Remedial Construction Services, L.P.

9977 West Sam Houston Parkway North, Suite 100
Houston, Texas 77604
Tel (281) 955.2442
www.reconservices.com

June 19, 2017

Andrea A. Wing
Principle Program Manager
Shell Oil Products US

Re: Remedial Action Letter Report – Former Lubes Facility Decommissioning
Shell Harbor Island Terminal
Seattle, Washington
Consent Decree 99-2-07176-0SEA

Dear Ms. Wing,

1 Introduction

This Remedial Action Letter Report serves to document the completion of the remedial action at the former Lubes Facility at the Shell Distribution Terminal on Harbor Island in Seattle, Washington (herein referred to as the Shell Harbor Island Terminal, the Site, or the Terminal) (Figure 1).

The remedial action included the excavation of visibly stained soils, confirmation soil sampling, and backfill of former Lubes Facility two small petroleum impacted areas, which are discussed below. This remedial action was performed in accordance with the *Proposed Remedial Action Scope of Work* (SOW) issued to the Washington State Department of Ecology dated August 24, 2016.

2 Background

In early October 2014, URS Corporation (URS) (a legacy AECOM company) was originally notified by Shell that a small area of petroleum impacted soil was observed in the gravel covered area between the former Boiler Building and the former West Manifold Pit (Figure 2). This stained area is herein referred to as Stain 1. Then in 2015, a second stain (Stain 2) was identified approximately 14.5 feet to the east of Stain 1. The two stained areas are shown on Figure 2.

At Stain 1, the pipes are approximately 12-inches below the gravel surface, and at Stain 2, a small yellow-jacketed pipe was observed approximately 18-inches below the gravel surface with no indication of any leaks.

Soil sampling was conducted at the stained areas in 2014 and 2015. Soil with total petroleum hydrocarbons (TPH) concentrations above the inland soil cleanup level of 20,000 milligrams per kilogram (mg/kg) (Ecology, 1998) remained only at Stain 1 (AECOM, 2016).

3 Scope of Services

RECON performed the following tasks in general accordance with the SOW and in coordination with AECOM.

3.1 Task 1 - Pre-Field Activities

RECON developed a site-specific health and safety plan, conducted site research, and conducted field preparations prior to implementation of remedial action. In addition, RECON obtained a pre-approved waste profile from AECOM.

3.2 Task 2 - Site Preparation

Prior to completion of the remedial action, RECON performed the following tasks:

- Notified the Washington One Call Center
- Conducted private utility locates to clear the area of underground utilities
- Performed initial hand probing to confirm presence of utilities prior to beginning excavation
- Installed barricades around the area of work to prevent access by unauthorized individuals
- Coordinated the disabling of the cathodic protection along with other lock out tag out requirements with the Terminal personnel

3.3 Task 3 - Report Preparation

Upon completion of the field activities and submission of the final laboratory results, RECON has prepared this Remedial Action Letter Report. This report includes a description of the field work performed, conclusions on the sample results, laboratory reports, analytical results tables, and a site map showing the approximate excavation area and confirmation soil sample locations.

4 Field Activities

RECON performed the remedial action detailed in this report beginning on September 19, 2016 with completion on September 21, 2016. AECOM was on-site to observe the field activities conducted on September 19 and 20, 2016.

4.1 Excavation of Stained Areas

RECON excavated the soils using a backhoe fitted with a high-density polyethylene (HDPE) bucket to minimize the risk of creating unsafe conditions due to sparking. The excavated soils were loaded into a lined roll-off container located next to the excavations. All remedial action waste was managed in accordance with the Shell Oil Products US Residual Management Program and transported to the Republic Services facility at 54 South Dawson Street in Seattle, Washington. Copies of the disposal receipts are attached.

4.1.1 Stain 1

The completion of the remedial action began with the excavation of Stain 1. The excavation activities exposed four 2-inch pipes that extended vertically from approximately 18- to 36-inches below ground surface (bgs) before turning southward.

RECON/AECOM confirmed with Terminal Management and worked with the assistance of a private utility locating company traced these four 4-inch pipes to the south and confirmed that they terminate at the former South Blending Area, which was removed during the Lubes Facility decommissioning. Photographs of the approximate piping terminus at the former South Blending Area are included in the attached photolog. The underground piping abandoned at the former South Blending Area was historically reportedly cleaned and pigged. A Terminal representative informed RECON's project team that these pipes were previously used to transport base oil, which is a colorless and odorless liquid. No indications of impacted soil were observed on the ground surface at the piping terminus within the former South Blending Area.

RECON continued the over excavation at Stain 1 to a final depth of 3-feet bgs based on the results and of the results from standard field screening methods (photoionization detector [PID] hits or presence of hydrocarbon odor, staining, or sheen). The approximate boundary of the final excavation at Stain 1 is indicated on Figure 3.

4.1.2 Installation of Grout Plugs

The open ends of the four pipes at Stain 1 had historically been plugged with rags, presumably in effort to prevent any free liquids from migrating into the soil. After removing the rags, no residual liquids were

observed in any of the pipes. Shell confirmed that there were no residual liquids present and that the pipes had sufficiently been historically cleaned and pigged. Shell authorized RECON to install grout plugs in the 18-inch vertical sections of the pipes. RECON used approximately 10 pounds of grout in each of the 18-inch vertical sections.

4.1.3 Stain 2

During the excavation of Stain 2 (east stain), a visible layer of black, stained soil was observed approximately 3- to 4-inches bgs. The stained layer was approximately 3-foot in diameter and 2- to 3-inches thick. A noticeable odor of hydrocarbon was present in the stained soil; no hydrocarbon sheen or PID hits above background were detected.

As with Stain 1, RECON extended the excavation at Stain 2 to 1-foot beyond the impacted soil to a final depth of 2-feet bgs. RECON also excavated partially exposing the yellow pipe that ran between Stain 1 and Stain 2. No indication of impacted soil was observed in the additional partial excavation beneath the yellow pipe. The boundary of the final excavation at Stain 2 is indicated on Figure 3.

4.2 Confirmatory Soil Sampling

Upon reaching the final limits of the excavations at the two stained areas, RECON collected 11 confirmation soil samples from the floor and sidewalls of the excavations. The confirmation samples are listed below and on Table 1 and indicated on Figure 3. Note: in the following bullets "-SAMPLE" was removed from the sample IDs.

- One floor sample (STAIN1-BOTTOM) was collected from the bottom of the Stain 1 excavation at a depth of 3-feet bgs, approximately 1-foot below the bottom of the pipes.
- Four sidewall samples (STAIN1-N, STAIN1-S, STAIN1-E, and STAIN1-W) were collected from the Stain 1 excavation at a depth of 2-feet bgs.
- One floor sample (STAIN2-BOTTOM) was collected from the Stain 2 excavation at a depth of 2-feet bgs.
- Four sidewall samples (STAIN2-N, STAIN2-E, STAIN2-S, and STAIN2-W) were collected from the Stain 2 excavation at a depth of 1-feet bgs.
- One sidewall sample (STAIN2-S-TOP) was collected from the Stain 2 excavation at the visible layer of black, stained soil at 0.25-feet bgs.

5 Analytical Methods and Soil Sample Results

Soil samples were delivered to FBI under chain of custody the same day they were collected. The samples were analyzed for gasoline, diesel, and heavy oil by the NWTPH-Gx and NWTPH-Dx methods. The soil sample results are summarized on Table 1. The laboratory analytical reports from FBI are also attached.

Table 1. Confirmation Soil Sample Results

Sample ID	Sample Depth (feet bgs)	Gasoline Range (mg/kg)	Diesel Range (mg/kg)	Motor Oil Range (mg/kg)	TPH (mg/kg)
Inland Soil Cleanup Levels (1)	n/a	NE	NE	NE	20,000
Stain 1 Excavation Confirmation Soil Samples					
STAIN1-SAMPLE-BOTTOM	3	<2.00	150	7,100	7,250
STAIN1-SAMPLE-N	2	<2.00	520	15,000	15,520
STAIN1-SAMPLE-S	2	<2.00	<50.0	2,000	2,000
STAIN1-SAMPLE-E	2	<2.00	<50.0	1,000	1,000
STAIN1-SAMPLE-W	2	<2.00	160	8,000	8,160
Stain 2 Excavation Confirmation Soil Samples					
STAIN2-SAMPLE-S-TOP	0.5	170	6,200	310	6,680
STAIN2-SAMPLE-BOTTOM	2	<2.00	<50.0	<250	<302
STAIN2-SAMPLE-S	1	2.1	<50.0	<250	2.1
STAIN2-SAMPLE-W	1	<2.00	<50.0	<250	<302
STAIN2-SAMPLE-N	1	<2.00	<50.0	<250	<302
STAIN2-SAMPLE-E	1	<2.00	<50.0	<250	<302

Table Notes:
bgs = below ground surface
mg/kg = milligrams per kilogram
NE = not established
TPH = total petroleum hydrocarbons
(1) = The Inland Soil Cleanup levels were established in the Final Consent Decree No. 99 2-07 176 SEA and the Cleanup Action Plan (Ecology, 1998)

As shown on Table 1, the TPH concentrations in all the confirmation soil samples were below the inland soil cleanup level of 20,000 mg/kg (Ecology, 1998). Upon receipt of these results, AECOM authorized RECON to backfill the excavations.

RECON backfilled the excavations using clean soil stockpiled at the facility and installed a rock cover with materials provided at the facility to match the surrounding areas.

6 Conclusions

Based on the results of the remediation action, RECON concludes the following:

- The impacted soils at the two stained areas were remediated to below the inland soil cleanup level of 20,000 mg/kg.
- The four abandoned pipes at Stain 1 were deemed to have been historically cleaned and pigged but not plugged. RECON therefore plugged the four pipes during this action.

The four pipes leading from Stain 1 to the former South Blending Area were traced to a terminus location using the utility locate company. No additional excavation or sampling was deemed necessary at the former South Blending Area terminus location based on the following conclusions:

- Lack of odor and residual hydrocarbon liquids present in the pipes at Stain 1 indicating the pipes had been historically cleaned and pigged during the Lubes Facility decommissioning and

- Lack of staining on the ground surface at the former South Blending Area terminus location.

7 References

AECOM, 2016. *Summary Letter – Former Lube Facility Investigation.* Shell Harbor Island Terminal, Seattle, Washington. Consent Decree 99-2-07176-0SEA and Cleanup Site #5051. May 3.

Ecology, 1998. Final Consent Decree No. 99 2-07 176 SEA and the Cleanup *Action Plan (CAP).* Shell Seattle Sale Terminal. Seattle, Washington. September 28.

RECON, 2016. *Proposed Remedial Action Scope of Work* – Former Lubes Facility Decommissioning. Shell Harbor Island Terminal, Seattle, Washington. Consent Decree 99-2-07176-0SEA. August 24.

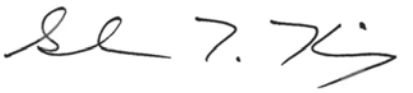
8 Limitations

The findings and conclusions documented in this report have been prepared for specific application to this project and have been developed in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area and in general accordance with the terms and conditions set forth in our Agreement, and with the RECON SOW dated August 24, 2016. No other warranty, expressed or implied, is made.

This report is for the exclusive use of Shell and its representatives. No third party shall have the right to rely on RECON's opinions rendered in connection with the services or in this document without our written consent and the third party's agreement to be bound to the same conditions and limitations as Shell.

RECON appreciates the opportunity to provide these services. Please contact the undersigned regarding any questions related to the information provided in this letter report.

Respectfully,



Shannon King, VP National Account Director
REMEDIAL CONSTRUCTION SERVICES, L.P. (RECON)
9977 W. Sam Houston Pkwy N. Suite 100
Houston, TX 77064

☎ 281-955-2442 (office) | ☎ 713-875-9125 (cell)

shannon.king@reconservices.com

cc: Nicky Moody, AECOM
Jerome Cruz, Washington Department of Ecology

Attachments:
Figure 1. Site Map
Figure 2. Lube Facility Details
Figure 3. Excavation and Confirmation Soil Sample Locations
Attachment A. Soil Disposal Receipts
Attachment B. Photographic Log
Attachment C. Laboratory Reports and Chain of Custody Forms

LEGEND

MW-212 ⊕ Shallow groundwater monitoring well location

Shell property line

100 0 100 200

SCALE IN FEET

AECOM

SITE MAP

SHELL HARBOR ISLAND TERMINAL
FORMER LUBES FACILITY DECOMMISSIONING
SEATTLE, WASHINGTON

FIGURE 1

K:\46194268_Seattle_Terminal\MXD\2016\Lube_Plant\Fig 1 Site Map.dwg Apr 29, 2016 - 8:18am

Source: USGS 2012

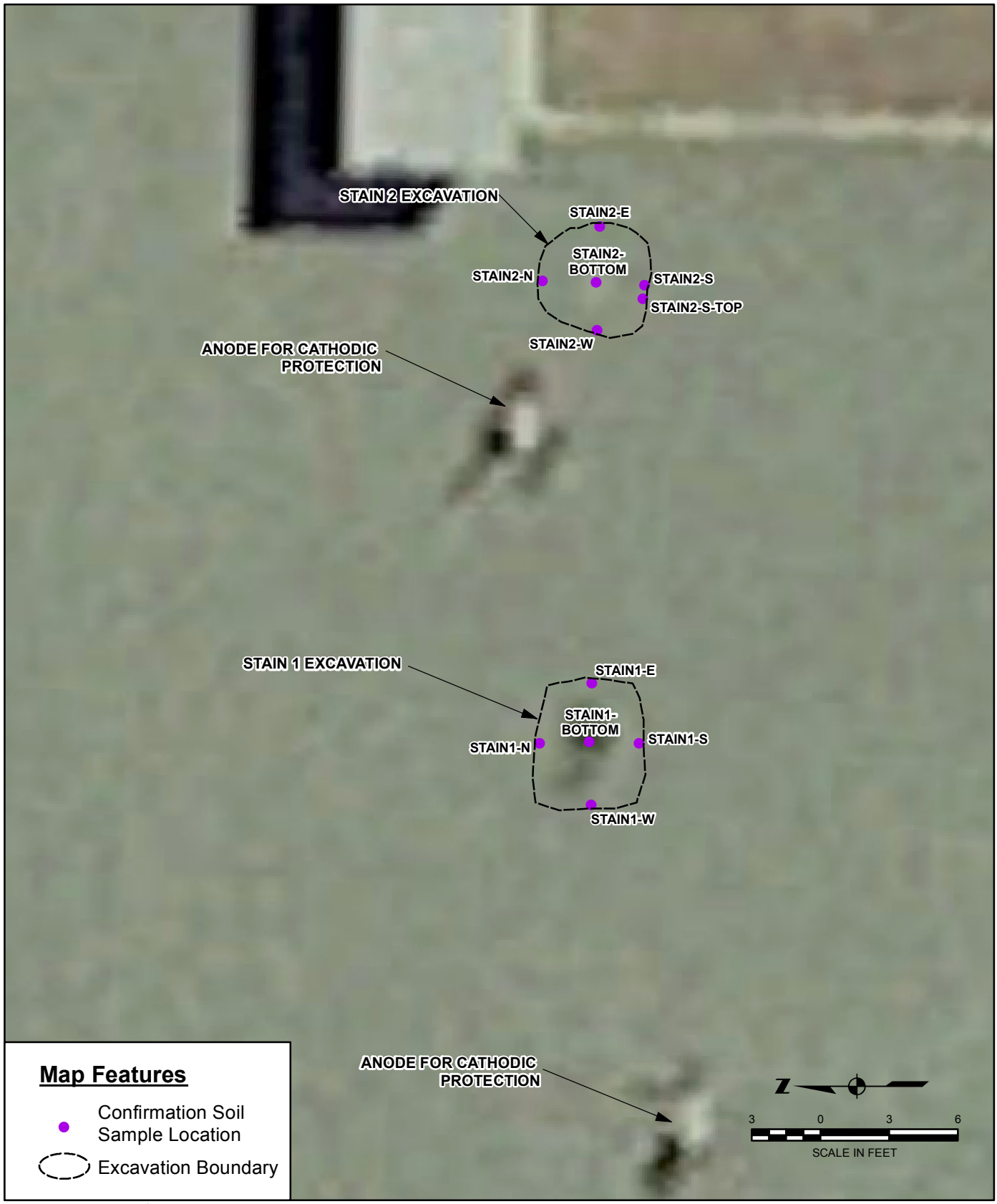
LUBE FACILITY DETAILS

SHELL HARBOR ISLAND TERMINAL
FORMER LUBES FACILITY DECOMMISSIONING
SEATTLE, WASHINGTON

AECOM

FIGURE 2

Document Path: K:\46194268 Seattle Terminal\MXD\2016\Lube Plant\Fig 2 Lube Facility Details.mxd



Source: Imagery ©2016 Google

EXCAVATION AND CONFIRMATION SOIL SAMPLE LOCATIONS

SHELL HARBOR ISLAND TERMINAL
LUBE FACILITY ABANDONMENT CLEANUP
SEATTLE, WASHINGTON

AECOM

FIGURE 3

Document Path: K:\46194268_Seattle_Terminal\MXD\2017\Fig 3 Excavation and Confirmation Soil Sample Locations.mxd

SITE
REGIONAL DISPOSAL INTERMODAL --
3rd and lander -Seattle, WA

CUSTOMER 021001
DIV 175 EMERALD CITY/SEATTLE DISP
54 S. Dawson
Seattle, WA 98134
Contract:TB-16072

SITE	TICKET #	CELL
01	941766	2619

WEIGHMASTER: IN - Drinda L. OUT - JAMIE B.

DATE/TIME IN	DATE/TIME OUT
9/19/16 3:00 pm	9/19/16 3:10 pm

VEHICLE: SOIL
CONTAINER:
REFERENCE: RECON
BILL OF LADING: 3461

SCALE IN	GROSS WEIGHT	43,660	NET TONS 4.32	INBOUND
SCALE OUT	TARE WEIGHT	35,020	NET WEIGHT 8,640	INVOICE

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	Tracking QTY				
4.32	tn	SW-CONT SOIL W/FUEL Origin:SEATTLE/KING 100%				

NET AMOUNT
TENDERED
CHANGE
CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

RS-F042UPR (07/12)

SIGNATURE _____

SITE
REGIONAL DISPOSAL INTERMODAL --
3rd and lander Seattle, WA

CUSTOMER
021001
DIV 175 EMERALD CITY/SEATTLE DISP
54 S. Dawson
Seattle, WA 98134
Contract:TB-16072

SITE	TICKET #	CELL
01	941778	

WEIGHMASTER: JAMIE B.

DATE/TIME IN	DATE/TIME OUT
9/20/16 3:36 pm	9/20/16 3:46 pm

VEHICLE: EC3461
CONTAINER:
REFERENCE: RECON
BILL OF LADING: 2619

SCALE IN	GROSS WEIGHT	36,880	NET TONS 0.96	INBOUND
SCALE OUT	TARE WEIGHT	34,960	NET WEIGHT 1,920	INVOICE

QTY.	UNIT	DESCRIPTION	RATE	EXTENSION	TAX	TOTAL
0.00	YD	Tracking QTY				
0.96	tn	SW-CONT SOIL W/FUEL Origin:SEATTLE/KING 100%				

4

NET AMOUNT
TENDERED
CHANGE
CHECK#

The undersigned individual signing this document on behalf of Customer acknowledges that he or she has read and understands the terms and conditions on the reverse side and that he or she has the authority to sign this document on behalf of the customer.

RS-F042UPR (07/12)

SIGNATURE _____

Field Photographic Log

Client Name: Shell (Equilon)	**Project:** Remedial Action Letter– Former Lubes Facility Decommissioning Shell Harbor Island Terminal

Photo No.	**Date:**
1	9/19/2016

Direction Photo Taken:

South

Description:

View of the southern terminus of the pipes at the former South Blending Area.

Photo No.	**Date:**
2	9/19/2016

Direction Photo Taken:

North

Description:

View of the southern terminus of the pipes at the former South Blending Area.

Field Photographic Log

Client Name: Shell (Equilon)	**Project:** Remedial Action Letter– Former Lubes Facility Decommissioning Shell Harbor Island Terminal

Photo No.	**Date:**
3	9/19/2016

Direction Photo Taken:

n/a

Description:

View of the final excavation limits, grouted four pipes, and single yellow pipe at Stain 1.

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

September 23, 2016

Bill Doherty, Project Manager
Remedial Construction Svc
9977 W Sam Houston Pkwy N Suite 100
Houston, TX 77064

Dear Mr Doherty:

Included are the results from the testing of material submitted on September 19, 2016 from the Shell Harbor Island Stained Soil, F&BI 609325 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
c: Nicky Moody, AECOM, bill.doherty@reconservices.com
NAA0923R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 19, 2016 by Friedman & Bruya, Inc. from the Remedial Construction Svc Shell Harbor Island Stained Soil, F&BI 609325 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Remedial Construction Svc
609325 -01	Stain 1-Sample Bottom
609325 -02	Stain 1-Sample-N
609325 -03	Stain 1-Sample-S
609325 -04	Stain 1-Sample-E
609325 -05	Stain 1-Sample-W

All quality control requirements were acceptable.

Date of Report: 09/23/16
Date Received: 09/19/16
Project: Shell Harbor Island Stained Soil, F&BI 609325
Date Extracted: 09/20/16
Date Analyzed: 09/20/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 58-139)
Stain 1-Sample Bottom 609325-01	<2	86
Stain 1-Sample-N 609325-02	<2	99
Stain 1-Sample-S 609325-03	<2	98
Stain 1-Sample-E 609325-04	<2	99
Stain 1-Sample-W 609325-05	<2	95
Method Blank 06-1911 MB	<2	99

Date of Report: 09/23/16
Date Received: 09/19/16
Project: Shell Harbor Island Stained Soil, F&BI 609325
Date Extracted: 09/20/16
Date Analyzed: 09/20/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
Stain 1-Sample Bottom 609325-01	150 x	7,100	93
Stain 1-Sample-N 609325-02	520 x	15,000	95
Stain 1-Sample-S 609325-03	<50	2,000	89
Stain 1-Sample-E 609325-04	<50	1,000	89
Stain 1-Sample-W 609325-05	160 x	8,000	89
Method Blank 06-1946 MB	<50	<250	87

Date of Report: 09/23/16
Date Received: 09/19/16
Project: Shell Harbor Island Stained Soil, F&BI 609325

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 609325-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	105	71-131

Date of Report: 09/23/16
Date Received: 09/19/16
Project: Shell Harbor Island Stained Soil, F&BI 609325

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

Laboratory Code: 609321-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	101	109	73-135	8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	111	74-139

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.

609325

SAMPLE CHAIN OF CUSTODY

ME 09-19-16 VSI/1C01

Page # 1 of 1

Report To Bill Doherty

Company Remedial Construction Svc.

Address 9977 W Sam Houston Pkwy N Suite 100

City, State, ZIP Houston, TX 77064

Phone 832-349-2609 Email bill.doherty@reconservices.com

SAMPLERS (signature) RECON

PROJECT NAME SITELL HARBOR ISLAND STAINED SOIL

PO #

REMARKS CC: NICKY MOODY W/REPORT nicky.moody@aecom.com

INVOICE TO BILL DOHERTY RECON

TURNAROUND TIME
- ☐ Standard Turnaround
- ☒ RUSH 24 hr.

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

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	HEAVY OIL				Notes
STAIN 1 - SAMPLE BOTTOM	01 A-E	9/19/16	1430	Soil	5		X	X					X				
STAIN 1 - SAMPLE - N	02	"	1550	"	5		X	X					X				
STAIN 1 - SAMPLE - S	03	"	1600	"	5		X	X					X				
STAIN 1 - SAMPLE - E	04	"	1555	"	5		X	X					X				
STAIN 1 - SAMPLE - W	05	"	1605	"	5		X	X					X				

ANALYSES REQUESTED

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Dave Lewis	DAVE LEWIS	AECOM	9/19/16	1645
Received by:		Eric Houn	F&B	9/19/16	1645
Relinquished by:					
Received by:			Samples received at 4		°C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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www.friedmanandbruya.com

September 23, 2016

Bill Doherty, Project Manager
Remedial Constrution Services
9977 W Sam Houston Pky N Suite 100
Houston, TX 77064

Dear Mr Doherty:

Included are the results from the testing of material submitted on September 20, 2016 from the Stained Soil Shell HI, F&BI 609337 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
c: Nicky Moody, AECOM, bill.doherty@reconservices.com
NAA0923R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on September 20, 2016 by Friedman & Bruya, Inc. from the Remedial Constrution Services Stained Soil Shell HI, F&BI 609337 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Remedial Constrution Services
609337 -01	STAIN2-SAMPLE-S-TOP
609337 -02	STAIN2-SAMPLE-S
609337 -03	STAIN2-SAMPLE-W
609337 -04	STAIN2-SAMPLE-N
609337 -05	STAIN2-SAMPLE-E
609337 -06	STAIN2-SAMPLE-BOTTOM

All quality control requirements were acceptable.

Date of Report: 09/23/16
Date Received: 09/20/16
Project: Stained Soil Shell HI, F&BI 609337
Date Extracted: 09/20/16
Date Analyzed: 09/20/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 58-139)
STAIN2-SAMPLE-S-TOP 609337-01	170	101
STAIN2-SAMPLE-S 609337-02	2.1	91
STAIN2-SAMPLE-W 609337-03	<2	100
STAIN2-SAMPLE-N 609337-04	<2	100
STAIN2-SAMPLE-E 609337-05	<2	98
STAIN2-SAMPLE-BOTTOM 609337-06	<2	98
Method Blank 06-1911 MB	<2	99

Date of Report: 09/23/16
Date Received: 09/20/16
Project: Stained Soil Shell HI, F&BI 609337
Date Extracted: 09/20/16
Date Analyzed: 09/20/16

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
STAIN2-SAMPLE-S-TOP 609337-01	6,200	310 x	111
STAIN2-SAMPLE-S 609337-02	<50	<250	101
STAIN2-SAMPLE-W 609337-03	<50	<250	98
STAIN2-SAMPLE-N 609337-04	<50	<250	90
STAIN2-SAMPLE-E 609337-05	<50	<250	91
STAIN2-SAMPLE-BOTTOM 609337-06	<50	<250	91
Method Blank 06-1948 MB	<50	<250	105

Date of Report: 09/23/16
Date Received: 09/20/16
Project: Stained Soil Shell HI, F&BI 609337

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 609325-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	105	71-131

Date of Report: 09/23/16
Date Received: 09/20/16
Project: Stained Soil Shell HI, F&BI 609337

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

Laboratory Code: 609337-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	107	63-146	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	117	79-144

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.

609337

SAMPLE CHAIN OF CUSTODY

ME 09/20/16

VS2/C02

Report To Bill Doherty

Company Remedial Construction Services

Address 9977 W Sam Houston Pkwy N suite 100

City, State, ZIP Houston, TX 77064

Phone 832-342-2669 Email bill.doherty@rcconservices.com

SAMPLERS (*signature*)

PROJECT NAME SHELL HI STAINED SOIL

PO #

REMARKS cc: NICKY MOODY W/RESULTS nicky.moody@aecom.com

INVOICE TO

Page # _____ of _____

TURNAROUND TIME
- ☐ Standard Turnaround
- ☐ RUSH 24hr.

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

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	HEAVY OIL				Notes
STAIN2-SAMPLE-S-TOP	01A-E	9/20/16	1110	Soil	5		X	X					X				PRIORITY!
STAIN2-SAMPLE-S	02	"	1135	"	5		X	X					X				
STAIN2-SAMPLE-W	03	"	1140	"	5		X	X					X				
STAIN2-SAMPLE-N	04	"	1145	"	5		X	X					X				
STAIN2-SAMPLE-E	05	"	1150	"	5		X	X					X				
STAIN2-SAMPLEBOTTOM	06	"	1155	"	5		X	X					X				

ANALYSES REQUESTED

Samples received at 5 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Dave Lewis	DAVE LEWIS	AECOM	9/20/16	1240
Received by:	Khan Phan	FEDEX	9/20/16	1240
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282