>	ND(<250)	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
			ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>					
	12/28/2017 42 gal pumped	55	ND(<50) <sup>SG</sup>	ND(<250) <sup>SG</sup>	ND (<100)	ND (<1)	ND (<1)	ND (<1)	ND (<3)
	8/21/2018 30 gal pumped	30	<b>1,000<sup>X</sup></b>	250 <sup>X</sup>	390	2.3	ND (<1)	ND (<1)	4.2
	8/27/2019 65 gal pumped	65	210 <sup>X SG</sup>	ND(<250) <sup>SG</sup>	320	2.3	ND (<1)	ND (<1)	3.2
<b>Model Toxics Control Act Method A Groundwater Cleanup Level</b>			<b>500</b> Diesel and Oil Ranges		<b>800**</b>	<b>5</b>	<b>1,000</b>	<b>700</b>	<b>1,000</b>

**Table 2 (Continued)**  
**FedEx Freight, Inc., Former Seattle Area Terminal**  
**November 2016 to August 2019 Summary of Groundwater Sample Analytical Results**

**Project No. WES-1276**

Table Notes:

Diesel and Oil Range total petroleum hydrocarbons conducted by Washington Method NWTPH-D(x).

X - Denotes laboratory flag on data - sample chromatogram does not resemble the fuel standard used for quantification. Commonly interpreted as native organic material in the sample or crossover from a different range of petroleum.

SG - Analytical result reported with silica gel cleanup prior to analysis, to remove non-polar organic material.

Gasoline range total petroleum hydrocarbons by Northwest Method NWTPH-G.

BTEX Compounds by EPA Method 8021B or 8260D.

ND (<X.XXX) - Not Detected by Analysis at levels above the noted detection reporting limit.

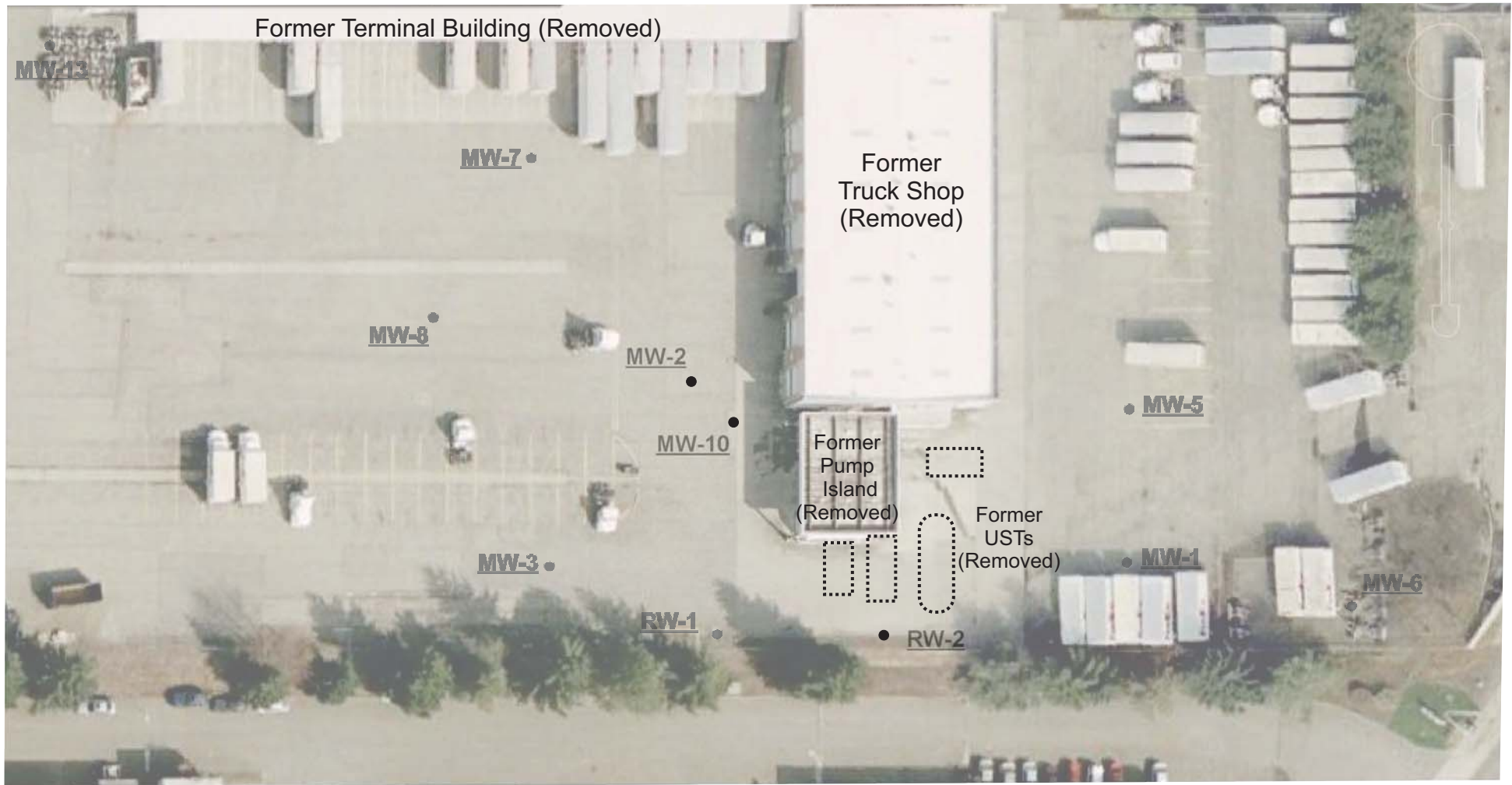
NA - Not analyzed for the listed parameter.

\* Previously unidentified well uncovered in December 2012. Prior well I.D., if any, remains unknown.

\*\*MTCA Method A cleanup level for gasoline range petroleum hydrocarbons, when benzene is present. If benzene is not present, Method A cleanup level is 1,000 ug/l.

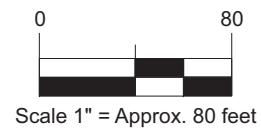
Sample results exceeding applicable cleanup criteria are noted in ***Bold Italic***.





### Legend

- Approximate Location of Sampled Monitoring Well
- Approximate Location of Monitoring Wells used for Water Level Measurements Only



North



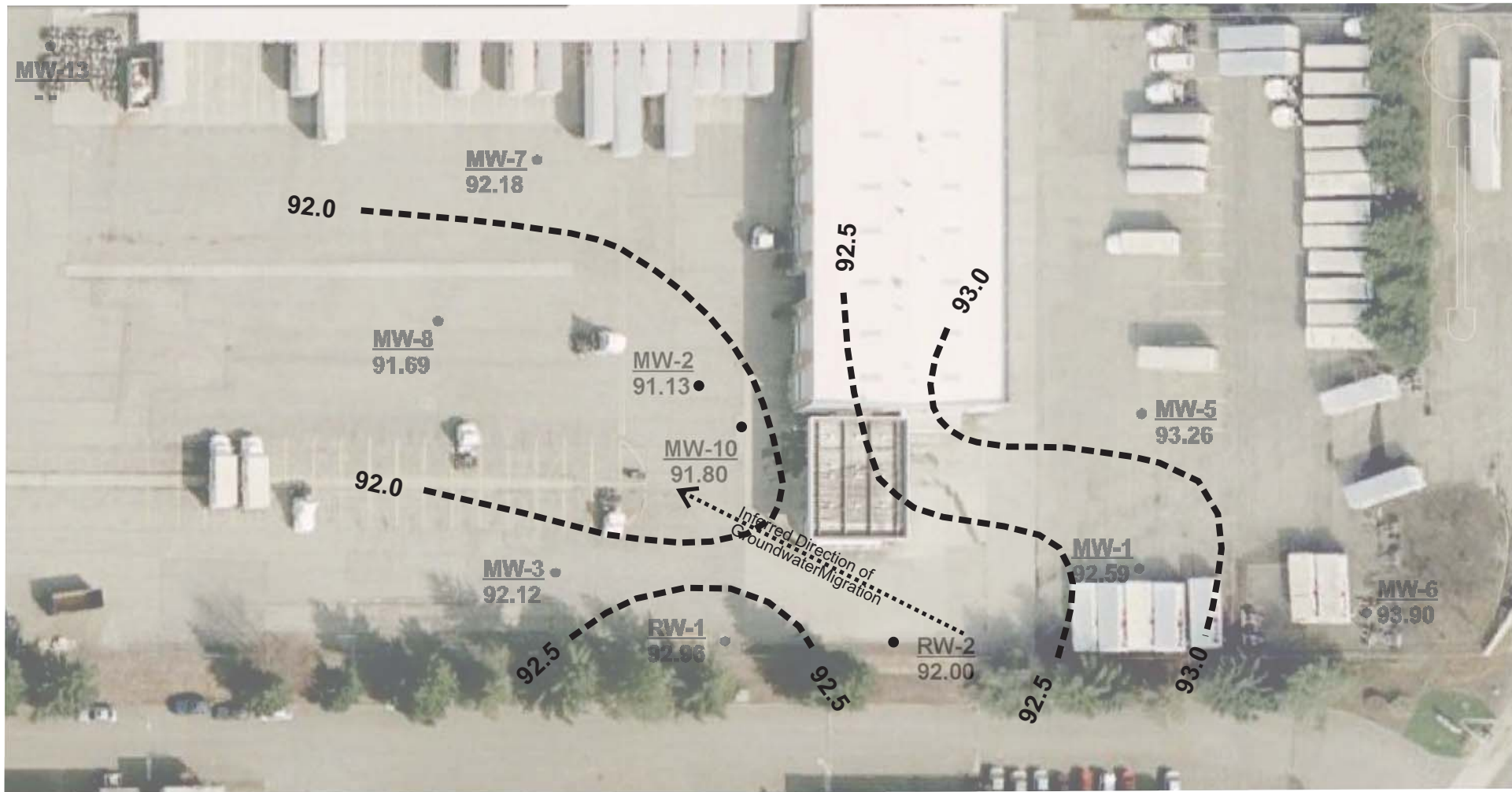
Figure 2 - Site Plan

Former FedEx Freight, Inc. Kent Terminal  
18221 E. Valley Highway  
Kent, Washington

Project No. WES - 1276  
Date Aug 7, 2019  
File ID 1276F2D

WHITMAN  
Environmental Sciences





### Legend

- Approximate Location of Sampled Monitoring Well
- Approximate Location of Monitoring Wells used for Water Level Measurements Only

Groundwater Surface Contours based on Water Level Measurements of 11/1/2016

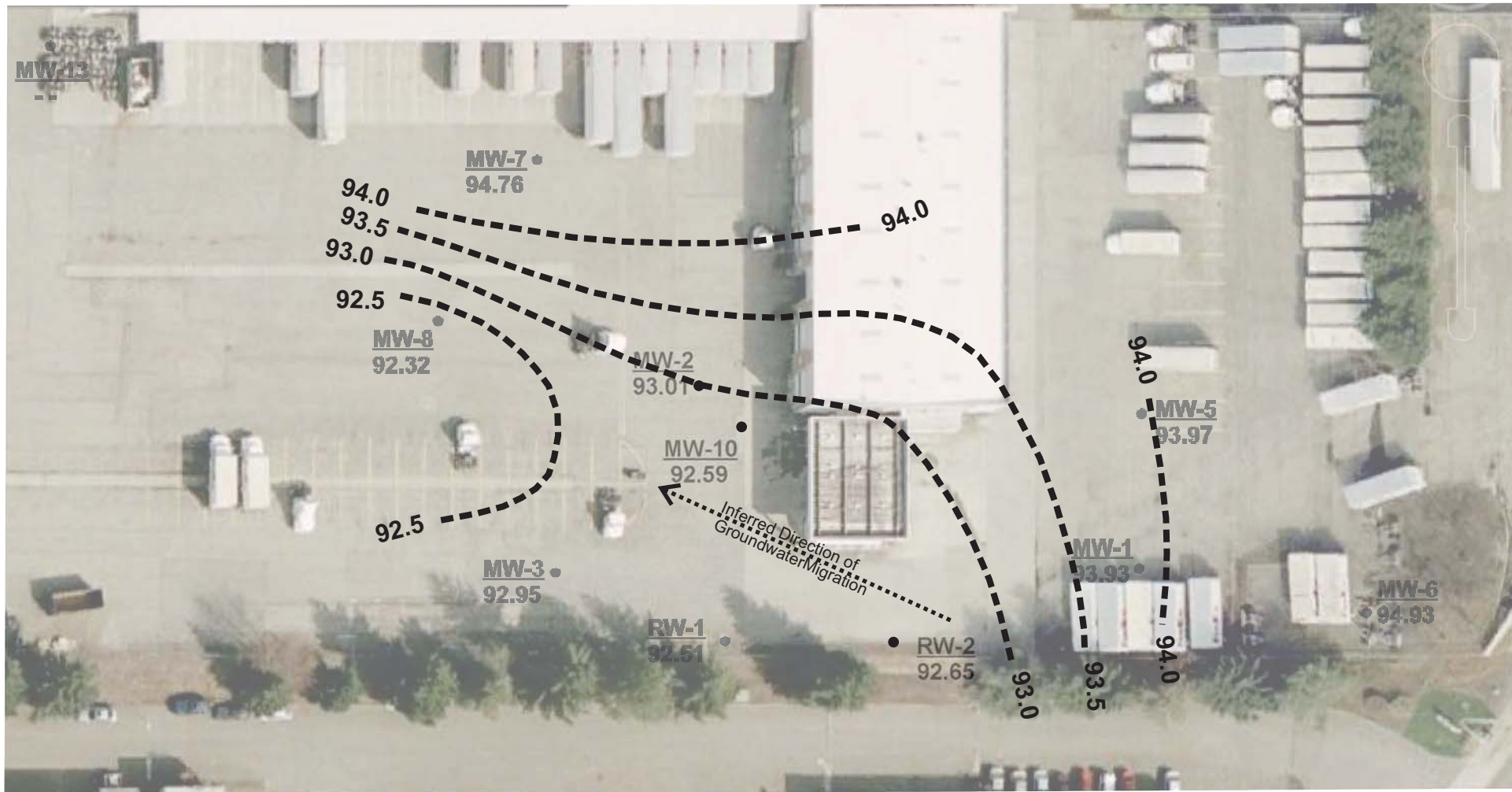
Scale 1" = Approx. 80 feet

North



Figure 3 - Monitoring Well Location Plan and Inferred Groundwater Contours  
Former FedEx Freight, Inc. Kent Terminal  
18221 E. Valley Highway  
Kent, Washington

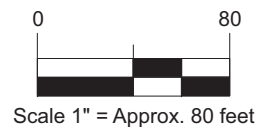
Project No.	WES - 1276	WHITMAN Environmental Sciences
Date	Aug 7, 2019	
File ID	1276F3	



### Legend

- Approximate Location of Sampled Monitoring Well
- Approximate Location of Monitoring Wells used for Water Level Measurements Only

Groundwater Surface Contours based on Water Level Measurements of 3/16/2017

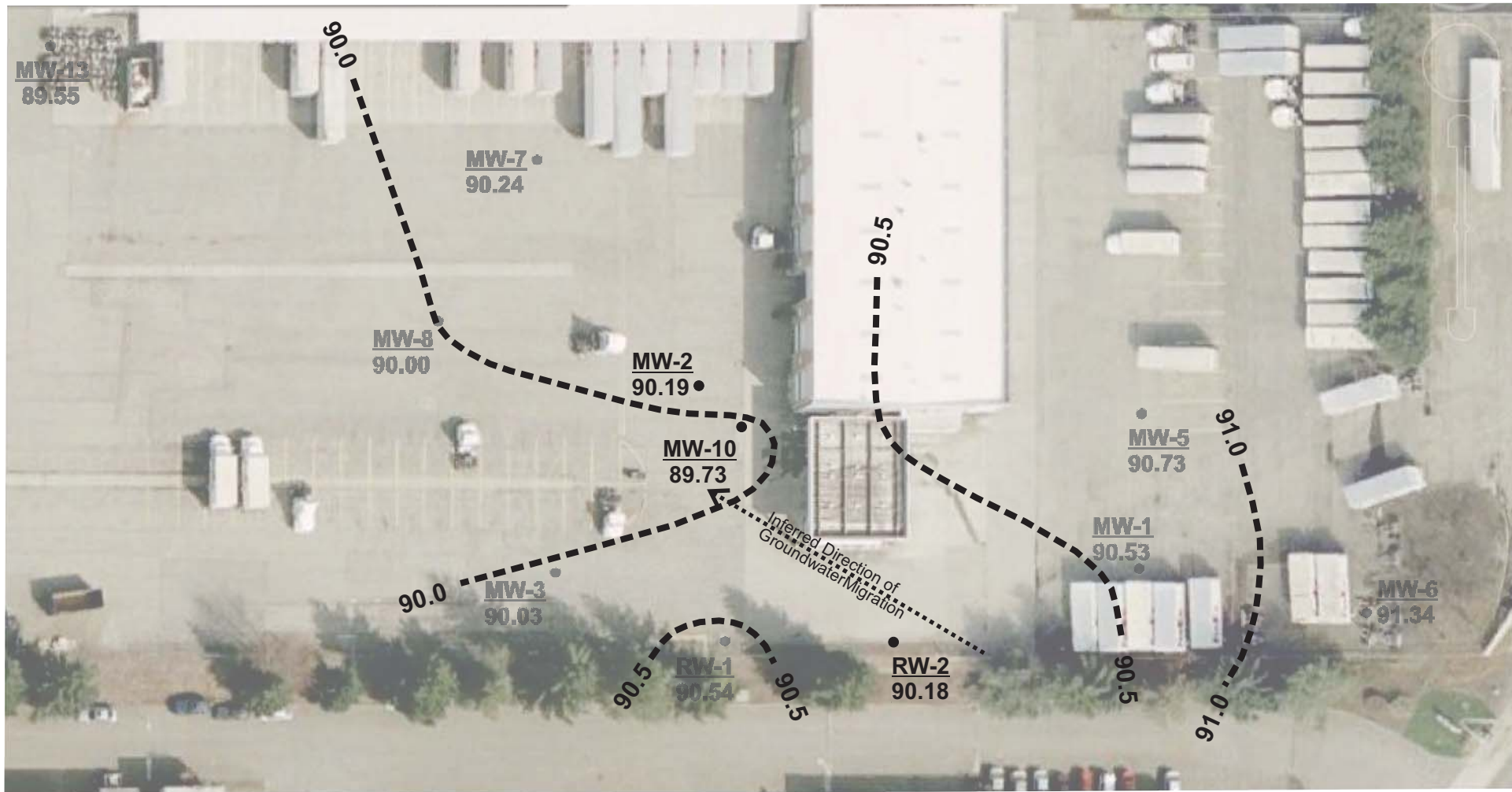


North



Figure 4 - Monitoring Well Location Plan and Inferred Groundwater Contours  
Former FedEx Freight, Inc. Kent Terminal  
18221 E. Valley Highway  
Kent, Washington

Project No.	WES - 1276	WHITMAN Environmental Sciences
Date	Aug 7, 2019	
File ID	1276F4	



### Legend

- Approximate Location of Sampled Monitoring Well
- Approximate Location of Monitoring Wells used for Water Level Measurements Only

Groundwater Surface Contours based on Water Level Measurements of 8/27/2019

0 80  
Scale 1" = Approx. 80 feet

North



Figure 5 - Monitoring Well Location Plan and Inferred Groundwater Contours  
Former FedEx Freight, Inc. Kent Terminal  
18221 E. Valley Highway  
Kent, Washington

Project No.	WES - 1276	WHITMAN Environmental Sciences
Date	Aug 31, 2019	
File ID	1276F5	

## ***Laboratory Analytical Reports***

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

3012 16th Avenue West  
Seattle, WA 98119-2029  
(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

November 9, 2016

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr. Whitman:

Included are the results from the testing of material submitted on November 2, 2016 from the Fedex Old Kent, WES 1276, F&BI 611039 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES1109R.DOC



# FRIEDMAN & BRUYA, INC.

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## ENVIRONMENTAL CHEMISTS

### CASE NARRATIVE

This case narrative encompasses samples received on November 2, 2016 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences Fedex Old Kent, WES 1276, F&BI 611039 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
611039 -01	MW-2
611039 -02	MW-10
611039 -03	RW-2

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

Date Extracted: 11/03/16

Date Analyzed: 11/03/16

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW-2 611039-01	<1	<1	<1	<3	<100	93
MW-10 611039-02	<1	<1	<1	<3	<100	91
RW-2 611039-03	3.3	<1	<1	<3	<100	93
Method Blank 06-2200 MB	<1	<1	<1	<3	<100	98

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

Date Extracted: 11/03/16

Date Analyzed: 11/07/16

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx  
Sample Extracts Passed Through a  
Silica Gel Column Prior to Analysis  
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 51-134)
MW-2 611039-01	<50	<250	88
MW-10 611039-02	<50	<250	69
RW-2 611039-03	<50	<250	79
Method Blank 06-2268 MB	<50	<250	89

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

Date Extracted: 11/03/16

Date Analyzed: 11/03/16

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx**  
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 41-152)
MW-2 611039-01	360	<260	118
MW-10 611039-02	740	290 x	118
RW-2 611039-03	<51	<260	123
Method Blank 06-2268 MB	<50	<250	115

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 611046-09 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	15	16	6
Toluene	ug/L (ppb)	91	84	8
Ethylbenzene	ug/L (ppb)	6.5	6.0	8
Xylenes	ug/L (ppb)	120	120	0
Gasoline	ug/L (ppb)	1,200	1,100	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	95	65-118
Toluene	ug/L (ppb)	50	95	72-122
Ethylbenzene	ug/L (ppb)	50	89	73-126
Xylenes	ug/L (ppb)	150	90	74-118
Gasoline	ug/L (ppb)	1,000	91	69-134



FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	110	111	58-134	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/09/16

Date Received: 11/02/16

Project: Fedex Old Kent, WES 1276, F&BI 611039

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	95	105	63-142	10

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

3012 16th Avenue West  
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(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

March 24, 2017

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr Whitman:

Included are the results from the testing of material submitted on March 16, 2017 from the FedEx Old Kent PO WES 1276, F&BI 703294 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES0324R.DOC

# FRIEDMAN & BRUYA, INC.

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## ENVIRONMENTAL CHEMISTS

### CASE NARRATIVE

This case narrative encompasses samples received on March 16, 2017 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences FedEx Old Kent PO WES 1276, F&BI 703294 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
703294 -01	RW-2
703294 -02	MW-2
703294 -03	MW-10

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

Date Extracted: 03/20/17

Date Analyzed: 03/20/17

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
RW-2 703294-01	12	<1	1.5	<3	150	83
MW-2 703294-02	<1	<1	<1	<3	<100	87
MW-10 703294-03	<1	<1	<1	<3	<100	85
Method Blank 07-565 MB	<1	<1	<1	<3	<100	84



FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

Date Extracted: 03/17/16

Date Analyzed: 03/22/16

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx  
Sample Extracts Passed Through a  
Silica Gel Column Prior to Analysis  
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 41-152)
RW-2 703294-01	<50	<250	100
MW-2 703294-02	<50	<250	109
MW-10 703294-03	<50	<250	107
Method Blank 07-577 MB2	<50	<250	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

Date Extracted: 03/17/17

Date Analyzed: 03/17/17

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx**  
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 41-152)
RW-2 703294-01	<50	<250	108
MW-2 703294-02	300 x	<250	115
MW-10 703294-03	540 x	<250	115
Method Blank 07-577 MB2	<50	<250	105

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

### **QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 703315-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	34	36	6
Toluene	ug/L (ppb)	120 ve	120 ve	0
Ethylbenzene	ug/L (ppb)	100 ve	100 ve	0
Xylenes	ug/L (ppb)	630 ve	630 ve	0
Gasoline	ug/L (ppb)	9,500	9,700	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent	Acceptance Criteria
			Recovery LCS	
Benzene	ug/L (ppb)	50	100	65-118
Toluene	ug/L (ppb)	50	96	72-122
Ethylbenzene	ug/L (ppb)	50	95	73-126
Xylenes	ug/L (ppb)	150	93	74-118
Gasoline	ug/L (ppb)	1,000	99	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	87	86	63-142	1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/24/17

Date Received: 03/16/17

Project: FedEx Old Kent PO WES 1276, F&BI 703294

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	85	81	63-142	5

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.





FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

3012 16th Avenue West  
Seattle, WA 98119-2029  
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www.friedmanandbruya.com

January 9, 2018

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr Whitman:

Included are the results from the testing of material submitted on January 2, 2018 from the FedEx Old Kent WES 1276, F&BI 801004 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES0109R.DOC

# FRIEDMAN & BRUYA, INC.

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## ENVIRONMENTAL CHEMISTS

### CASE NARRATIVE

This case narrative encompasses samples received on January 2, 2018 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences FedEx Old Kent WES 1276, F&BI 801004 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
801004 -01	MW-2
801004 -02	MW-10
801004 -03	RW-2

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/09/18

Date Received: 01/02/18

Project: FedEx Old Kent WES 1276, F&BI 801004

Date Extracted: 01/04/18

Date Analyzed: 01/04/18

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 50-150)
MW-2 801004-01	<1	<1	<1	<3	<100	72
MW-10 801004-02	<1	<1	<1	<3	<100	85
RW-2 801004-03	39	1.3	5.1	3.2	290	85
Method Blank 08-009 MB	<1	<1	<1	<3	<100	85

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/09/18

Date Received: 01/02/18

Project: FedEx Old Kent WES 1276, F&BI 801004

Date Extracted: 01/03/18

Date Analyzed: 01/05/18

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND RESIDUAL RANGE  
USING METHOD NWTPH-Dx  
Sample Extracts Passed Through a  
Silica Gel Column Prior to Analysis  
Results Reported as ug/L (ppb)**

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Residual Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
MW-2 801004-01	<50	<250	123
MW-10 801004-02	<50	<250	129
RW-2 801004-03	<50	<250	106
Method Blank 08-037 MB2	<50	<250	92

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/09/18

Date Received: 01/02/18

Project: FedEx Old Kent WES 1276, F&BI 801004

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 801004-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery	Acceptance Criteria
			LCS	
Benzene	ug/L (ppb)	50	105	72-119
Toluene	ug/L (ppb)	50	99	71-113
Ethylbenzene	ug/L (ppb)	50	101	72-114
Xylenes	ug/L (ppb)	150	85	72-113
Gasoline	ug/L (ppb)	1,000	98	70-119

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/09/18

Date Received: 01/02/18

Project: FedEx Old Kent WES 1276, F&BI 801004

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	96	61-133	0

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.





FRIEDMAN & BRUYA, INC.

---

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

3012 16th Avenue West  
Seattle, WA 98119-2029  
(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

August 28, 2018

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr Whitman:

Included are the results from the testing of material submitted on August 22, 2018 from the Fedex Old Kent WES 1276, F&BI 808515 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES0828R.DOC

# FRIEDMAN & BRUYA, INC.

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## ENVIRONMENTAL CHEMISTS

### CASE NARRATIVE

This case narrative encompasses samples received on August 22, 2018 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences Fedex Old Kent WES 1276, F&BI 808515 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
808515 -01	MW-2
808515 -02	MW-10
808515 -03	RW-2-1.5V
808515 -04	RW-2-3V

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/28/18

Date Received: 08/22/18

Project: Fedex Old Kent WES 1276, F&BI 808515

Date Extracted: 08/23/18

Date Analyzed: 08/23/18 and 08/24/18

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW-2 808515-01	<1	<1	<1	<3	<100	93
MW-10 808515-02	2.3	<1	<1	4.2	390	98
RW-2-1.5V 808515-03	95	1.6	<1	4.4	620	95
RW-2-3V 808515-04	40	<1	<1	<3	230	93
Method Blank 08-1762 MB	<1	<1	<1	<3	<100	97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/28/18

Date Received: 08/22/18

Project: Fedex Old Kent WES 1276, F&BI 808515

Date Extracted: 08/24/18

Date Analyzed: 08/24/18

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx**  
Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C <sub>10</sub> -C <sub>25</sub> )	<u>Motor Oil Range</u> (C <sub>25</sub> -C <sub>36</sub> )	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 47-140)
MW-2 808515-01	300 x	<250	94
MW-10 808515-02	1,000 x	250 x	102
Method Blank 08-1894 MB	<50	<250	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/28/18

Date Received: 08/22/18

Project: Fedex Old Kent WES 1276, F&BI 808515

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 808487-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	109	65-118
Toluene	ug/L (ppb)	50	114	72-122
Ethylbenzene	ug/L (ppb)	50	112	73-126
Xylenes	ug/L (ppb)	150	113	74-118
Gasoline	ug/L (ppb)	1,000	101	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/28/18

Date Received: 08/22/18

Project: Fedex Old Kent WES 1276, F&BI 808515

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	80	80	61-133	0

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

- a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.
- b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.
- ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.
- c - The presence of the analyte may be due to carryover from previous sample injections.
- cf - The sample was centrifuged prior to analysis.
- d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.
- dv - Insufficient sample volume was available to achieve normal reporting limits.
- f - The sample was laboratory filtered prior to analysis.
- fb - The analyte was detected in the method blank.
- fc - The compound is a common laboratory and field contaminant.
- hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.
- hs - Headspace was present in the container used for analysis.
- ht - The analysis was performed outside the method or client-specified holding time requirement.
- ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.
- j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.
- J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.
- jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.
- js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.
- lc - The presence of the analyte is likely due to laboratory contamination.
- L - The reported concentration was generated from a library search.
- nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.
- pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.
- ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.
- vo - The value reported fell outside the control limits established for this analyte.
- x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



808515

## SAMPLE CHAIN OF CUSTODY

WE8/22/18

WMI/A03

Page # of

Report To

Company

Address

City, State, ZIP

Phone

Email

SAMPLERS (signature)

PROJECT NAME

PO #

REMARKS

INVOICE TO

TURNAROUND TIME

Standard Turnaround

RUSH

Rush charges authorized by:

SAMPLE DISPOSAL

Dispose after 30 days

Archive Samples

Other

## ANALYSES REQUESTED

Sample ID

Lab ID

Date Sampled

Time Sampled

Sample Type

# of Jars

TPH-HCID

TPH-Diesel

TPH-Gasoline

BTEX by 8021B

VOCs by 8260C

SVOCs by 8270D

PAHs 8270D SIM

Notes

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by:

Received by:

Relinquished by:

Received by:

Friedman &amp; Bruya, Inc.

3012 16<sup>th</sup> Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
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Arina Podnozova, B.S.  
Eric Young, B.S.

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www.friedmanandbruya.com

May 15, 2019

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr Whitman:

Included are the results from the testing of material submitted on May 3, 2019 from the Fedex Old Kent WES 1276, F&BI 905083 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES0515R.DOC

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### CASE NARRATIVE

This case narrative encompasses samples received on May 3, 2019 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences Fedex Old Kent WES 1276, F&BI 905083 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
905083 -01	RW-2-GW-1
905083 -02	RW-2-GW-2

Chloromethane failed below the acceptance criteria in the 8260C matrix spike sample. The laboratory control samples met the acceptance criteria, therefore the data were likely due to sample matrix effect.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

Date Extracted: 05/06/19

Date Analyzed: 05/06/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE  
USING METHOD NWTPH-G<sub>x</sub>**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate <u>(% Recovery)</u> (Limit 50-150)
RW-2-GW-1 905083-01	360	93
RW-2-GW-2 905083-02	220	92
Method Blank 09-830 MB	<100	106

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

Date Extracted: 05/09/19

Date Analyzed: 05/13/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx  
Sample Extracts Passed Through a  
Silica Gel Column Prior to Analysis  
Results Reported as ug/L (ppb)**

<u>Sample ID</u>	<u>Diesel Range</u>	<u>Motor Oil Range</u>	<u>Surrogate</u>
Laboratory ID	(C <sub>10</sub> -C <sub>25</sub> )	(C <sub>25</sub> -C <sub>36</sub> )	(% Recovery)
			(Limit 51-134)
RW-2-GW-2	52 x	<250	98
905083-02			
Method Blank	<50	<250	84
09-1079 MB			

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	RW-2-GW-1	Client:	Whitman Environmental Sciences
Date Received:	05/03/19	Project:	Fedex Old Kent WES 1276
Date Extracted:	05/08/19	Lab ID:	905083-01
Date Analyzed:	05/08/19	Data File:	050821.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	102	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	9.7
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	6.3
Hexane	6.5	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	1.3
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	2.9
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	1.9
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	3.6
Benzene	55	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	7.8
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	RW-2-GW-2	Client:	Whitman Environmental Sciences
Date Received:	05/03/19	Project:	Fedex Old Kent WES 1276
Date Extracted:	05/08/19	Lab ID:	905083-02
Date Analyzed:	05/08/19	Data File:	050822.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	4.1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	2.9
Hexane	3.3	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	1.6
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	1.4
Benzene	25	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	3.3
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Whitman Environmental Sciences
Date Received:	Not Applicable	Project:	Fedex Old Kent WES 1276
Date Extracted:	05/08/19	Lab ID:	09-1023 mb
Date Analyzed:	05/08/19	Data File:	050816.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<50	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Hexane	<1	o-Xylene	<1
Methylene chloride	<5	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
1,1-Dichloroethane	<1	n-Propylbenzene	<1
2,2-Dichloropropane	<1	Bromobenzene	<1
cis-1,2-Dichloroethene	<1	1,3,5-Trimethylbenzene	<1
Chloroform	<1	1,1,2,2-Tetrachloroethane	<1
2-Butanone (MEK)	<10	1,2,3-Trichloropropane	<1
1,2-Dichloroethane (EDC)	<1	2-Chlorotoluene	<1
1,1,1-Trichloroethane	<1	4-Chlorotoluene	<1
1,1-Dichloropropene	<1	tert-Butylbenzene	<1
Carbon tetrachloride	<1	1,2,4-Trimethylbenzene	<1
Benzene	<0.35	sec-Butylbenzene	<1
Trichloroethene	<1	p-Isopropyltoluene	<1
1,2-Dichloropropane	<1	1,3-Dichlorobenzene	<1
Bromodichloromethane	<1	1,4-Dichlorobenzene	<1
Dibromomethane	<1	1,2-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dibromo-3-chloropropane	<10
cis-1,3-Dichloropropene	<1	1,2,4-Trichlorobenzene	<1
Toluene	<1	Hexachlorobutadiene	<1
trans-1,3-Dichloropropene	<1	Naphthalene	<1
1,1,2-Trichloroethane	<1	1,2,3-Trichlorobenzene	<1
2-Hexanone	<10		



FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TPH AS GASOLINE  
USING METHOD NWTPH-G<sub>x</sub>**

Laboratory Code: 905024-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	2,000	2,100	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	108	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-D<sub>x</sub>**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	119	117	58-134	2

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

### QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 905024-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent	Acceptance Criteria
				Recovery MS	
Dichlorodifluoromethane	ug/L (ppb)	50	<10	65	55-137
Chloromethane	ug/L (ppb)	50	<10	56	61-120
Vinyl chloride	ug/L (ppb)	50	<0.2	64	61-139
Bromomethane	ug/L (ppb)	50	<1	56	20-265
Chloroethane	ug/L (ppb)	50	<1	66	55-149
Trichlorofluoromethane	ug/L (ppb)	50	<1	74	71-128
Acetone	ug/L (ppb)	250	<10	65	48-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	73	71-123
Hexane	ug/L (ppb)	50	<1	89	44-139
Methylene chloride	ug/L (ppb)	50	<5	75	61-126
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	78	68-125
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	76	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	81	79-113
2,2-Dichloropropane	ug/L (ppb)	50	<1	59	48-157
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	86	63-126
Chloroform	ug/L (ppb)	50	<1	90	77-117
2-Butanone (MEK)	ug/L (ppb)	250	<10	89	70-135
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	90	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	87	75-121
1,1-Dichloropropene	ug/L (ppb)	50	<1	82	67-121
Carbon tetrachloride	ug/L (ppb)	50	<1	87	70-132
Benzene	ug/L (ppb)	50	<0.35	83	75-114
Trichloroethene	ug/L (ppb)	50	<1	86	73-122
1,2-Dichloropropane	ug/L (ppb)	50	<1	92	80-111
Bromodichloromethane	ug/L (ppb)	50	<1	110	78-117
Dibromomethane	ug/L (ppb)	50	<1	92	73-125
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	115	79-140
cis-1,3-Dichloropropene	ug/L (ppb)	50	<1	95	76-120
Toluene	ug/L (ppb)	50	<1	87	73-117
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	96	75-122
1,1,2-Trichloroethane	ug/L (ppb)	50	<1	98	81-116
2-Hexanone	ug/L (ppb)	250	<10	111	74-127
1,3-Dichloropropene	ug/L (ppb)	50	<1	96	80-113
Tetrachloroethene	ug/L (ppb)	50	<1	87	72-113
Dibromochloromethane	ug/L (ppb)	50	<1	118	69-129
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	99	79-120
Chlorobenzene	ug/L (ppb)	50	<1	92	75-115
Ethylbenzene	ug/L (ppb)	50	<1	97	66-124
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	107	76-130
m,p-Xylene	ug/L (ppb)	100	<2	95	63-128
o-Xylene	ug/L (ppb)	50	<1	89	64-129
Styrene	ug/L (ppb)	50	<1	100	56-142
Isopropylbenzene	ug/L (ppb)	50	<1	100	74-122
Bromoform	ug/L (ppb)	50	<1	114	49-138
n-Propylbenzene	ug/L (ppb)	50	<1	97	65-129
Bromobenzene	ug/L (ppb)	50	<1	96	70-121
1,3,5-Trimethylbenzene	ug/L (ppb)	50	<1	98	60-138
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	107	79-120
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	98	62-125
2-Chlorotoluene	ug/L (ppb)	50	<1	94	40-159
4-Chlorotoluene	ug/L (ppb)	50	<1	98	76-122
tert-Butylbenzene	ug/L (ppb)	50	<1	98	74-125
1,2,4-Trimethylbenzene	ug/L (ppb)	50	<1	97	59-136
sec-Butylbenzene	ug/L (ppb)	50	<1	99	69-127
p-Isopropyltoluene	ug/L (ppb)	50	<1	99	64-132
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	97	77-113
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	98	75-110
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	99	70-120
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	119	69-129
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	100	66-123
Hexachlorobutadiene	ug/L (ppb)	50	<1	98	53-136
Naphthalene	ug/L (ppb)	50	<1	103	60-145
1,2,3-Trichlorobenzene	ug/L (ppb)	50	<1	100	59-130

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

Date of Report: 05/15/19

Date Received: 05/03/19

Project: Fedex Old Kent WES 1276, F&BI 905083

### QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCS/D	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	102	94	50-157	8
Chloromethane	ug/L (ppb)	50	89	85	62-130	5
Vinyl chloride	ug/L (ppb)	50	100	93	70-128	7
Bromomethane	ug/L (ppb)	50	97	89	62-188	9
Chloroethane	ug/L (ppb)	50	95	87	66-149	9
Trichlorofluoromethane	ug/L (ppb)	50	103	97	70-132	6
Acetone	ug/L (ppb)	250	88	85	44-145	3
1,1-Dichloroethene	ug/L (ppb)	50	89	82	75-119	8
Hexane	ug/L (ppb)	50	101	101	51-153	0
Methylene chloride	ug/L (ppb)	50	89	82	63-132	8
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	96	88	70-122	9
trans-1,2-Dichloroethene	ug/L (ppb)	50	93	87	76-118	7
1,1-Dichloroethane	ug/L (ppb)	50	93	87	77-119	7
2,2-Dichloropropane	ug/L (ppb)	50	117	102	62-141	14
cis-1,2-Dichloroethene	ug/L (ppb)	50	107	100	76-119	7
Chloroform	ug/L (ppb)	50	103	97	78-117	6
2-Butanone (MEK)	ug/L (ppb)	250	90	99	49-147	10
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	96	97	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	102	95	80-116	7
1,1-Dichloropropene	ug/L (ppb)	50	97	94	78-119	3
Carbon tetrachloride	ug/L (ppb)	50	111	104	72-128	7
Benzene	ug/L (ppb)	50	94	93	75-116	1
Trichloroethene	ug/L (ppb)	50	95	95	72-119	0
1,2-Dichloropropane	ug/L (ppb)	50	95	99	79-121	4
Bromodichloromethane	ug/L (ppb)	50	110	111	76-120	1
Dibromomethane	ug/L (ppb)	50	97	99	79-121	2
4-Methyl-2-pentanone	ug/L (ppb)	250	98	108	54-153	10
cis-1,3-Dichloropropene	ug/L (ppb)	50	94	102	76-128	8
Toluene	ug/L (ppb)	50	99	98	79-115	1
trans-1,3-Dichloropropene	ug/L (ppb)	50	96	106	76-128	10
1,1,2-Trichloroethane	ug/L (ppb)	50	94	99	78-120	5
2-Hexanone	ug/L (ppb)	250	89	108	49-147	19
1,3-Dichloropropane	ug/L (ppb)	50	94	102	81-115	8
Tetrachloroethene	ug/L (ppb)	50	99	102	78-109	3
Dibromochloromethane	ug/L (ppb)	50	118	121	63-140	3
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	97	107	82-118	10
Chlorobenzene	ug/L (ppb)	50	95	97	80-113	2
Ethylbenzene	ug/L (ppb)	50	97	98	83-111	1
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	119	110	76-125	8
m,p-Xylene	ug/L (ppb)	100	100	101	84-112	1
o-Xylene	ug/L (ppb)	50	98	94	81-117	4
Styrene	ug/L (ppb)	50	101	103	83-121	2
Isopropylbenzene	ug/L (ppb)	50	108	103	81-122	5
Bromoform	ug/L (ppb)	50	112	113	40-161	1
n-Propylbenzene	ug/L (ppb)	50	100	102	81-115	2
Bromobenzene	ug/L (ppb)	50	98	100	80-113	2
1,3,5-Trimethylbenzene	ug/L (ppb)	50	106	103	83-117	3
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	103	107	79-118	4
1,2,3-Trichloropropane	ug/L (ppb)	50	95	100	74-116	5
2-Chlorotoluene	ug/L (ppb)	50	100	99	79-112	1
4-Chlorotoluene	ug/L (ppb)	50	98	101	80-116	3
tert-Butylbenzene	ug/L (ppb)	50	106	103	81-119	3
1,2,4-Trimethylbenzene	ug/L (ppb)	50	104	102	81-121	2
sec-Butylbenzene	ug/L (ppb)	50	106	104	83-123	2
p-Isopropyltoluene	ug/L (ppb)	50	106	103	81-122	3
1,3-Dichlorobenzene	ug/L (ppb)	50	100	100	80-115	0
1,4-Dichlorobenzene	ug/L (ppb)	50	99	99	77-112	0
1,2-Dichlorobenzene	ug/L (ppb)	50	105	99	79-115	6
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	124	112	62-133	10
1,2,4-Trichlorobenzene	ug/L (ppb)	50	107	99	75-119	8
Hexachlorobutadiene	ug/L (ppb)	50	110	105	70-116	5
Naphthalene	ug/L (ppb)	50	107	99	72-131	8
1,2,3-Trichlorobenzene	ug/L (ppb)	50	105	101	74-122	4

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

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Rush charges authorized by:

## SAMPLE DISPOSAL

☐ Archive samples☐ Other \_\_\_\_\_ANALYSES REQUESTED

Ph. (206) 285-8282

TIME

10-10-44

1812

10

100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.  
Yelena Aravkina, M.S.  
Michael Erdahl, B.S.  
Arina Podnozova, B.S.  
Eric Young, B.S.

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Seattle, WA 98119-2029  
(206) 285-8282  
fbi@isomedia.com  
www.friedmanandbruya.com

September 4, 2019

Dan Whitman, Project Manager  
Whitman Environmental Sciences  
6812 16<sup>th</sup> Ave NE  
Seattle, WA 98115

Dear Mr Whitman:

Included are the results from the testing of material submitted on August 28, 2019 from the FedEx Old Kent WES-1276, F&BI 908572 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl  
Project Manager

Enclosures  
WES0904R.DOC

FRIEDMAN & BRUYA, INC.

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ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 28, 2019 by Friedman & Bruya, Inc. from the Whitman Environmental Sciences FedEx Old Kent WES-1276, F&BI 908572 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Whitman Environmental Sciences</u>
908572 -01	MW-2-GW
908572 -02	MW-10-GW
908572 -03	RW-2-S1
908572 -04	RW-2-S2
908572 -05	RW-2-S3

All quality control requirements were acceptable.



FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/04/19

Date Received: 08/28/19

Project: FedEx Old Kent WES-1276, F&BI 908572

Date Extracted: 08/29/19

Date Analyzed: 08/29/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES AND TPH AS GASOLINE  
USING METHODS 8021B AND NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Toluene</u>	<u>Ethyl Benzene</u>	<u>Total Xylenes</u>	<u>Gasoline Range</u>	<u>Surrogate (% Recovery)</u> (Limit 52-124)
MW-2-GW 908572-01	<1	<1	<1	<3	<100	85
MW-10-GW 908572-02	2.3	<1	<1	3.2	320	87
RW-2-S1 908572-03	23	<1	<1	<3	190	86
RW-2-S2 908572-04	3.9	<1	<1	<3	<100	86
RW-2-S3 908572-05	1.2	<1	<1	<3	<100	87
Method Blank 09-2034 MB	<1	<1	<1	<3	<100	90

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/04/19

Date Received: 08/28/19

Project: FedEx Old Kent WES-1276, F&BI 908572

Date Extracted: 08/29/19

Date Analyzed: 08/30/19

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES  
FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL AND MOTOR OIL  
USING METHOD NWTPH-Dx  
Sample Extracts Passed Through a  
Silica Gel Column Prior to Analysis  
Results Reported as ug/L (ppb)**

<u>Sample ID</u>	<u>Diesel Range</u>	<u>Motor Oil Range</u>	<u>Surrogate</u>
Laboratory ID	(C <sub>10</sub> -C <sub>25</sub> )	(C <sub>25</sub> -C <sub>36</sub> )	(% Recovery)
			(Limit 41-152)
MW-2-GW 908572-01	<50	<250	119
MW-10-GW 908572-02	210 x	<250	120
RW-2-S1 908572-03	79 x	<250	126
RW-2-S2 908572-04	91 x	<250	126
RW-2-S3 908572-05	<50	<250	130
Method Blank 09-2149 MB	<50	<250	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/04/19

Date Received: 08/28/19

Project: FedEx Old Kent WES-1276, F&BI 908572

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE,  
XYLENES, AND TPH AS GASOLINE  
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 908494-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent	
			Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	90	65-118
Toluene	ug/L (ppb)	50	91	72-122
Ethylbenzene	ug/L (ppb)	50	91	73-126
Xylenes	ug/L (ppb)	150	91	74-118
Gasoline	ug/L (ppb)	1,000	97	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/04/19

Date Received: 08/28/19

Project: FedEx Old Kent WES-1276, F&BI 908572

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER  
SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS  
DIESEL EXTENDED USING METHOD NWTPH-D<sub>x</sub>**

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	71	75	63-142	5

# FRIEDMAN & BRUYA, INC.

## ENVIRONMENTAL CHEMISTS

### **Data Qualifiers & Definitions**

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cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

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js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.



pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

11/14/12

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: 			8-28-19	7:57
Received by: 	Eric Dean	to B	8/28/19	16:00
Relinquished by:				
Received by:				