

Technical Memorandum

TO: Nick Garson, The Boeing Company
FROM: Chris Kimmel, LHG, and Erin Waibel, RG
DATE: September 11, 2017
RE: **Castell III Foundation Excavation – Construction Support Summary**
Boeing Portland 85-001 Building
Gresham, Oregon
Project No. 025116.117.520

Introduction

This technical memorandum has been prepared on behalf of The Boeing Company (Boeing) to summarize environmental construction support conducted for the Castell III foundation excavation located near column K-13 in the 85-001 building at the Boeing Portland facility located at 19000 NE Sandy Boulevard in Gresham, Oregon (Figure 1). The analytical results for samples collected in association with the excavation are being provided to the State of Oregon Department of Environmental Quality (ODEQ) to document environmental conditions in the shallow soil of the Troutdale Grave Aquifer (TGA). Remediation of the TGA is ongoing and overseen by ODEQ-Order on Consent ODEQ No. LQSR-NWR-04-12 (ODEQ 2008).

Boeing is in the process of installing a new production metal fabrication machine (Castell III) and during the excavation for the foundation, discolored soil was initially observed along the northwestern portion of the excavation. Per the Institutional Control Plan (ICP; LAI 2005), the contractor notified Boeing Environment, Health and Safety (EHS), and excavation work was placed on a temporary hold to allow for analytical testing of the potentially impacted soil. Based on the elevated concentration of residual heavy oil-range petroleum hydrocarbons (TPH-O), the remainder of the excavation was conducted using an updated health and safety plan. Final confirmation soil samples were collected at the extent of the excavation to document site conditions. The initial results along with final confirmation soil sample results are summarized in the report.

The Castell III excavation is located approximately 18 feet (ft) north of an area where TPH-O-impacted soil was observed in a previous equipment foundation excavation. The previous excavation was conducted at building column J-13 and the impacted soil was removed and disposed within the footprint of the designed foundation. Final confirmation soil samples from the J-13 column were collected from the limit of the excavation and indicated TPH-O concentrations ranged from non-detect at the laboratory reporting limit to 2,900 milligrams per kilogram (mg/kg) at depths ranging from 1.0 to 4.0 ft below the top of concrete slab. The final confirmation sample results were below the ODEQ generic remedy Risk Based Concentrations (RBCs) for cleanup levels (ODEQ 2015). Boeing provided notification of the historical release to the Oregon Emergency Response System (OERS;

report number 2011-1033). The results of the excavation and confirmation soil sampling are provided in a summary report (LAI 2011).

Given the proximity of the Castell III foundation and the J-13 excavation, and the type of impacted soil conditions, it would appear that these two areas are from the same historical release. Therefore, a separate report for the Castell III foundation was not filed with OERS. The approximate location of the Castell III foundation excavation and the previously conducted J-13 excavation are shown on Figure 2.

Sample Collection Procedures

An initial soil sample was collected near column K-13 on July 19, 2017 to characterize the impacted soil to assist Boeing with soil disposal. On August 1, 2017, final confirmation soil samples were collected at the limits of the excavation to represent soil conditions at the vertical and horizontal extent of the Castell III foundation. The excavation was completed to the planned limits of the engineering design and impacted soil was not “chased” to remove due to limited access within the building footprint. The final limits of the excavation extended vertically to 5.5 ft below finished floor grade. The horizontal extent of the excavation extends approximately 22 ft (east to west) and 29 ft (north to south), as shown on Figure 3.

Soil sample collection and field-screening procedures were conducted in accordance with the ODEQ-approved Environmental Strategic Plan (LAI 2008). A total of 20 samples were collected; however, based on field screening results, 14 samples were selected for analytical testing. The remaining 6 samples, for which field screening results indicated no presence of contamination, were shipped to the laboratory and placed on hold for potential follow-up analyses, on an as needed basis. The initial disposal characterization sample, Bldg001-K13(2.5-3.0), was collected from an area of the excavation where field screening results (soil discoloration, odor, and headspace vapor measurements with a photoionization detector) indicated the presence of contamination. Four confirmation soil samples were collected and analyzed from the excavation base at a depth of 5.5 ft below finished floor grade. Nine confirmation sidewall soil samples were collected and analyzed from the west, southwest, east, and southeast sidewalls. Sidewall samples were collected from 2 to 5 ft below finished floor grade. The approximate locations of the soil samples are shown on Figure 3.

Samples were submitted to Apex Laboratory, located in Tigard, Oregon, and analyzed for total petroleum hydrocarbons–diesel range (TPH-D) and TPH-O using Northwest Method NWTPH-Dx, and volatile organic compounds (VOCs) using US Environmental Protection Agency (EPA) Method 8260B.

Subsurface Conditions

Subsurface soil conditions consist of brown to gray silty sand with various amounts of gravel, which was interpreted as fill material. Groundwater was not observed in the excavation and, based on

nearby monitoring well information, the static groundwater for the TGA is approximately 40 ft below the top of slab.

Analytical Results

Soil analytical results for the Castell III foundation excavation are summarized in Table 1 and are shown on Figure 3. Laboratory reports are provided in Attachment 1. The analytical results were compared to the RBC cleanup levels. The most protective applicable generic RBC (soil ingestion, dermal contact, and inhalation exposure pathway for the construction worker in an occupational setting and protection of groundwater from leaching) receptor was used to evaluate the results.

The analytical results from the Castell III excavation soil samples indicate no TPH-D or VOC concentrations above the respective laboratory reporting limits, with the exception of one low-level naphthalene concentration (128 micrograms per kilogram [$\mu\text{g}/\text{kg}$]) in sample Bldg001-K13(2.5-3); however, the concentration is well below the RBC level (223,000 $\mu\text{g}/\text{kg}$). TPH-O concentrations were also below the laboratory reporting limits with the exception of three samples:

- A low-level TPH-O concentration (1,300 mg/kg) was reported at sample Castell-BaseSW(5.5); however, the concentration is below the RBC cleanup level (11,000 mg/kg).
- The initial disposal characterization sample [Bldg001-K13(2.5-3.0)] had a reported TPH-O concentration of 54,300 mg/kg, which is above the RBC cleanup level.
- The final confirmation soil sample Castell-Side SW(3.4) had a reported TPH-O concentration of 20,100, which is above the RBC cleanup level.

Recommendations

The results of the analytical testing indicate isolated areas of TPH-O concentrations above the RBCs in the shallow soil (2.5 to 4 ft below the top of slab) along the western portion of the excavation. Sample results from the base of the excavation and other sidewall confirmation samples indicate concentrations are below the RBC or not detected at the laboratory reporting limit. Groundwater is approximately 40 ft bgs based on nearby groundwater monitoring well data; therefore, the risk of leaching to groundwater is considered very low.

The TPH-O-impacted soil was removed as much as practical within the engineered extent of the excavation. However, the location of the TPH-O-impacted soil will be stored electronically in the project files for reference to allow for future investigations, if needed, as access is acquired (i.e., future foundation modification of building demolition).

Use of This Report

This Technical Memorandum has been prepared for the exclusive use of The Boeing Company for specific application to the Castell III Foundation Excavation Soil Sampling Investigation. No other party is entitled to rely on the information, conclusions, and recommendations included in this document

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This document has been prepared under the supervision and direction of the following key staff.

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Attachments

- Figure 1: Boeing Portland Site Map
- Figure 2: Building 85-001 Main Floor Plan
- Figure 3: Castell III Equipment Foundation Soil Analytical Results
- Table 1: Castell III Foundation Soil Disposal Characterization Sample Results
- Attachment 1: Laboratory Analytical Results

References

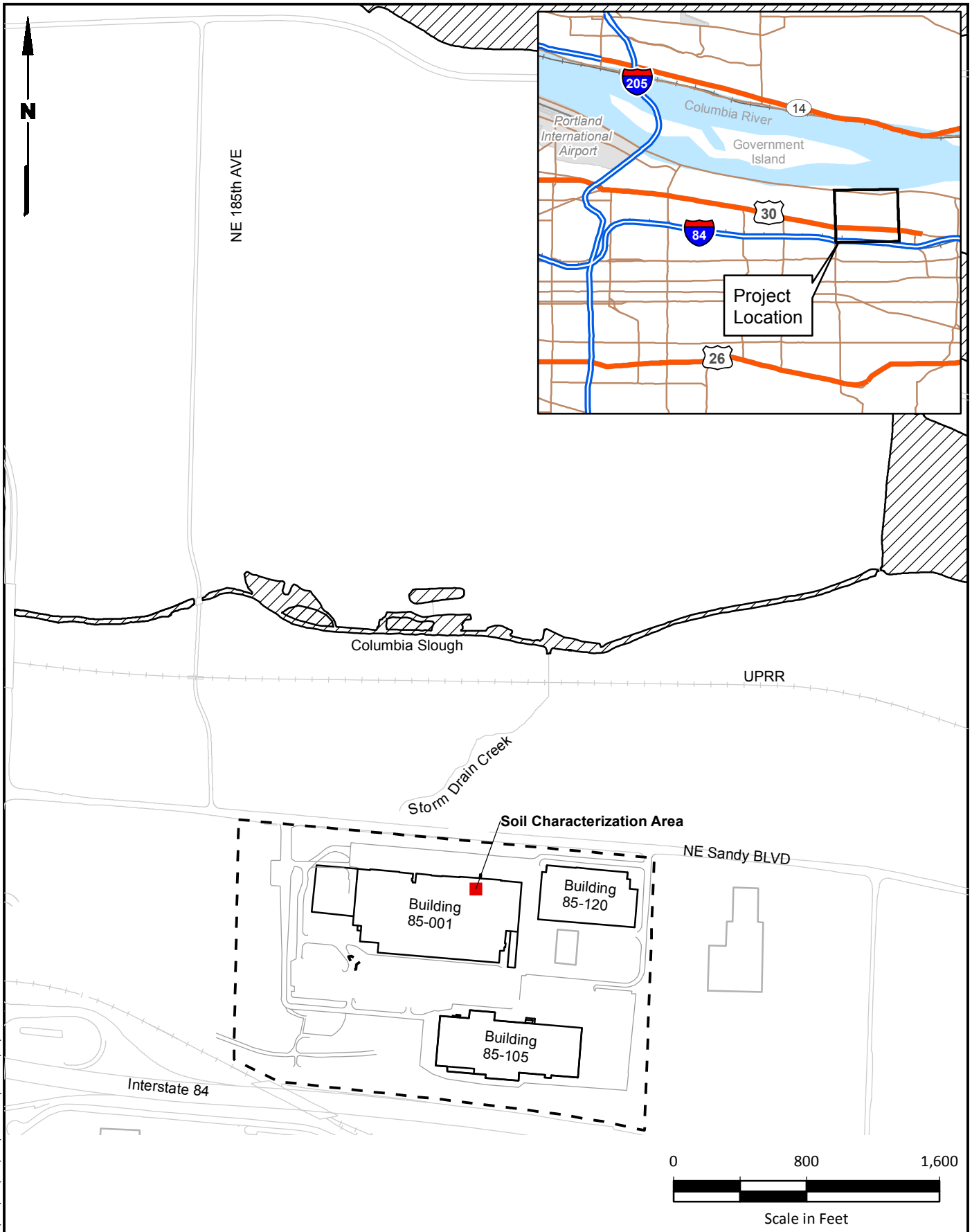
ODEQ. 2015. *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites*. Oregon Department of Environmental Quality.

ODEQ. 2008. Order of Consent, DEQ No. LOSR-NWR-04-12(h). September 8.

LAI. 2011. Report, Column J-13 Limited Shallow Soil Investigation, 85-001 Building Expansion, Gresham, Oregon. Prepared for The Boeing Company. July 25.

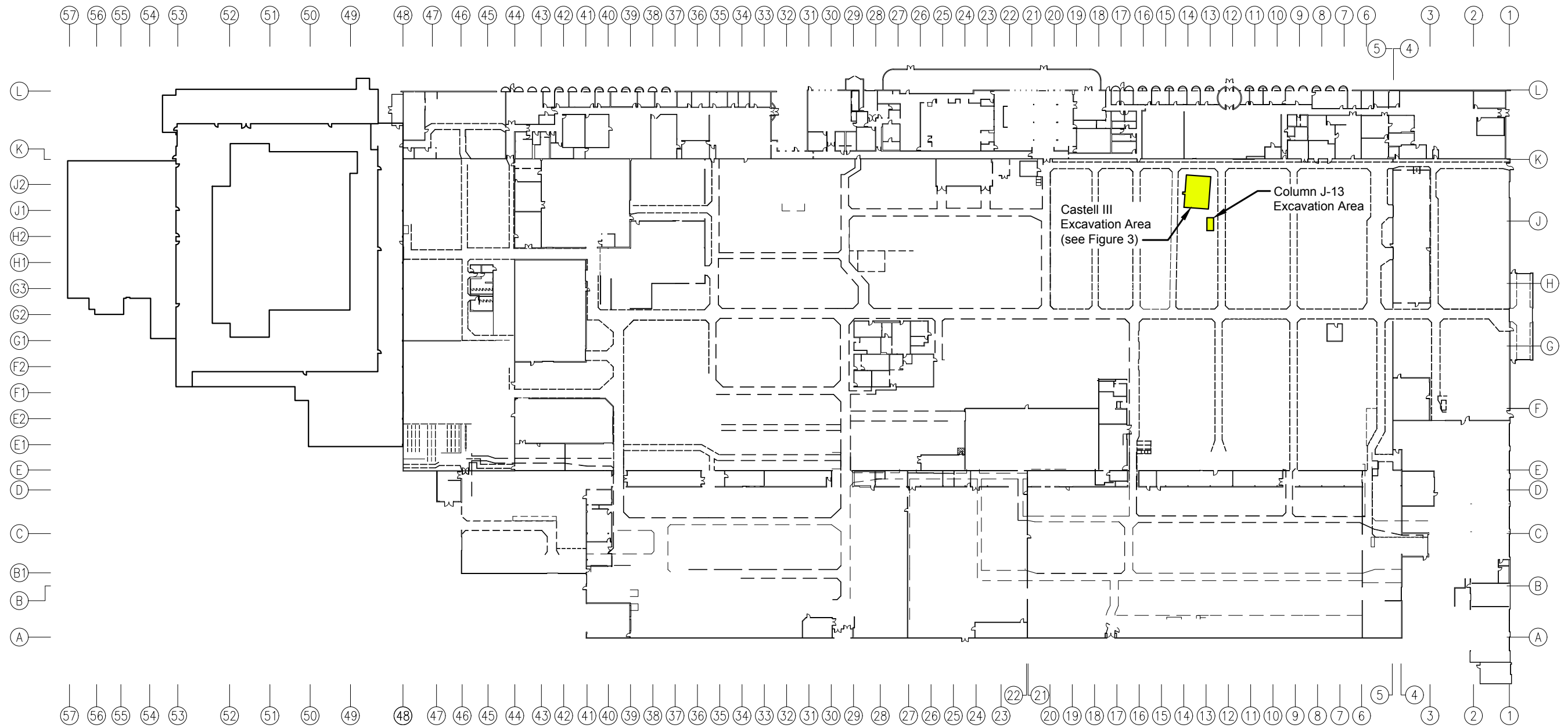
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LAI. 2008. Environmental Strategic Plan, 85-001 Building Expansion, Boeing Portland, Gresham, Oregon. March 28.



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Landau Associates, Inc. | G:\Projects\025\116\17\520\F02 Building 85-001.dwg (A) "Figure 2" 8/22/2017



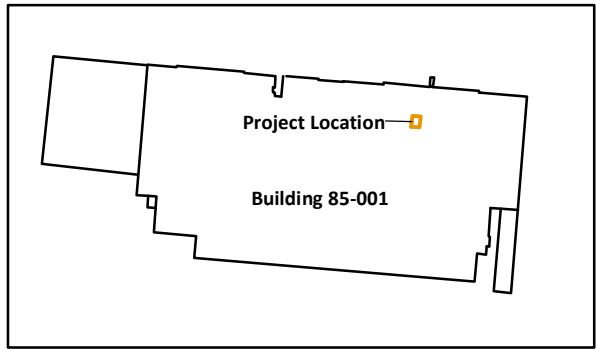
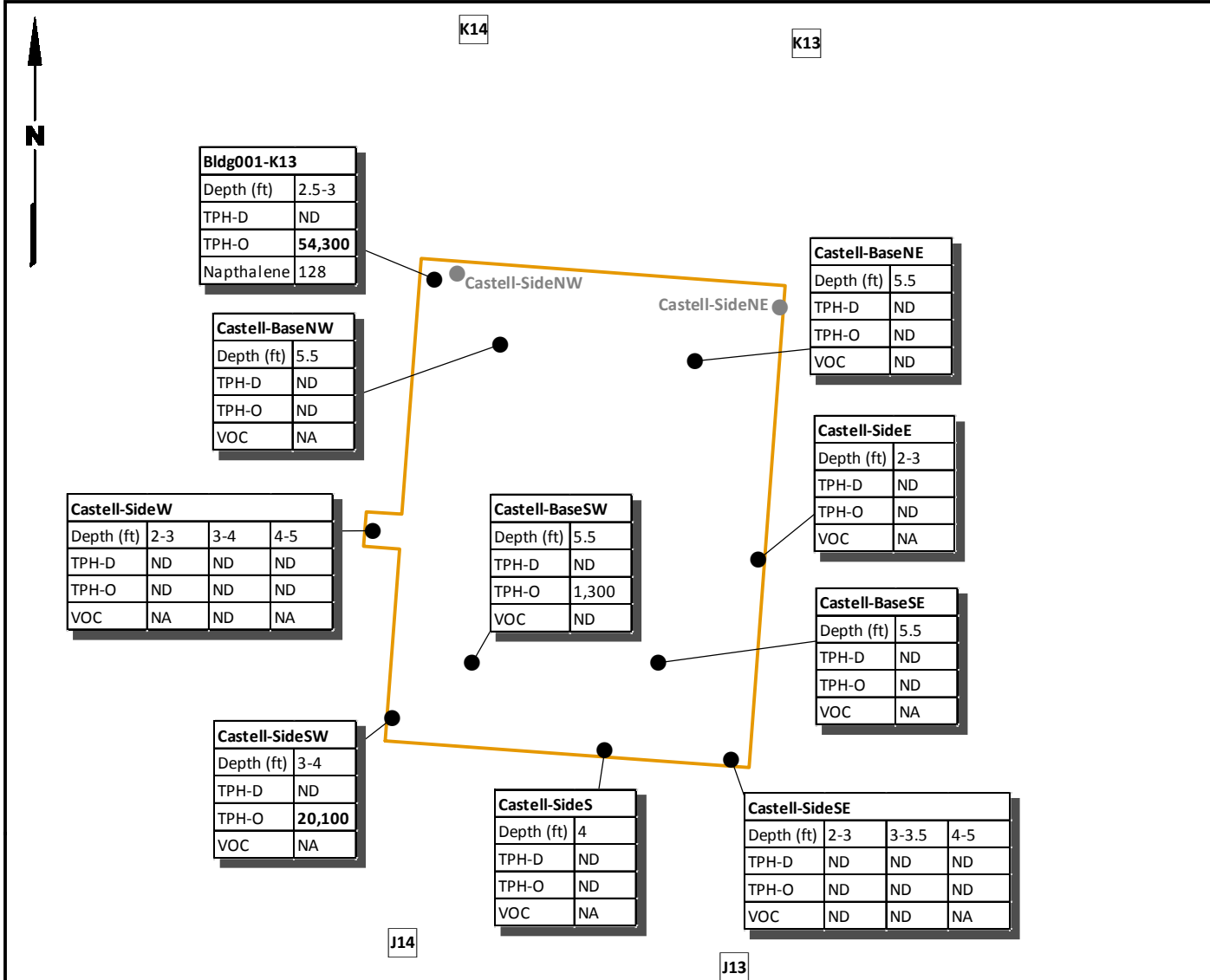
Source: Boeing 2009

Boeing of Portland
Portland, Oregon

Building 85-001
Main Floor Plan

Figure
2

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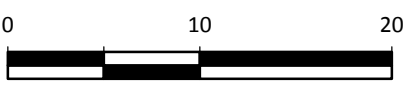
Castell-SideS	Sample ID
Depth (ft)	Sample Depth (ft below top of slab)
TPH-D	Total Petroleum Hydrocarbon - Diesel Range Concentration (mg/kg)
TPH-O	Total Petroleum Hydrocarbon - Oil Range Concentration (mg/kg)
VOC	Volatile Organic Compounds Concentration (µg/kg)
Napthalene	Individual VOC with Low Level Detection

Legend

- Soil Sample Location
- Soil Sample Collected but not Analyzed
- K13** Building Columns
- ▭ Excavation Area

Abbreviations

ND = Not Detected at the Laboratory Reporting Limit
 NA = Not Analyzed



Scale in Feet

Notes

1. **Bold** text indicate result above the respective RBC cleanup level.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Boeing Portland
Gresham, Oregon

**Castell III Foundation
Soil Analytical Results**

Figure
3

Table 1
Castel III Foundation
Soil Characterization Sample Results
Boeing Portland

Analyte	RBC (a)	Sample ID, Sample Date, and Laboratory SDG							
		Disposal Sample	Final Confirmation Samples						
		Bldg001-K13(2.5-3)	Castell-Side SW(3-4)	Castell-Base SW(5.5)	Castell-Side W(2-3)	Castell-Side W(3-4)	Castell-Side W(4-5)	Castell-Base NW(5.5)	Castell-Base NE(5.5)
		07/19/2017 A7G0500	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069
Total Petroleum Hydrocarbons (mg/kg; NWTPH-dx)									
Diesel	4,600	2,030 U	404 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.3 U
Oil	11,000	54,300	20,100	1,300	50.0 U	50.0 U	50.0 U	50.0 U	50.5 U
Volatile Organic Compounds (µg/kg; SW-846 8260B)									
1,1,1,2-Tetrachloroethane	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,1,1-Trichloroethane	470,000,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,1,2,2-Tetrachloroethane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,1,2-Trichloroethane	26,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,1-Dichloroethane	260,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,1-Dichloroethene	13,000,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,1-Dichloropropene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,2,3-Trichlorobenzene	N/A	253 U	--	6.11 U	--	5.45 U	--	--	8.18 U
1,2,3-Trichloropropane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,2,4-Trichlorobenzene	N/A	253 U	--	6.11 U	--	5.45 U	--	--	8.18 U
1,2,4-Trimethylbenzene	2,000,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,2-Dibromo-3-chloropropane	N/A	253 U	--	6.11 U	--	5.45 U	--	--	8.18 U
1,2-Dibromoethane (EDB)	730	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,2-Dichlorobenzene	20,000,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,2-Dichloroethane (EDC)	16,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,2-Dichloropropane	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,3,5-Trimethylbenzene	3,500,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,3-Dichlorobenzene	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
1,3-Dichloropropane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
1,4-Dichlorobenzene	64,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
2,2-Dichloropropane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
2-Butanone (MEK)	N/A	506 U	--	12.2 U	--	10.9 U	--	--	16.4 U
2-Chlorotoluene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
2-Hexanone	N/A	506 U	--	12.2 U	--	10.9 U	--	--	16.4 U
4-Chlorotoluene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
4-Isopropyltoluene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
4-Methyl-2-pentanone (MiBK)	N/A	506 U	--	12.2 U	--	10.9 U	--	--	16.4 U
Acetone	N/A	1,010 U	--	24.4 U	--	21.8 U	--	--	32.7 U
Benzene	37,000	10.1 U	--	0.244 U	--	0.218 U	--	--	0.327 U
Bromobenzene	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
Bromochloromethane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Bromodichloromethane	N/A	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Bromoform	260,000	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Bromomethane	370,000	506 U	--	12.2 U	--	10.9 U	--	--	16.4 U
Carbon tetrachloride	34,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Chlorobenzene	4,700,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
Chloroethane	N/A	506 U	--	12.2 U	--	10.9 U	--	--	16.4 U
Chloroform	350,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U

Table 1
Castel III Foundation
Soil Characterization Sample Results
Boeing Portland

Analyte	RBC (a)	Sample ID, Sample Date, and Laboratory SDG							
		Disposal Sample	Final Confirmation Samples						
		Bldg001-K13(2.5-3)	Castell-Side SW(3-4)	Castell-Base SW(5.5)	Castell-Side W(2-3)	Castell-Side W(3-4)	Castell-Side W(4-5)	Castell-Base NW(5.5)	Castell-Base NE(5.5)
		07/19/2017 A7G0500	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069
Chloromethane	25,000,000	253 U	--	6.11 U	--	5.45 U	--	--	8.18 U
cis-1,2-Dichloroethene	710,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
cis-1,3-Dichloropropene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Dibromochloromethane	N/A	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Dibromomethane	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Dichlorodifluoromethane	N/A	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Ethylbenzene	150,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
Hexachlorobutadiene	N/A	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Isopropylbenzene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
m,p-Xylene	20,000,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Methyl tert-butyl ether (MTBE)	1,100,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Methylene chloride	N/A	253 U	--	6.11 U	--	5.45 U	--	--	8.18 U
Naphthalene	223,000	128	--	2.44 U	--	2.18 U	--	--	3.27 U
n-Butylbenzene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
n-Propylbenzene	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
o-Xylene	20,000,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
sec-Butylbenzene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Styrene	56,000,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
tert-Butylbenzene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Tetrachloroethene (PCE)	1,000,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
Toluene	28,000,000	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
trans-1,2-Dichloroethene	7,100,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
trans-1,3-Dichloropropene	N/A	50.6 U	--	1.22 U	--	1.09 U	--	--	1.64 U
Trichloroethene (TCE)	51,000	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U
Trichlorofluoromethane	69,000,000	101 U	--	2.44 U	--	2.18 U	--	--	3.27 U
Vinyl chloride	N/A	25.3 U	--	0.611 U	--	0.545 U	--	--	0.818 U

Table 1
Castel III Foundation
Soil Characterization Sample Results
Boeing Portland

Analyte	RBC (a)	Sample ID, Sample Date, and Laboratory SDG					
		Final Confirmation Samples					
		Castell-Base SE(5.5)	Castell-Side E(2-3)	Castell-Side SE(2-3)	Castell-Side SE(3-3.5)	Castell-Side SE(4-5)	Castell-Side S(4)
		8/1/2017	8/1/2017	8/1/2017	8/1/2017	8/1/2017	8/1/2017
		A7H0069	A7H0069	A7H0069	A7H0069	A7H0069	A7H0069
Total Petroleum Hydrocarbons (mg/kg; NWTPH-dx)							
Diesel	4,600	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
Oil	11,000	50.0 U	50.0 U	50.0 U	50.0 U	50.0 U	50.0 U
Volatile Organic Compounds (µg/kg; SW-846 8260B)							
1,1,1,2-Tetrachloroethane	N/A	--	--	0.673 U	0.612 U	--	--
1,1,1-Trichloroethane	470,000,000	--	--	0.673 U	0.612 U	--	--
1,1,2,2-Tetrachloroethane	N/A	--	--	1.35 U	1.22 U	--	--
1,1,2-Trichloroethane	26,000	--	--	0.673 U	0.612 U	--	--
1,1-Dichloroethane	260,000	--	--	0.673 U	0.612 U	--	--
1,1-Dichloroethene	13,000,000	--	--	0.673 U	0.612 U	--	--
1,1-Dichloropropene	N/A	--	--	1.35 U	1.22 U	--	--
1,2,3-Trichlorobenzene	N/A	--	--	6.73 U	6.12 U	--	--
1,2,3-Trichloropropane	N/A	--	--	1.35 U	1.22 U	--	--
1,2,4-Trichlorobenzene	N/A	--	--	6.73 U	6.12 U	--	--
1,2,4-Trimethylbenzene	2,000,000	--	--	1.35 U	1.22 U	--	--
1,2-Dibromo-3-chloropropane	N/A	--	--	6.73 U	6.12 U	--	--
1,2-Dibromoethane (EDB)	730	--	--	1.35 U	1.22 U	--	--
1,2-Dichlorobenzene	20,000,000	--	--	0.673 U	0.612 U	--	--
1,2-Dichloroethane (EDC)	16,000	--	--	0.673 U	0.612 U	--	--
1,2-Dichloropropane	N/A	--	--	0.673 U	0.612 U	--	--
1,3,5-Trimethylbenzene	3,500,000	--	--	1.35 U	1.22 U	--	--
1,3-Dichlorobenzene	N/A	--	--	0.673 U	0.612 U	--	--
1,3-Dichloropropane	N/A	--	--	1.35 U	1.22 U	--	--
1,4-Dichlorobenzene	64,000	--	--	0.673 U	0.612 U	--	--
2,2-Dichloropropane	N/A	--	--	1.35 U	1.22 U	--	--
2-Butanone (MEK)	N/A	--	--	13.5 U	12.2 U	--	--
2-Chlorotoluene	N/A	--	--	1.35 U	1.22 U	--	--
2-Hexanone	N/A	--	--	13.5 U	12.2 U	--	--
4-Chlorotoluene	N/A	--	--	1.35 U	1.22 U	--	--
4-Isopropyltoluene	N/A	--	--	1.35 U	1.22 U	--	--
4-Methyl-2-pentanone (MiBK)	N/A	--	--	13.5 U	12.2 U	--	--
Acetone	N/A	--	--	26.9 U	24.5 U	--	--
Benzene	37,000	--	--	0.269 U	0.245 U	--	--
Bromobenzene	N/A	--	--	0.673 U	0.612 U	--	--
Bromochloromethane	N/A	--	--	1.35 U	1.22 U	--	--
Bromodichloromethane	N/A	--	--	2.69 U	2.45 U	--	--
Bromoform	260,000	--	--	2.69 U	2.45 U	--	--
Bromomethane	370,000	--	--	13.5 U	12.2 U	--	--
Carbon tetrachloride	34,000	--	--	1.35 U	1.22 U	--	--
Chlorobenzene	4,700,000	--	--	0.673 U	0.612 U	--	--
Chloroethane	N/A	--	--	13.5 U	12.2 U	--	--
Chloroform	350,000	--	--	1.35 U	1.22 U	--	--

Table 1
Castel III Foundation
Soil Characterization Sample Results
Boeing Portland

Analyte	RBC (a)	Sample ID, Sample Date, and Laboratory SDG					
		Final Confirmation Samples					
		Castell-Base SE(5.5)	Castell-Side E(2-3)	Castell-Side SE(2-3)	Castell-Side SE(3-3.5)	Castell-Side SE(4-5)	Castell-Side S(4)
		8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069	8/1/2017 A7H0069
Chloromethane	25,000,000	--	--	6.73 U	6.12 U	--	--
cis-1,2-Dichloroethene	710,000	--	--	0.673 U	0.612 U	--	--
cis-1,3-Dichloropropene	N/A	--	--	1.35 U	1.22 U	--	--
Dibromochloromethane	N/A	--	--	2.69 U	2.45 U	--	--
Dibromomethane	N/A	--	--	1.35 U	1.22 U	--	--
Dichlorodifluoromethane	N/A	--	--	2.69 U	2.45 U	--	--
Ethylbenzene	150,000	--	--	0.673 U	0.612 U	--	--
Hexachlorobutadiene	N/A	--	--	2.69 U	2.45 U	--	--
Isopropylbenzene	N/A	--	--	1.35 U	1.22 U	--	--
m,p-Xylene	20,000,000	--	--	1.35 U	1.22 U	--	--
Methyl tert-butyl ether (MTBE)	1,100,000	--	--	1.35 U	1.22 U	--	--
Methylene chloride	N/A	--	--	6.73 U	6.12 U	--	--
Naphthalene	223,000	--	--	2.69 U	2.45 U	--	--
n-Butylbenzene	N/A	--	--	1.35 U	1.22 U	--	--
n-Propylbenzene	N/A	--	--	0.673 U	0.612 U	--	--
o-Xylene	20,000,000	--	--	0.673 U	0.612 U	--	--
sec-Butylbenzene	N/A	--	--	1.35 U	1.22 U	--	--
Styrene	56,000,000	--	--	1.35 U	1.22 U	--	--
tert-Butylbenzene	N/A	--	--	1.35 U	1.22 U	--	--
Tetrachloroethene (PCE)	1,000,000	--	--	0.673 U	0.612 U	--	--
Toluene	28,000,000	--	--	1.35 U	1.22 U	--	--
trans-1,2-Dichloroethene	7,100,000	--	--	0.673 U	0.612 U	--	--
trans-1,3-Dichloropropene	N/A	--	--	1.35 U	1.22 U	--	--
Trichloroethene (TCE)	51,000	--	--	0.673 U	0.612 U	--	--
Trichlorofluoromethane	69,000,000	--	--	2.69 U	2.45 U	--	--
Vinyl chloride	N/A	--	--	0.673 U	0.612 U	--	--

Abbreviations and Acronyms:

ID = identification
 mg/kg = milligrams per kilogram
 µg/kg = micrograms per kilogram
 -- = not analyzed
 N/A = Not Applicable
 RBC = Risk Based Concentration
 SDG = sample delivery group

Notes:

U = Indicates the compound was undetected at the reported concentration.
Bold = Detected compound
 Green shading = Exceedance of RBC

(a) Oregon Department of Environmental Quality (ODEQ) RBC for protection of construction worker in an occupational setting from soil ingestion, dermal contact, and inhalation and protection of groundwater from leaching.

Laboratory Analytical Results

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Thursday, July 20, 2017

Chris Kimmel
Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

RE: Boeing of Portland / 025116.117.520

Enclosed are the results of analyses for work order A7G0500, which was received by the laboratory on 7/19/2017 at 2:48:00PM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Apex Laboratories



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Lisa Domenighini, Client Services Manager

Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
07/20/17 16:06

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Bldg001-K13(25.3)	A7G0500-01	Soil	07/19/17 13:45	07/19/17 14:48

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Lisa Domenighini, Client Services Manager

Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 07/20/17 16:06

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg001-K13(25.3) (A7G0500-01)			Matrix: Soil		Batch: 7070693			
Diesel	ND	---	2030	mg/kg dry	100	07/20/17 00:49	NWTPH-Dx	
Oil	54300	---	4070	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>	<i>Limits: 50-150 %</i>	"	"	"	<i>S-01</i>



Landau Associates

333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:

07/20/17 16:06

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg001-K13(25.3) (A7G0500-01)			Matrix: Soil		Batch: 7070675			V-15
Acetone	ND	---	1010	ug/kg dry	50	07/19/17 19:45	5035A/8260B	
Benzene	ND	---	10.1	"	"	"	"	
Bromobenzene	ND	---	25.3	"	"	"	"	
Bromochloromethane	ND	---	50.6	"	"	"	"	
Bromodichloromethane	ND	---	101	"	"	"	"	
Bromoform	ND	---	101	"	"	"	"	
Bromomethane	ND	---	506	"	"	"	"	
2-Butanone (MEK)	ND	---	506	"	"	"	"	
n-Butylbenzene	ND	---	50.6	"	"	"	"	
sec-Butylbenzene	ND	---	50.6	"	"	"	"	
tert-Butylbenzene	ND	---	50.6	"	"	"	"	
Carbon tetrachloride	ND	---	50.6	"	"	"	"	
Chlorobenzene	ND	---	25.3	"	"	"	"	
Chloroethane	ND	---	506	"	"	"	"	
Chloroform	ND	---	50.6	"	"	"	"	
Chloromethane	ND	---	253	"	"	"	"	
2-Chlorotoluene	ND	---	50.6	"	"	"	"	
4-Chlorotoluene	ND	---	50.6	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	253	"	"	"	"	
Dibromochloromethane	ND	---	101	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	50.6	"	"	"	"	
Dibromomethane	ND	---	50.6	"	"	"	"	
1,2-Dichlorobenzene	ND	---	25.3	"	"	"	"	
1,3-Dichlorobenzene	ND	---	25.3	"	"	"	"	
1,4-Dichlorobenzene	ND	---	25.3	"	"	"	"	
Dichlorodifluoromethane	ND	---	101	"	"	"	"	
1,1-Dichloroethane	ND	---	25.3	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	25.3	"	"	"	"	
1,1-Dichloroethene	ND	---	25.3	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	25.3	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	25.3	"	"	"	"	
1,2-Dichloropropane	ND	---	25.3	"	"	"	"	
1,3-Dichloropropane	ND	---	50.6	"	"	"	"	
2,2-Dichloropropane	ND	---	50.6	"	"	"	"	
1,1-Dichloropropene	ND	---	50.6	"	"	"	"	

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Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

07/20/17 16:06

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Bldg001-K13(25.3) (A7G0500-01)			Matrix: Soil		Batch: 7070675			V-15
cis-1,3-Dichloropropene	ND	---	50.6	ug/kg dry	50	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	50.6	"	"	"	"	
Ethylbenzene	ND	---	25.3	"	"	"	"	
Hexachlorobutadiene	ND	---	101	"	"	"	"	
2-Hexanone	ND	---	506	"	"	"	"	
Isopropylbenzene	ND	---	50.6	"	"	"	"	
4-Isopropyltoluene	ND	---	50.6	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	506	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	50.6	"	"	"	"	
Methylene chloride	ND	---	253	"	"	"	"	
Naphthalene	128	---	101	"	"	"	"	
n-Propylbenzene	ND	---	25.3	"	"	"	"	
Styrene	ND	---	50.6	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	25.3	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	50.6	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	25.3	"	"	"	"	
Toluene	ND	---	50.6	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	253	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	253	"	"	"	"	
1,1,1-Trichloroethane	ND	---	25.3	"	"	"	"	
1,1,2-Trichloroethane	ND	---	25.3	"	"	"	"	
Trichloroethene (TCE)	ND	---	25.3	"	"	"	"	
Trichlorofluoromethane	ND	---	101	"	"	"	"	
1,2,3-Trichloropropane	ND	---	50.6	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	50.6	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	50.6	"	"	"	"	
Vinyl chloride	ND	---	25.3	"	"	"	"	
m,p-Xylene	ND	---	50.6	"	"	"	"	
o-Xylene	ND	---	25.3	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 100 %</i>	<i>Limits: 70-130 %</i>	1	"	"	
<i>Toluene-d8 (Surr)</i>			<i>97 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>104 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 07/20/17 16:06
---	---	------------------------------------

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight								
--------------------	--	--	--	--	--	--	--	--

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Bldg001-K13(25.3) (A7G0500-01)			Matrix: Soil		Batch: 7070690			
% Solids	92.6	---	1.00	% by Weight	1	07/20/17 07:44	EPA 8000C	

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Lisa Domenighini, Client Services Manager

Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 07/20/17 16:06

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070693 - EPA 3546 (Fuels)						Soil						
Blank (7070693-BLK1)						Prepared: 07/19/17 13:39 Analyzed: 07/19/17 22:28						
NWTPH-Dx												
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	---
Oil	ND	---	50.0	"	"	---	---	---	---	---	---	---
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 89 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>			
LCS (7070693-BS1)						Prepared: 07/19/17 13:39 Analyzed: 07/19/17 22:48						
NWTPH-Dx												
Diesel	118	---	25.0	mg/kg wet	1	125	---	94	76-115%	---	---	---
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 91 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>			

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Lisa Domenighini, Client Services Manager

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Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 07/20/17 16:06

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070675 - EPA 5035A						Soil						
Blank (7070675-BLK1)						Prepared: 07/19/17 08:00 Analyzed: 07/19/17 11:26						
5035A/8260B												
Acetone	ND	---	667	ug/kg wet	50	---	---	---	---	---	---	---
Benzene	ND	---	6.67	"	"	---	---	---	---	---	---	---
Bromobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Bromochloromethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
Bromoform	ND	---	66.7	"	"	---	---	---	---	---	---	---
Bromomethane	ND	---	333	"	"	---	---	---	---	---	---	---
2-Butanone (MEK)	ND	---	333	"	"	---	---	---	---	---	---	---
n-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
sec-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
tert-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Chloroethane	ND	---	333	"	"	---	---	---	---	---	---	---
Chloroform	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chloromethane	ND	---	167	"	"	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	167	"	"	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	33.3	"	"	---	---	---	---	---	---	---
Dibromomethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	---

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Lisa Domenighini, Client Services Manager

Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
07/20/17 16:06

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070675 - EPA 5035A						Soil						
Blank (7070675-BLK1)						Prepared: 07/19/17 08:00 Analyzed: 07/19/17 11:26						
5035A/8260B												
1,1-Dichloropropene	ND	---	33.3	ug/kg wet	"	---	---	---	---	---	---	
cis-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	
trans-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	
Ethylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
Hexachlorobutadiene	ND	---	66.7	"	"	---	---	---	---	---	---	
2-Hexanone	ND	---	333	"	"	---	---	---	---	---	---	
Isopropylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
4-Isopropyltoluene	ND	---	33.3	"	"	---	---	---	---	---	---	
4-Methyl-2-pentanone (MiBK)	ND	---	333	"	"	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	33.3	"	"	---	---	---	---	---	---	
Methylene chloride	ND	---	167	"	"	---	---	---	---	---	---	
Naphthalene	ND	---	66.7	"	"	---	---	---	---	---	---	
n-Propylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	
Styrene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,1,1,2-Tetrachloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	
1,1,2,2-Tetrachloroethane	ND	---	33.3	"	"	---	---	---	---	---	---	
Tetrachloroethene (PCE)	ND	---	16.7	"	"	---	---	---	---	---	---	
Toluene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2,3-Trichlorobenzene	ND	---	167	"	"	---	---	---	---	---	---	
1,2,4-Trichlorobenzene	ND	---	167	"	"	---	---	---	---	---	---	
1,1,1-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	
1,1,2-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	
Trichloroethene (TCE)	ND	---	16.7	"	"	---	---	---	---	---	---	
Trichlorofluoromethane	ND	---	66.7	"	"	---	---	---	---	---	---	
1,2,3-Trichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	
Vinyl chloride	ND	---	16.7	"	"	---	---	---	---	---	---	
m,p-Xylene	ND	---	33.3	"	"	---	---	---	---	---	---	
o-Xylene	ND	---	16.7	"	"	---	---	---	---	---	---	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 98 % Limits: 70-130 % Dilution: 1x
Toluene-d8 (Surr) 99 % 70-130 % "
4-Bromofluorobenzene (Surr) 102 % 70-130 % "

LCS (7070675-BS1)

Prepared: 07/19/17 08:00 Analyzed: 07/19/17 10:33

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Lisa Domenighini, Client Services Manager

Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 07/20/17 16:06

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070675 - EPA 5035A						Soil						
LCS (7070675-BS1)						Prepared: 07/19/17 08:00 Analyzed: 07/19/17 10:33						
5035A/8260B												
Acetone	1580	---	1000	ug/kg wet	50	2000	---	79	65-135%	---	---	
Benzene	982	---	10.0	"	"	1000	---	98	"	---	---	
Bromobenzene	1040	---	25.0	"	"	"	---	104	"	---	---	
Bromochloromethane	942	---	50.0	"	"	"	---	94	"	---	---	
Bromodichloromethane	985	---	100	"	"	"	---	98	"	---	---	
Bromoform	1030	---	100	"	"	"	---	103	"	---	---	
Bromomethane	1270	---	500	"	"	"	---	127	"	---	---	
2-Butanone (MEK)	1720	---	500	"	"	2000	---	86	"	---	---	
n-Butylbenzene	1080	---	50.0	"	"	1000	---	108	"	---	---	
sec-Butylbenzene	1120	---	50.0	"	"	"	---	112	"	---	---	
tert-Butylbenzene	1110	---	50.0	"	"	"	---	111	"	---	---	
Carbon tetrachloride	1010	---	50.0	"	"	"	---	101	"	---	---	
Chlorobenzene	950	---	25.0	"	"	"	---	95	"	---	---	
Chloroethane	1400	---	500	"	"	"	---	140	"	---	---	Q-29
Chloroform	1010	---	50.0	"	"	"	---	101	"	---	---	
Chloromethane	1020	---	250	"	"	"	---	102	"	---	---	
2-Chlorotoluene	1100	---	50.0	"	"	"	---	110	"	---	---	
4-Chlorotoluene	1080	---	50.0	"	"	"	---	108	"	---	---	
1,2-Dibromo-3-chloropropane	964	---	250	"	"	"	---	96	"	---	---	
Dibromochloromethane	1040	---	100	"	"	"	---	104	"	---	---	
1,2-Dibromoethane (EDB)	1000	---	50.0	"	"	"	---	100	"	---	---	
Dibromomethane	898	---	50.0	"	"	"	---	90	"	---	---	
1,2-Dichlorobenzene	1010	---	25.0	"	"	"	---	101	"	---	---	
1,3-Dichlorobenzene	1040	---	25.0	"	"	"	---	104	"	---	---	
1,4-Dichlorobenzene	957	---	25.0	"	"	"	---	96	"	---	---	
Dichlorodifluoromethane	999	---	100	"	"	"	---	100	"	---	---	
1,1-Dichloroethane	1020	---	25.0	"	"	"	---	102	"	---	---	
1,2-Dichloroethane (EDC)	920	---	25.0	"	"	"	---	92	"	---	---	
1,1-Dichloroethene	947	---	25.0	"	"	"	---	95	"	---	---	
cis-1,2-Dichloroethene	971	---	25.0	"	"	"	---	97	"	---	---	
trans-1,2-Dichloroethene	960	---	25.0	"	"	"	---	96	"	---	---	
1,2-Dichloropropane	980	---	25.0	"	"	"	---	98	"	---	---	
1,3-Dichloropropane	999	---	50.0	"	"	"	---	100	"	---	---	
2,2-Dichloropropane	1110	---	50.0	"	"	"	---	111	"	---	---	

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Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

07/20/17 16:06

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070675 - EPA 5035A						Soil						
LCS (7070675-BS1)						Prepared: 07/19/17 08:00 Analyzed: 07/19/17 10:33						
5035A/8260B												
1,1-Dichloropropene	1090	---	50.0	ug/kg wet	"	"	---	109	"	---	---	
cis-1,3-Dichloropropene	922	---	50.0	"	"	"	---	92	"	---	---	
trans-1,3-Dichloropropene	970	---	50.0	"	"	"	---	97	"	---	---	
Ethylbenzene	1020	---	25.0	"	"	"	---	102	"	---	---	
Hexachlorobutadiene	950	---	100	"	"	"	---	95	"	---	---	
2-Hexanone	1770	---	500	"	"	2000	---	89	"	---	---	
Isopropylbenzene	1080	---	50.0	"	"	1000	---	108	"	---	---	
4-Isopropyltoluene	996	---	50.0	"	"	"	---	100	"	---	---	
4-Methyl-2-pentanone (MiBK)	1930	---	500	"	"	2000	---	96	"	---	---	
Methyl tert-butyl ether (MTBE)	1030	---	50.0	"	"	1000	---	103	"	---	---	
Methylene chloride	917	---	250	"	"	"	---	92	"	---	---	
Naphthalene	939	---	100	"	"	"	---	94	"	---	---	
n-Propylbenzene	1080	---	25.0	"	"	"	---	108	"	---	---	
Styrene	952	---	50.0	"	"	"	---	95	"	---	---	
1,1,1,2-Tetrachloroethane	1020	---	25.0	"	"	"	---	102	"	---	---	
1,1,2,2-Tetrachloroethane	997	---	50.0	"	"	"	---	100	"	---	---	
Tetrachloroethene (PCE)	1040	---	25.0	"	"	"	---	104	"	---	---	
Toluene	941	---	50.0	"	"	"	---	94	"	---	---	
1,2,3-Trichlorobenzene	1060	---	250	"	"	"	---	106	"	---	---	
1,2,4-Trichlorobenzene	1060	---	250	"	"	"	---	106	"	---	---	
1,1,1-Trichloroethane	980	---	25.0	"	"	"	---	98	"	---	---	
1,1,2-Trichloroethane	946	---	25.0	"	"	"	---	95	"	---	---	
Trichloroethene (TCE)	1040	---	25.0	"	"	"	---	104	"	---	---	
Trichlorofluoromethane	1280	---	100	"	"	"	---	128	"	---	---	Q-41
1,2,3-Trichloropropane	986	---	50.0	"	"	"	---	99	"	---	---	
1,2,4-Trimethylbenzene	1140	---	50.0	"	"	"	---	114	"	---	---	
1,3,5-Trimethylbenzene	1120	---	50.0	"	"	"	---	112	"	---	---	
Vinyl chloride	1250	---	25.0	"	"	"	---	125	"	---	---	
m,p-Xylene	2130	---	50.0	"	"	2000	---	106	"	---	---	
o-Xylene	1130	---	25.0	"	"	1000	---	113	"	---	---	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 97 % Limits: 70-130 % Dilution: 1x
Toluene-d8 (Surr) 98 % 70-130 % "
4-Bromofluorobenzene (Surr) 102 % 70-130 % "

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Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 07/20/17 16:06
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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7070690 - Total Solids (Dry Weight)							Soil					

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Lisa Domenighini, Client Services Manager

Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 07/20/17 16:06
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SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7070693							
A7G0500-01	Soil	NWTPH-Dx	07/19/17 13:45	07/19/17 16:22	10.62g/5mL	10g/5mL	0.94

Volatile Organic Compounds by EPA 8260B

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7070675							
A7G0500-01	Soil	5035A/8260B	07/19/17 13:45	07/19/17 15:15	5.79g/5mL	5g/5mL	0.86

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 7070690							
A7G0500-01	Soil	EPA 8000C	07/19/17 13:45	07/19/17 16:41	1N/A/1N/A	1N/A/1N/A	NA



Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: Boeing of Portland

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

07/20/17 16:06

Notes and Definitions

Qualifiers:

- Q-29 Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.
- Q-41 Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
- S-01 Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.
- V-15 Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling.

Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC Unless specifically requested, this report contains only results for Batch QC derived from client samples included in this report. All analyses were performed with the appropriate Batch QC (including Sample Duplicates, Matrix Spikes and/or Matrix Spike Duplicates) in order to meet or exceed method and regulatory requirements. Any exceptions to this will be qualified in this report. Complete Batch QC results are available upon request. In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- *** Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

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Lisa Domenighini, Client Services Manager

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Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: Boeing of Portland
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 07/20/17 16:06

AG 1740500 Date *7/19/2017*
 Page *1* of *1*

Chain-of-Custody Record

- Seattle/Edmonds (425) 778-0907
- Tacoma (253) 926-2493
- Spokane (509) 327-9737
- Portland (503) 542-1080



Project Name *Boeing Portland* Project No. *25116.117.520*

Project Location/Event *Boeing Palmd*

Sampler's Name *Chris Kimmel*

Project Contact *11 11 CKIMMEL@LANDAUAWS.COM*

Send Results To _____

Sample I.D.	Date	Time	Matrix	No. of Containers
<i>B049-001-K13(2513)</i>	<i>7/19</i>	<i>1345</i>	<i>Soil</i>	<i>2</i>

Turnaround Time
 Standard
 Expedited
 I-DAY TAT

Observations/Comments
 * Allow water samples to settle, collect aliquot from clear portion
 NWTPH-Dx - run acid wash silica gel cleanup
 Analyze for EPH if no specific product identified
 VOC/BTEX/VPH (soil):
 non-preserved
 preserved w/methanol
 preserved w/sodium bisulfate
 Freeze upon receipt
 Dissolved metal water samples field filtered
 Other _____

(copy to TRH-DX (8160))

Special Shipment/Handling or Storage Requirements *Hand delivery stored on ice*

Relinquished by	Received by
Signature <i>Christie Kimmel</i>	Signature <i>Christie Kimmel</i>
Printed Name <i>Christie Kimmel</i>	Printed Name <i>Christie Kimmel</i>
Company <i>Landau Associates</i>	Company <i>Apex</i>
Date <i>7/19/17</i>	Date <i>7/19/17</i>
Time <i>14:48</i>	Time <i>16:48</i>

Method of Shipment _____

Received by
 Signature _____
 Printed Name _____
 Company _____
 Date _____ Time _____

Relinquished by
 Signature _____
 Printed Name _____
 Company _____
 Date _____ Time _____

WHITE COPY - Project File
 YELLOW COPY - Laboratory
 PINK COPY - Client Representative

Apex Laboratories

Lisa Domenighini

Lisa Domenighini, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 07/20/17 16:06
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APEX LABS COOLER RECEIPT FORM

Client: Landau Element WO#: A7 G0900

Project/Project #: Boeing Portland / 25116.117.520

Delivery info:

Date/Time Received: 14:48 @ 7/19/17 By: MS

Delivered by: Apex Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Inspected by: MS : 7/19/17 @ 14:45

Chain of Custody Included? Yes No Custody Seals? Yes No

Signed/Dated by Client? Yes No

Signed/Dated by Apex? Yes No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>6.0</u>						
Received on Ice? <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u>							
Temp. Blanks? <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u>							
Ice Type: (Gel/ <u>Real</u> /Other)							
Condition: <u>good</u>							
Cooler out of temp? <input checked="" type="checkbox"/> <u>Y</u> <input type="checkbox"/> <u>N</u> Possible reason why: _____							
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No <input checked="" type="checkbox"/> <u>NA</u>							

Samples Inspection: Inspected by: MS : 7/19/17 @ 14:55

All Samples Intact? Yes No Comments: _____

Bottle Labels/COCs agree? Yes No Comments: _____

Containers/Volumes Received Appropriate for Analysis? Yes No Comments: _____

Do VOA Vials have Visible Headspace? Yes No NA

Comments: _____

Water Samples: pH Checked and Appropriate (except VOAs): Yes No NA

Comments: _____

Additional Information: _____

Labeled by: MS Witness: CM Cooler Inspected by: MS See Project Contact Form: Y

Lisa Domenighini

Apex Labs

12232 S.W. Garden Place
Tigard, OR 97223
503-718-2323 Phone
503-718-0333 Fax

Tuesday, August 8, 2017

Chris Kimmel
Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

RE: Boeing of Portland / 025116.117.520

Enclosed are the results of analyses for work order A7H0069, which was received by the laboratory on 8/2/2017 at 11:15:00AM.

Thank you for using Apex Labs. We appreciate your business and strive to provide the highest quality services to the environmental industry.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Apex Laboratories



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Lisa Domenighini, Client Services Manager

Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 08/08/17 16:43

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Castell-Side SW(3-4)	A7H0069-02	Soil	08/01/17 07:45	08/02/17 11:15
Castell-Base SW(5.5)	A7H0069-03	Soil	08/01/17 07:50	08/02/17 11:15
Castell-Side W(2-3)	A7H0069-04	Soil	08/01/17 07:55	08/02/17 11:15
Castell-Side W(3-4)	A7H0069-05	Soil	08/01/17 08:00	08/02/17 11:15
Castell-Side W(4-5)	A7H0069-06	Soil	08/01/17 08:05	08/02/17 11:15
Castell-Base NW(5.5)	A7H0069-07	Soil	08/01/17 08:10	08/02/17 11:15
Castell-Base NE(5.5)	A7H0069-09	Soil	08/01/17 08:20	08/02/17 11:15
Castell-Base SE(5.5)	A7H0069-11	Soil	08/01/17 13:35	08/02/17 11:15
Castell-Side E(2-3)	A7H0069-12	Soil	08/01/17 14:55	08/02/17 11:15
Castell-Side SE(2-3)	A7H0069-15	Soil	08/01/17 14:45	08/02/17 11:15
Castell-Side SE(3-3.5)	A7H0069-16	Soil	08/01/17 14:48	08/02/17 11:15
Castell-Side SE(4-5)	A7H0069-17	Soil	08/01/17 14:50	08/02/17 11:15
Castell-Side S(4)	A7H0069-19	Soil	08/01/17 13:10	08/02/17 11:15



Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side SW(3-4) (A7H0069-02)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	404	mg/kg dry	20	08/03/17 22:57	NWTPH-Dx	
Oil	20100	---	809	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>	<i>Limits: 50-150 %</i>	"	"	"	<i>S-01</i>
Castell-Base SW(5.5) (A7H0069-03)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/03/17 23:59	NWTPH-Dx	
Oil	1300	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 79 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side W(2-3) (A7H0069-04)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 00:20	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 67 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side W(3-4) (A7H0069-05)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 00:40	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 68 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side W(4-5) (A7H0069-06)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 01:01	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 68 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Base NW(5.5) (A7H0069-07)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 01:22	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 69 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Base NE(5.5) (A7H0069-09)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.3	mg/kg dry	1	08/04/17 01:42	NWTPH-Dx	
Oil	ND	---	50.5	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 67 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Base SE(5.5) (A7H0069-11)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 02:03	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 71 %</i>	<i>Limits: 50-150 %</i>	"	"	"	

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Lisa Domenighini, Client Services Manager

Landau Associates

333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side E(2-3) (A7H0069-12)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 03:46	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 77 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side SE(2-3) (A7H0069-15)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 04:07	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 75 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side SE(3-3.5) (A7H0069-16)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 04:27	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 86 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side SE(4-5) (A7H0069-17)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 04:48	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 77 %</i>	<i>Limits: 50-150 %</i>	"	"	"	
Castell-Side S(4) (A7H0069-19)			Matrix: Soil		Batch: 7080384			
Diesel	ND	---	25.0	mg/kg dry	1	08/04/17 05:09	NWTPH-Dx	
Oil	ND	---	50.0	"	"	"	"	
<i>Surrogate: o-Terphenyl (Surr)</i>			<i>Recovery: 76 %</i>	<i>Limits: 50-150 %</i>	"	"	"	

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Lisa Domenighini, Client Services Manager

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Landau Associates

333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Base SW(5.5) (A7H0069-03)			Matrix: Soil		Batch: 7080333			V-15
Acetone	ND	---	24.4	ug/kg dry	1	08/02/17 21:47	5035A/8260B	
Benzene	ND	---	0.244	"	"	"	"	
Bromobenzene	ND	---	0.611	"	"	"	"	
Bromochloromethane	ND	---	1.22	"	"	"	"	
Bromodichloromethane	ND	---	2.44	"	"	"	"	
Bromoform	ND	---	2.44	"	"	"	"	
Bromomethane	ND	---	12.2	"	"	"	"	
2-Butanone (MEK)	ND	---	12.2	"	"	"	"	
n-Butylbenzene	ND	---	1.22	"	"	"	"	
sec-Butylbenzene	ND	---	1.22	"	"	"	"	
tert-Butylbenzene	ND	---	1.22	"	"	"	"	
Carbon tetrachloride	ND	---	1.22	"	"	"	"	
Chlorobenzene	ND	---	0.611	"	"	"	"	
Chloroethane	ND	---	12.2	"	"	"	"	
Chloroform	ND	---	1.22	"	"	"	"	
Chloromethane	ND	---	6.11	"	"	"	"	
2-Chlorotoluene	ND	---	1.22	"	"	"	"	
4-Chlorotoluene	ND	---	1.22	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	6.11	"	"	"	"	
Dibromochloromethane	ND	---	2.44	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	1.22	"	"	"	"	
Dibromomethane	ND	---	1.22	"	"	"	"	
1,2-Dichlorobenzene	ND	---	0.611	"	"	"	"	
1,3-Dichlorobenzene	ND	---	0.611	"	"	"	"	
1,4-Dichlorobenzene	ND	---	0.611	"	"	"	"	
Dichlorodifluoromethane	ND	---	2.44	"	"	"	"	
1,1-Dichloroethane	ND	---	0.611	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	0.611	"	"	"	"	
1,1-Dichloroethene	ND	---	0.611	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	0.611	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	0.611	"	"	"	"	
1,2-Dichloropropane	ND	---	0.611	"	"	"	"	
1,3-Dichloropropane	ND	---	1.22	"	"	"	"	
2,2-Dichloropropane	ND	---	1.22	"	"	"	"	
1,1-Dichloropropene	ND	---	1.22	"	"	"	"	

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Project Number: 025116.117.520
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ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Base SW(5.5) (A7H0069-03)			Matrix: Soil		Batch: 7080333			V-15
cis-1,3-Dichloropropene	ND	---	1.22	ug/kg dry	1	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	1.22	"	"	"	"	
Ethylbenzene	ND	---	0.611	"	"	"	"	
Hexachlorobutadiene	ND	---	2.44	"	"	"	"	
2-Hexanone	ND	---	12.2	"	"	"	"	
Isopropylbenzene	ND	---	1.22	"	"	"	"	
4-Isopropyltoluene	ND	---	1.22	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	12.2	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	1.22	"	"	"	"	
Methylene chloride	ND	---	6.11	"	"	"	"	
Naphthalene	ND	---	2.44	"	"	"	"	
n-Propylbenzene	ND	---	0.611	"	"	"	"	
Styrene	ND	---	1.22	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	0.611	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	1.22	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	0.611	"	"	"	"	
Toluene	ND	---	1.22	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	6.11	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	6.11	"	"	"	"	
1,1,1-Trichloroethane	ND	---	0.611	"	"	"	"	
1,1,2-Trichloroethane	ND	---	0.611	"	"	"	"	
Trichloroethene (TCE)	ND	---	0.611	"	"	"	"	
Trichlorofluoromethane	ND	---	2.44	"	"	"	"	
1,2,3-Trichloropropane	ND	---	1.22	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	1.22	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	1.22	"	"	"	"	
Vinyl chloride	ND	---	0.611	"	"	"	"	
m,p-Xylene	ND	---	1.22	"	"	"	"	
o-Xylene	ND	---	0.611	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 102 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>98 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>96 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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Project: **Boeing of Portland**

Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side W(3-4) (A7H0069-05)			Matrix: Soil		Batch: 7080333			V-15
Acetone	ND	---	21.8	ug/kg dry	1	08/02/17 22:14	5035A/8260B	
Benzene	ND	---	0.218	"	"	"	"	
Bromobenzene	ND	---	0.545	"	"	"	"	
Bromochloromethane	ND	---	1.09	"	"	"	"	
Bromodichloromethane	ND	---	2.18	"	"	"	"	
Bromoform	ND	---	2.18	"	"	"	"	
Bromomethane	ND	---	10.9	"	"	"	"	
2-Butanone (MEK)	ND	---	10.9	"	"	"	"	
n-Butylbenzene	ND	---	1.09	"	"	"	"	
sec-Butylbenzene	ND	---	1.09	"	"	"	"	
tert-Butylbenzene	ND	---	1.09	"	"	"	"	
Carbon tetrachloride	ND	---	1.09	"	"	"	"	
Chlorobenzene	ND	---	0.545	"	"	"	"	
Chloroethane	ND	---	10.9	"	"	"	"	
Chloroform	ND	---	1.09	"	"	"	"	
Chloromethane	ND	---	5.45	"	"	"	"	
2-Chlorotoluene	ND	---	1.09	"	"	"	"	
4-Chlorotoluene	ND	---	1.09	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	5.45	"	"	"	"	
Dibromochloromethane	ND	---	2.18	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	1.09	"	"	"	"	
Dibromomethane	ND	---	1.09	"	"	"	"	
1,2-Dichlorobenzene	ND	---	0.545	"	"	"	"	
1,3-Dichlorobenzene	ND	---	0.545	"	"	"	"	
1,4-Dichlorobenzene	ND	---	0.545	"	"	"	"	
Dichlorodifluoromethane	ND	---	2.18	"	"	"	"	
1,1-Dichloroethane	ND	---	0.545	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	0.545	"	"	"	"	
1,1-Dichloroethene	ND	---	0.545	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	0.545	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	0.545	"	"	"	"	
1,2-Dichloropropane	ND	---	0.545	"	"	"	"	
1,3-Dichloropropane	ND	---	1.09	"	"	"	"	
2,2-Dichloropropane	ND	---	1.09	"	"	"	"	
1,1-Dichloropropene	ND	---	1.09	"	"	"	"	

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Project Number: 025116.117.520
Project Manager: Chris Kimmel

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ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side W(3-4) (A7H0069-05)			Matrix: Soil		Batch: 7080333			V-15
cis-1,3-Dichloropropene	ND	---	1.09	ug/kg dry	1	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	1.09	"	"	"	"	
Ethylbenzene	ND	---	0.545	"	"	"	"	
Hexachlorobutadiene	ND	---	2.18	"	"	"	"	
2-Hexanone	ND	---	10.9	"	"	"	"	
Isopropylbenzene	ND	---	1.09	"	"	"	"	
4-Isopropyltoluene	ND	---	1.09	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	10.9	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	1.09	"	"	"	"	
Methylene chloride	ND	---	5.45	"	"	"	"	
Naphthalene	ND	---	2.18	"	"	"	"	
n-Propylbenzene	ND	---	0.545	"	"	"	"	
Styrene	ND	---	1.09	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	0.545	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	1.09	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	0.545	"	"	"	"	
Toluene	ND	---	1.09	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	5.45	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	5.45	"	"	"	"	
1,1,1-Trichloroethane	ND	---	0.545	"	"	"	"	
1,1,2-Trichloroethane	ND	---	0.545	"	"	"	"	
Trichloroethene (TCE)	ND	---	0.545	"	"	"	"	
Trichlorofluoromethane	ND	---	2.18	"	"	"	"	
1,2,3-Trichloropropane	ND	---	1.09	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	1.09	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	1.09	"	"	"	"	
Vinyl chloride	ND	---	0.545	"	"	"	"	
m,p-Xylene	ND	---	1.09	"	"	"	"	
o-Xylene	ND	---	0.545	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 103 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>98 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>91 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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333 SW 5th Ave. Suite 700
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Project: Boeing of Portland

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Base NE(5.5) (A7H0069-09)			Matrix: Soil		Batch: 7080333			V-15
Acetone	ND	---	32.7	ug/kg dry	1	08/02/17 22:41	5035A/8260B	
Benzene	ND	---	0.327	"	"	"	"	
Bromobenzene	ND	---	0.818	"	"	"	"	
Bromochloromethane	ND	---	1.64	"	"	"	"	
Bromodichloromethane	ND	---	3.27	"	"	"	"	
Bromoform	ND	---	3.27	"	"	"	"	
Bromomethane	ND	---	16.4	"	"	"	"	
2-Butanone (MEK)	ND	---	16.4	"	"	"	"	
n-Butylbenzene	ND	---	1.64	"	"	"	"	
sec-Butylbenzene	ND	---	1.64	"	"	"	"	
tert-Butylbenzene	ND	---	1.64	"	"	"	"	
Carbon tetrachloride	ND	---	1.64	"	"	"	"	
Chlorobenzene	ND	---	0.818	"	"	"	"	
Chloroethane	ND	---	16.4	"	"	"	"	
Chloroform	ND	---	1.64	"	"	"	"	
Chloromethane	ND	---	8.18	"	"	"	"	
2-Chlorotoluene	ND	---	1.64	"	"	"	"	
4-Chlorotoluene	ND	---	1.64	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	8.18	"	"	"	"	
Dibromochloromethane	ND	---	3.27	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	1.64	"	"	"	"	
Dibromomethane	ND	---	1.64	"	"	"	"	
1,2-Dichlorobenzene	ND	---	0.818	"	"	"	"	
1,3-Dichlorobenzene	ND	---	0.818	"	"	"	"	
1,4-Dichlorobenzene	ND	---	0.818	"	"	"	"	
Dichlorodifluoromethane	ND	---	3.27	"	"	"	"	
1,1-Dichloroethane	ND	---	0.818	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	0.818	"	"	"	"	
1,1-Dichloroethene	ND	---	0.818	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	0.818	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	0.818	"	"	"	"	
1,2-Dichloropropane	ND	---	0.818	"	"	"	"	
1,3-Dichloropropane	ND	---	1.64	"	"	"	"	
2,2-Dichloropropane	ND	---	1.64	"	"	"	"	
1,1-Dichloropropene	ND	---	1.64	"	"	"	"	

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Project Number: 025116.117.520
Project Manager: Chris Kimmel

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08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Base NE(5.5) (A7H0069-09)			Matrix: Soil		Batch: 7080333			V-15
cis-1,3-Dichloropropene	ND	---	1.64	ug/kg dry	1	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	1.64	"	"	"	"	
Ethylbenzene	ND	---	0.818	"	"	"	"	
Hexachlorobutadiene	ND	---	3.27	"	"	"	"	
2-Hexanone	ND	---	16.4	"	"	"	"	
Isopropylbenzene	ND	---	1.64	"	"	"	"	
4-Isopropyltoluene	ND	---	1.64	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	16.4	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	1.64	"	"	"	"	
Methylene chloride	ND	---	8.18	"	"	"	"	
Naphthalene	ND	---	3.27	"	"	"	"	
n-Propylbenzene	ND	---	0.818	"	"	"	"	
Styrene	ND	---	1.64	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	0.818	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	1.64	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	0.818	"	"	"	"	
Toluene	ND	---	1.64	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	8.18	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	8.18	"	"	"	"	
1,1,1-Trichloroethane	ND	---	0.818	"	"	"	"	
1,1,2-Trichloroethane	ND	---	0.818	"	"	"	"	
Trichloroethene (TCE)	ND	---	0.818	"	"	"	"	
Trichlorofluoromethane	ND	---	3.27	"	"	"	"	
1,2,3-Trichloropropane	ND	---	1.64	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	1.64	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	1.64	"	"	"	"	
Vinyl chloride	ND	---	0.818	"	"	"	"	
m,p-Xylene	ND	---	1.64	"	"	"	"	
o-Xylene	ND	---	0.818	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 106 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>94 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>97 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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Project Number: 025116.117.520
 Project Manager: Chris Kimmel

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ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side SE(2-3) (A7H0069-15)			Matrix: Soil		Batch: 7080333			V-15
Acetone	ND	---	26.9	ug/kg dry	1	08/02/17 23:08	5035A/8260B	
Benzene	ND	---	0.269	"	"	"	"	
Bromobenzene	ND	---	0.673	"	"	"	"	
Bromochloromethane	ND	---	1.35	"	"	"	"	
Bromodichloromethane	ND	---	2.69	"	"	"	"	
Bromoform	ND	---	2.69	"	"	"	"	
Bromomethane	ND	---	13.5	"	"	"	"	
2-Butanone (MEK)	ND	---	13.5	"	"	"	"	
n-Butylbenzene	ND	---	1.35	"	"	"	"	
sec-Butylbenzene	ND	---	1.35	"	"	"	"	
tert-Butylbenzene	ND	---	1.35	"	"	"	"	
Carbon tetrachloride	ND	---	1.35	"	"	"	"	
Chlorobenzene	ND	---	0.673	"	"	"	"	
Chloroethane	ND	---	13.5	"	"	"	"	
Chloroform	ND	---	1.35	"	"	"	"	
Chloromethane	ND	---	6.73	"	"	"	"	
2-Chlorotoluene	ND	---	1.35	"	"	"	"	
4-Chlorotoluene	ND	---	1.35	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	6.73	"	"	"	"	
Dibromochloromethane	ND	---	2.69	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	1.35	"	"	"	"	
Dibromomethane	ND	---	1.35	"	"	"	"	
1,2-Dichlorobenzene	ND	---	0.673	"	"	"	"	
1,3-Dichlorobenzene	ND	---	0.673	"	"	"	"	
1,4-Dichlorobenzene	ND	---	0.673	"	"	"	"	
Dichlorodifluoromethane	ND	---	2.69	"	"	"	"	
1,1-Dichloroethane	ND	---	0.673	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	0.673	"	"	"	"	
1,1-Dichloroethene	ND	---	0.673	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	0.673	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	0.673	"	"	"	"	
1,2-Dichloropropane	ND	---	0.673	"	"	"	"	
1,3-Dichloropropane	ND	---	1.35	"	"	"	"	
2,2-Dichloropropane	ND	---	1.35	"	"	"	"	
1,1-Dichloropropene	ND	---	1.35	"	"	"	"	

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Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side SE(2-3) (A7H0069-15)			Matrix: Soil		Batch: 7080333			V-15
cis-1,3-Dichloropropene	ND	---	1.35	ug/kg dry	1	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	1.35	"	"	"	"	
Ethylbenzene	ND	---	0.673	"	"	"	"	
Hexachlorobutadiene	ND	---	2.69	"	"	"	"	
2-Hexanone	ND	---	13.5	"	"	"	"	
Isopropylbenzene	ND	---	1.35	"	"	"	"	
4-Isopropyltoluene	ND	---	1.35	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	13.5	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	1.35	"	"	"	"	
Methylene chloride	ND	---	6.73	"	"	"	"	
Naphthalene	ND	---	2.69	"	"	"	"	
n-Propylbenzene	ND	---	0.673	"	"	"	"	
Styrene	ND	---	1.35	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	0.673	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	1.35	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	0.673	"	"	"	"	
Toluene	ND	---	1.35	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	6.73	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	6.73	"	"	"	"	
1,1,1-Trichloroethane	ND	---	0.673	"	"	"	"	
1,1,2-Trichloroethane	ND	---	0.673	"	"	"	"	
Trichloroethene (TCE)	ND	---	0.673	"	"	"	"	
Trichlorofluoromethane	ND	---	2.69	"	"	"	"	
1,2,3-Trichloropropane	ND	---	1.35	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	1.35	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	1.35	"	"	"	"	
Vinyl chloride	ND	---	0.673	"	"	"	"	
m,p-Xylene	ND	---	1.35	"	"	"	"	
o-Xylene	ND	---	0.673	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 106 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>98 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>96 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side SE(3-3.5) (A7H0069-16)			Matrix: Soil		Batch: 7080333			V-15
Acetone	ND	---	24.5	ug/kg dry	1	08/02/17 23:35	5035A/8260B	
Benzene	ND	---	0.245	"	"	"	"	
Bromobenzene	ND	---	0.612	"	"	"	"	
Bromochloromethane	ND	---	1.22	"	"	"	"	
Bromodichloromethane	ND	---	2.45	"	"	"	"	
Bromoform	ND	---	2.45	"	"	"	"	
Bromomethane	ND	---	12.2	"	"	"	"	
2-Butanone (MEK)	ND	---	12.2	"	"	"	"	
n-Butylbenzene	ND	---	1.22	"	"	"	"	
sec-Butylbenzene	ND	---	1.22	"	"	"	"	
tert-Butylbenzene	ND	---	1.22	"	"	"	"	
Carbon tetrachloride	ND	---	1.22	"	"	"	"	
Chlorobenzene	ND	---	0.612	"	"	"	"	
Chloroethane	ND	---	12.2	"	"	"	"	
Chloroform	ND	---	1.22	"	"	"	"	
Chloromethane	ND	---	6.12	"	"	"	"	
2-Chlorotoluene	ND	---	1.22	"	"	"	"	
4-Chlorotoluene	ND	---	1.22	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	---	6.12	"	"	"	"	
Dibromochloromethane	ND	---	2.45	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	---	1.22	"	"	"	"	
Dibromomethane	ND	---	1.22	"	"	"	"	
1,2-Dichlorobenzene	ND	---	0.612	"	"	"	"	
1,3-Dichlorobenzene	ND	---	0.612	"	"	"	"	
1,4-Dichlorobenzene	ND	---	0.612	"	"	"	"	
Dichlorodifluoromethane	ND	---	2.45	"	"	"	"	
1,1-Dichloroethane	ND	---	0.612	"	"	"	"	
1,2-Dichloroethane (EDC)	ND	---	0.612	"	"	"	"	
1,1-Dichloroethene	ND	---	0.612	"	"	"	"	
cis-1,2-Dichloroethene	ND	---	0.612	"	"	"	"	
trans-1,2-Dichloroethene	ND	---	0.612	"	"	"	"	
1,2-Dichloropropane	ND	---	0.612	"	"	"	"	
1,3-Dichloropropane	ND	---	1.22	"	"	"	"	
2,2-Dichloropropane	ND	---	1.22	"	"	"	"	
1,1-Dichloropropene	ND	---	1.22	"	"	"	"	

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Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting		Dilution	Date Analyzed	Method	Notes
			Limit	Units				
Castell-Side SE(3-3.5) (A7H0069-16)			Matrix: Soil		Batch: 7080333			V-15
cis-1,3-Dichloropropene	ND	---	1.22	ug/kg dry	1	"	5035A/8260B	
trans-1,3-Dichloropropene	ND	---	1.22	"	"	"	"	
Ethylbenzene	ND	---	0.612	"	"	"	"	
Hexachlorobutadiene	ND	---	2.45	"	"	"	"	
2-Hexanone	ND	---	12.2	"	"	"	"	
Isopropylbenzene	ND	---	1.22	"	"	"	"	
4-Isopropyltoluene	ND	---	1.22	"	"	"	"	
4-Methyl-2-pentanone (MiBK)	ND	---	12.2	"	"	"	"	
Methyl tert-butyl ether (MTBE)	ND	---	1.22	"	"	"	"	
Methylene chloride	ND	---	6.12	"	"	"	"	
Naphthalene	ND	---	2.45	"	"	"	"	
n-Propylbenzene	ND	---	0.612	"	"	"	"	
Styrene	ND	---	1.22	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	---	0.612	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	---	1.22	"	"	"	"	
Tetrachloroethene (PCE)	ND	---	0.612	"	"	"	"	
Toluene	ND	---	1.22	"	"	"	"	
1,2,3-Trichlorobenzene	ND	---	6.12	"	"	"	"	
1,2,4-Trichlorobenzene	ND	---	6.12	"	"	"	"	
1,1,1-Trichloroethane	ND	---	0.612	"	"	"	"	
1,1,2-Trichloroethane	ND	---	0.612	"	"	"	"	
Trichloroethene (TCE)	ND	---	0.612	"	"	"	"	
Trichlorofluoromethane	ND	---	2.45	"	"	"	"	
1,2,3-Trichloropropane	ND	---	1.22	"	"	"	"	
1,2,4-Trimethylbenzene	ND	---	1.22	"	"	"	"	
1,3,5-Trimethylbenzene	ND	---	1.22	"	"	"	"	
Vinyl chloride	ND	---	0.612	"	"	"	"	
m,p-Xylene	ND	---	1.22	"	"	"	"	
o-Xylene	ND	---	0.612	"	"	"	"	
<i>Surrogate: 1,4-Difluorobenzene (Surr)</i>			<i>Recovery: 105 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>Toluene-d8 (Surr)</i>			<i>99 %</i>	<i>Limits: 70-130 %</i>	"	"	"	
<i>4-Bromofluorobenzene (Surr)</i>			<i>94 %</i>	<i>Limits: 70-130 %</i>	"	"	"	

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Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 08/08/17 16:43

ANALYTICAL SAMPLE RESULTS

Percent Dry Weight								
Analyte	Result	MDL	Reporting Limit	Units	Dilution	Date Analyzed	Method	Notes
Castell-Side SW(3-4) (A7H0069-02)			Matrix: Soil	Batch: 7080378				
% Solids	90.2	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Base SW(5.5) (A7H0069-03)			Matrix: Soil	Batch: 7080378				
% Solids	86.1	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side W(2-3) (A7H0069-04)			Matrix: Soil	Batch: 7080378				
% Solids	89.8	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side W(3-4) (A7H0069-05)			Matrix: Soil	Batch: 7080426				
% Solids	91.1	---	1.00	% by Weight	1	08/07/17 07:12	EPA 8000C	
Castell-Side W(4-5) (A7H0069-06)			Matrix: Soil	Batch: 7080378				
% Solids	82.9	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Base NW(5.5) (A7H0069-07)			Matrix: Soil	Batch: 7080426				
% Solids	84.1	---	1.00	% by Weight	1	08/07/17 07:12	EPA 8000C	
Castell-Base NE(5.5) (A7H0069-09)			Matrix: Soil	Batch: 7080378				
% Solids	75.7	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Base SE(5.5) (A7H0069-11)			Matrix: Soil	Batch: 7080378				
% Solids	83.9	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side E(2-3) (A7H0069-12)			Matrix: Soil	Batch: 7080378				
% Solids	85.0	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side SE(2-3) (A7H0069-15)			Matrix: Soil	Batch: 7080378				
% Solids	79.1	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side SE(3-3.5) (A7H0069-16)			Matrix: Soil	Batch: 7080396				
% Solids	87.2	---	1.00	% by Weight	1	08/04/17 08:51	EPA 8000C	
Castell-Side SE(4-5) (A7H0069-17)			Matrix: Soil	Batch: 7080378				
% Solids	90.0	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	
Castell-Side S(4) (A7H0069-19)			Matrix: Soil	Batch: 7080378				
% Solids	82.7	---	1.00	% by Weight	1	08/04/17 06:11	EPA 8000C	

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Lisa Domenighini, Client Services Manager

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QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes	
Batch 7080384 - EPA 3546 (Fuels)						Soil							
Blank (7080384-BLK1)						Prepared: 08/03/17 13:33 Analyzed: 08/03/17 22:16							
NWTPH-Dx													
Diesel	ND	---	25.0	mg/kg wet	1	---	---	---	---	---	---	---	
Oil	ND	---	50.0	"	"	---	---	---	---	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 77 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
LCS (7080384-BS1)						Prepared: 08/03/17 13:33 Analyzed: 08/03/17 22:37							
NWTPH-Dx													
Diesel	102	---	25.0	mg/kg wet	1	125	---	81	76-115%	---	---	---	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: 85 %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 1x</i>				
Duplicate (7080384-DUP1)						Prepared: 08/03/17 13:33 Analyzed: 08/03/17 23:18							
QC Source Sample: Castell-Side SW(3-4) (A7H0069-02)													
NWTPH-Dx													
Diesel	ND	---	404	mg/kg dry	20	---	ND	---	---	---	---	30%	
Oil	15700	---	809	"	"	---	20100	---	---	25	---	30%	
<i>Surr: o-Terphenyl (Surr)</i>			<i>Recovery: %</i>			<i>Limits: 50-150 %</i>			<i>Dilution: 20x</i>				<i>S-01</i>



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QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7080333 - EPA 5035A						Soil						
Blank (7080333-BLK1)						Prepared: 08/02/17 12:00 Analyzed: 08/02/17 14:23						
5035A/8260B												
Acetone	ND	---	667	ug/kg wet	50	---	---	---	---	---	---	---
Benzene	ND	---	6.67	"	"	---	---	---	---	---	---	---
Bromobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Bromochloromethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
Bromodichloromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
Bromoform	ND	---	66.7	"	"	---	---	---	---	---	---	---
Bromomethane	ND	---	333	"	"	---	---	---	---	---	---	---
2-Butanone (MEK)	ND	---	333	"	"	---	---	---	---	---	---	---
n-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
sec-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
tert-Butylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
Carbon tetrachloride	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Chloroethane	ND	---	333	"	"	---	---	---	---	---	---	---
Chloroform	ND	---	33.3	"	"	---	---	---	---	---	---	---
Chloromethane	ND	---	167	"	"	---	---	---	---	---	---	---
2-Chlorotoluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
4-Chlorotoluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2-Dibromo-3-chloropropane	ND	---	167	"	"	---	---	---	---	---	---	---
Dibromochloromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,2-Dibromoethane (EDB)	ND	---	33.3	"	"	---	---	---	---	---	---	---
Dibromomethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,3-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,4-Dichlorobenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Dichlorodifluoromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,1-Dichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloroethane (EDC)	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
cis-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
trans-1,2-Dichloroethene	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,2-Dichloropropane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,3-Dichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	---
2,2-Dichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	---

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Reported:
08/08/17 16:43

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7080333 - EPA 5035A						Soil						
Blank (7080333-BLK1)						Prepared: 08/02/17 12:00 Analyzed: 08/02/17 14:23						
5035A/8260B												
1,1-Dichloropropene	ND	---	33.3	ug/kg wet	"	---	---	---	---	---	---	---
cis-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	---
trans-1,3-Dichloropropene	ND	---	33.3	"	"	---	---	---	---	---	---	---
Ethylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Hexachlorobutadiene	ND	---	66.7	"	"	---	---	---	---	---	---	---
2-Hexanone	ND	---	333	"	"	---	---	---	---	---	---	---
Isopropylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
4-Isopropyltoluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
4-Methyl-2-pentanone (MiBK)	ND	---	333	"	"	---	---	---	---	---	---	---
Methyl tert-butyl ether (MTBE)	ND	---	33.3	"	"	---	---	---	---	---	---	---
Methylene chloride	ND	---	167	"	"	---	---	---	---	---	---	---
Naphthalene	ND	---	66.7	"	"	---	---	---	---	---	---	---
n-Propylbenzene	ND	---	16.7	"	"	---	---	---	---	---	---	---
Styrene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,1,1,2-Tetrachloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1,2,2-Tetrachloroethane	ND	---	33.3	"	"	---	---	---	---	---	---	---
Tetrachloroethene (PCE)	ND	---	16.7	"	"	---	---	---	---	---	---	---
Toluene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2,3-Trichlorobenzene	ND	---	167	"	"	---	---	---	---	---	---	---
1,2,4-Trichlorobenzene	ND	---	167	"	"	---	---	---	---	---	---	---
1,1,1-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
1,1,2-Trichloroethane	ND	---	16.7	"	"	---	---	---	---	---	---	---
Trichloroethene (TCE)	ND	---	16.7	"	"	---	---	---	---	---	---	---
Trichlorofluoromethane	ND	---	66.7	"	"	---	---	---	---	---	---	---
1,2,3-Trichloropropane	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene	ND	---	33.3	"	"	---	---	---	---	---	---	---
Vinyl chloride	ND	---	16.7	"	"	---	---	---	---	---	---	---
m,p-Xylene	ND	---	33.3	"	"	---	---	---	---	---	---	---
o-Xylene	ND	---	16.7	"	"	---	---	---	---	---	---	---

Surr: 1,4-Difluorobenzene (Surr) Recovery: 106 % Limits: 70-130 % Dilution: 50x
Toluene-d8 (Surr) 97 % 70-130 % "
4-Bromofluorobenzene (Surr) 97 % 70-130 % "

LCS (7080333-BS1)

Prepared: 08/02/17 12:00 Analyzed: 08/02/17 13:28

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QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7080333 - EPA 5035A						Soil						
LCS (7080333-BS1)						Prepared: 08/02/17 12:00 Analyzed: 08/02/17 13:28						
5035A/8260B												
Acetone	2020	---	1000	ug/kg wet	50	2000	---	101	65-135%	---	---	
Benzene	1010	---	10.0	"	"	1000	---	101	"	---	---	
Bromobenzene	990	---	25.0	"	"	"	---	99	"	---	---	
Bromochloromethane	1130	---	50.0	"	"	"	---	113	"	---	---	
Bromodichloromethane	1210	---	100	"	"	"	---	121	"	---	---	Q-41
Bromoform	1280	---	100	"	"	"	---	128	"	---	---	Q-41
Bromomethane	1230	---	500	"	"	"	---	123	"	---	---	Q-41
2-Butanone (MEK)	2000	---	500	"	"	2000	---	100	"	---	---	
n-Butylbenzene	1040	---	50.0	"	"	1000	---	104	"	---	---	
sec-Butylbenzene	994	---	50.0	"	"	"	---	99	"	---	---	
tert-Butylbenzene	1010	---	50.0	"	"	"	---	101	"	---	---	
Carbon tetrachloride	1280	---	50.0	"	"	"	---	128	"	---	---	Q-41
Chlorobenzene	1040	---	25.0	"	"	"	---	104	"	---	---	
Chloroethane	1830	---	500	"	"	"	---	183	"	---	---	Q-41
Chloroform	1160	---	50.0	"	"	"	---	116	"	---	---	
Chloromethane	1030	---	250	"	"	"	---	103	"	---	---	
2-Chlorotoluene	940	---	50.0	"	"	"	---	94	"	---	---	
4-Chlorotoluene	992	---	50.0	"	"	"	---	99	"	---	---	
1,2-Dibromo-3-chloropropane	962	---	250	"	"	"	---	96	"	---	---	
Dibromochloromethane	1110	---	100	"	"	"	---	111	"	---	---	
1,2-Dibromoethane (EDB)	1060	---	50.0	"	"	"	---	106	"	---	---	
Dibromomethane	1090	---	50.0	"	"	"	---	109	"	---	---	
1,2-Dichlorobenzene	1010	---	25.0	"	"	"	---	101	"	---	---	
1,3-Dichlorobenzene	980	---	25.0	"	"	"	---	98	"	---	---	
1,4-Dichlorobenzene	997	---	25.0	"	"	"	---	100	"	---	---	
Dichlorodifluoromethane	1100	---	100	"	"	"	---	110	"	---	---	
1,1-Dichloroethane	1110	---	25.0	"	"	"	---	111	"	---	---	
1,2-Dichloroethane (EDC)	1110	---	25.0	"	"	"	---	111	"	---	---	
1,1-Dichloroethene	862	---	25.0	"	"	"	---	86	"	---	---	
cis-1,2-Dichloroethene	1050	---	25.0	"	"	"	---	105	"	---	---	
trans-1,2-Dichloroethene	1080	---	25.0	"	"	"	---	108	"	---	---	
1,2-Dichloropropane	1060	---	25.0	"	"	"	---	106	"	---	---	
1,3-Dichloropropane	1010	---	50.0	"	"	"	---	101	"	---	---	
2,2-Dichloropropane	1060	---	50.0	"	"	"	---	106	"	---	---	

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Lisa Domenighini, Client Services Manager

Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

QUALITY CONTROL (QC) SAMPLE RESULTS

Volatile Organic Compounds by EPA 8260B

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7080333 - EPA 5035A												
						Soil						
LCS (7080333-BS1)						Prepared: 08/02/17 12:00 Analyzed: 08/02/17 13:28						
5035A/8260B												
1,1-Dichloropropene	1040	---	50.0	ug/kg wet	"	"	---	104	"	---	---	
cis-1,3-Dichloropropene	1040	---	50.0	"	"	"	---	104	"	---	---	
trans-1,3-Dichloropropene	1090	---	50.0	"	"	"	---	109	"	---	---	
Ethylbenzene	984	---	25.0	"	"	"	---	98	"	---	---	
Hexachlorobutadiene	930	---	100	"	"	"	---	93	"	---	---	
2-Hexanone	1890	---	500	"	"	2000	---	94	"	---	---	
Isopropylbenzene	954	---	50.0	"	"	1000	---	95	"	---	---	
4-Isopropyltoluene	966	---	50.0	"	"	"	---	97	"	---	---	
4-Methyl-2-pentanone (MiBK)	1980	---	500	"	"	2000	---	99	"	---	---	
Methyl tert-butyl ether (MTBE)	952	---	50.0	"	"	1000	---	95	"	---	---	
Methylene chloride	1150	---	250	"	"	"	---	115	"	---	---	
Naphthalene	948	---	100	"	"	"	---	95	"	---	---	
n-Propylbenzene	1040	---	25.0	"	"	"	---	104	"	---	---	
Styrene	1080	---	50.0	"	"	"	---	108	"	---	---	
1,1,1,2-Tetrachloroethane	1140	---	25.0	"	"	"	---	114	"	---	---	
1,1,2,2-Tetrachloroethane	1060	---	50.0	"	"	"	---	106	"	---	---	
Tetrachloroethene (PCE)	1000	---	25.0	"	"	"	---	100	"	---	---	
Toluene	1010	---	50.0	"	"	"	---	101	"	---	---	
1,2,3-Trichlorobenzene	962	---	250	"	"	"	---	96	"	---	---	
1,2,4-Trichlorobenzene	944	---	250	"	"	"	---	94	"	---	---	
1,1,1-Trichloroethane	1120	---	25.0	"	"	"	---	112	"	---	---	
1,1,2-Trichloroethane	1050	---	25.0	"	"	"	---	105	"	---	---	
Trichloroethene (TCE)	1070	---	25.0	"	"	"	---	107	"	---	---	
Trichlorofluoromethane	1410	---	100	"	"	"	---	141	"	---	---	Q-41
1,2,3-Trichloropropane	1000	---	50.0	"	"	"	---	100	"	---	---	
1,2,4-Trimethylbenzene	982	---	50.0	"	"	"	---	98	"	---	---	
1,3,5-Trimethylbenzene	1000	---	50.0	"	"	"	---	100	"	---	---	
Vinyl chloride	1110	---	25.0	"	"	"	---	111	"	---	---	
m,p-Xylene	2070	---	50.0	"	"	2000	---	103	"	---	---	
o-Xylene	1050	---	25.0	"	"	1000	---	105	"	---	---	

Surr: 1,4-Difluorobenzene (Surr) Recovery: 104 % Limits: 70-130 % Dilution: 50x
 Toluene-d8 (Surr) 100 % 70-130 %
 4-Bromofluorobenzene (Surr) 96 % 70-130 %

Apex Laboratories



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Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 08/08/17 16:43
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QUALITY CONTROL (QC) SAMPLE RESULTS

Percent Dry Weight

Analyte	Result	MDL	Reporting Limit	Units	Dil.	Spike Amount	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 7080378 - Total Solids (Dry Weight)						Soil						
Duplicate (7080378-DUP1)						Prepared: 08/03/17 12:39 Analyzed: 08/04/17 06:11						
QC Source Sample: Castell-Side SW(3-4) (A7H0069-02)												
EPA 8000C												
% Solids	90.8	---	1.00	% by Weight	1	---	90.2	---	---	0.6	10%	



Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3546 (Fuels)

Lab Number	Matrix	Method	Sampled	Prepared	Sample	Default	RL Prep
					Initial/Final	Initial/Final	Factor
Batch: 7080384							
A7H0069-02	Soil	NWTPH-Dx	08/01/17 07:45	08/03/17 13:33	10.97g/5mL	10g/5mL	0.91
A7H0069-03	Soil	NWTPH-Dx	08/01/17 07:50	08/03/17 13:33	10.4g/5mL	10g/5mL	0.96
A7H0069-04	Soil	NWTPH-Dx	08/01/17 07:55	08/03/17 13:33	10.48g/5mL	10g/5mL	0.95
A7H0069-05	Soil	NWTPH-Dx	08/01/17 08:00	08/03/17 13:33	10.43g/5mL	10g/5mL	0.96
A7H0069-06	Soil	NWTPH-Dx	08/01/17 08:05	08/03/17 13:33	10.51g/5mL	10g/5mL	0.95
A7H0069-07	Soil	NWTPH-Dx	08/01/17 08:10	08/03/17 13:33	10.24g/5mL	10g/5mL	0.98
A7H0069-09	Soil	NWTPH-Dx	08/01/17 08:20	08/03/17 13:33	10.46g/5mL	10g/5mL	0.96
A7H0069-11	Soil	NWTPH-Dx	08/01/17 13:35	08/03/17 13:33	10.33g/5mL	10g/5mL	0.97
A7H0069-12	Soil	NWTPH-Dx	08/01/17 14:55	08/03/17 13:33	10.38g/5mL	10g/5mL	0.96
A7H0069-15	Soil	NWTPH-Dx	08/01/17 14:45	08/03/17 13:33	10.32g/5mL	10g/5mL	0.97
A7H0069-16	Soil	NWTPH-Dx	08/01/17 14:48	08/03/17 13:33	10.35g/5mL	10g/5mL	0.97
A7H0069-17	Soil	NWTPH-Dx	08/01/17 14:50	08/03/17 13:33	10.35g/5mL	10g/5mL	0.97
A7H0069-19	Soil	NWTPH-Dx	08/01/17 13:10	08/03/17 13:33	10.24g/5mL	10g/5mL	0.98

Volatile Organic Compounds by EPA 8260B

Prep: EPA 5035A

Lab Number	Matrix	Method	Sampled	Prepared	Sample	Default	RL Prep
					Initial/Final	Initial/Final	Factor
Batch: 7080333							
A7H0069-03	Soil	5035A/8260B	08/01/17 07:50	08/02/17 17:12	5.48g/5mL	5g/5mL	0.91
A7H0069-05	Soil	5035A/8260B	08/01/17 08:00	08/02/17 17:12	5.53g/5mL	5g/5mL	0.90
A7H0069-09	Soil	5035A/8260B	08/01/17 08:20	08/02/17 17:12	5.02g/5mL	5g/5mL	1.00
A7H0069-15	Soil	5035A/8260B	08/01/17 14:45	08/02/17 17:12	5.84g/5mL	5g/5mL	0.86
A7H0069-16	Soil	5035A/8260B	08/01/17 14:48	08/02/17 17:12	5.33g/5mL	5g/5mL	0.94

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample	Default	RL Prep
					Initial/Final	Initial/Final	Factor
Batch: 7080378							
A7H0069-02	Soil	EPA 8000C	08/01/17 07:45	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-03	Soil	EPA 8000C	08/01/17 07:50	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-04	Soil	EPA 8000C	08/01/17 07:55	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-06	Soil	EPA 8000C	08/01/17 08:05	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-09	Soil	EPA 8000C	08/01/17 08:20	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA

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Lisa Domenighini, Client Services Manager

Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 08/08/17 16:43
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SAMPLE PREPARATION INFORMATION

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A7H0069-11	Soil	EPA 8000C	08/01/17 13:35	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-12	Soil	EPA 8000C	08/01/17 14:55	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-15	Soil	EPA 8000C	08/01/17 14:45	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-17	Soil	EPA 8000C	08/01/17 14:50	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-19	Soil	EPA 8000C	08/01/17 13:10	08/03/17 12:39	1N/A/1N/A	1N/A/1N/A	NA
<u>Batch: 7080396</u>							
A7H0069-16	Soil	EPA 8000C	08/01/17 14:48	08/04/17 06:17	1N/A/1N/A	1N/A/1N/A	NA
<u>Batch: 7080426</u>							
A7H0069-05	Soil	EPA 8000C	08/01/17 08:00	08/04/17 12:25	1N/A/1N/A	1N/A/1N/A	NA
A7H0069-07	Soil	EPA 8000C	08/01/17 08:10	08/04/17 12:25	1N/A/1N/A	1N/A/1N/A	NA



Landau Associates

333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**

Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:

08/08/17 16:43

Notes and Definitions

Qualifiers:

- Q-41 Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
- S-01 Surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interference.
- V-15 Sample aliquot was subsampled from the sample container. The subsampled aliquot was preserved in the laboratory within 48 hours of sampling.

Notes and Conventions:

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis. Results listed as 'wet' or without 'dry' designation are not dry weight corrected.
- RPD Relative Percent Difference
- MDL If MDL is not listed, data has been evaluated to the Method Reporting Limit only.
- WMSC Water Miscible Solvent Correction has been applied to Results and MRLs for volatiles soil samples per EPA 8000C.
- Batch QC Unless specifically requested, this report contains only results for Batch QC derived from client samples included in this report. All analyses were performed with the appropriate Batch QC (including Sample Duplicates, Matrix Spikes and/or Matrix Spike Duplicates) in order to meet or exceed method and regulatory requirements. Any exceptions to this will be qualified in this report. Complete Batch QC results are available upon request. In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) is analyzed to demonstrate accuracy and precision of the extraction and analysis.
- Blank Policy Apex assesses blank data for potential high bias down to a level equal to 1/2 the method reporting limit (MRL), except for conventional chemistry and HCID analyses which are assessed only to the MRL. Sample results flagged with a B or B-02 qualifier are potentially biased high if they are less than ten times the level found in the blank for inorganic analyses or less than five times the level found in the blank for organic analyses.
- For accurate comparison of volatile results to the level found in the blank; water sample results should be divided by the dilution factor, and soil sample results should be divided by 1/50 of the sample dilution to account for the sample prep factor.
- Results qualified as reported below the MRL may include a potential high bias if associated with a B or B-02 qualified blank. B and B-02 qualifications are not applied to J qualified results reported below the MRL.
- QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- *** Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Apex Laboratories



Lisa Domenighini, Client Services Manager

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Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
08/08/17 16:43

CHAIN OF CUSTODY

APEX LABS Lab # A740069 coc 1 of 3

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Landau Associates Project Mgr: Chris Kimmel Project Name: Boeing of Portland Project # 025116.117.520
Address: 333 SW 5th Ave #700 Portland OR 97204 Phone: 503-542-1080 Fax: 503-542-1081 Email: ckimmel@landauinc.com

Sampled by: EMW

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
Castell-Side SW (5-5)	8/1/17	7:40	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side SW (3-4)	8/1/17	7:45	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Base SW (5-5)	8/1/17	7:50	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side W (2-3)	8/1/17	7:55	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side W (3-4)	8/1/17	8:00	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side W (4-5)	8/1/17	8:05	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Base NW (5-5)	8/1/17	8:10	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side NW (4-5)	8/1/17	8:15	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Base NE (5-5)	8/1/17	8:20	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Castell-Side NE (4-5)	8/1/17	8:25	Soil	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS: DVDC 38 list
Hold

RELINQUISHED BY: E. Waisel Date: 8/1/17 Signature: [Signature] Date: 8/1/17
Printed Name: Chris Kimmel Time: 11:15
Company: Landau Associates

RECEIVED BY: _____
Signature: _____ Date: _____
Printed Name: _____ Time: _____
Company: _____

Apex Laboratories

Lisa Domenighini

Lisa Domenighini, Client Services Manager

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Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
08/08/17 16:43

CHAIN OF CUSTODY

Company: Landau Associates Project Mgr: Chris Kimmel Project Name: Boeing of Portland Project # DZ5116.117.520
Address: 333 SW 5th Ave #700 Portland OR 97204 Phone: 5035421080 Fax: 5035421081 Email: ckimmel@landauinc.com
Sampled by: EMW

Site Location: WA (OR) (WA)
Other: _____

Lab # 700 Lab # A7H 0069 Lab # 2 of 3
COC 2 of 3

Revised

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWPH-HCD	NWPH-DX	NWPH-CX	8260 VOC	8260 RBDM VOC	8260 BTEX	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCA Metals (B)	TCLP Metals (A)	AT, SV, AS, H, H, G, K, F, Z	Se, Mg, Ni, Tl, V, Pb, Cr, Cu, Cd, Hg, Zn, Mn, Fe, Ni, Y, Sr, Zr	1200-Z
1	8/17/1335	Soil	1					2											
2	8/17/1455	Soil	2					2											
3	8/17/1458	Soil	2					2											
4	8/17/1500	Soil	2					2											
5	8/17/1445	Soil	1					2											
6	8/17/1448	Soil	2					2											
7	8/17/1450	Soil	1					2											
8	8/17/1330	Soil	2					2											
9	8/17/1310	Soil	1					2											
10	8/17/1320	Soil	3					2											

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS: ① VOC 38 list ② Hold

RELINQUISHED BY: Chris Kimmel Date: 8/17/17 Signature: [Signature] Time: 11:15
Signature: Erin Wambel Date: 8/17/17 Signature: [Signature] Time: 11:15
Printed Name: Erin Wambel Time: 11:15
Company: Landau Associates Company: Apex

RECEIVED BY: _____ Date: _____ Signature: _____ Time: _____
Printed Name: _____ Time: _____
Company: _____

Apex Laboratories

Lisa Domenighini

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Landau Associates
 333 SW 5th Ave. Suite 700
 Portland, OR 97204

Project: **Boeing of Portland**
 Project Number: 025116.117.520
 Project Manager: Chris Kimmel

Reported:
 08/08/17 16:43

CHAIN OF CUSTODY

Lab # A7H0069 COC 3 of 3
 Revised

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Landau Associates Project Mgr: Chris Kimmel Project Name: Boeing of Portland Project # 025116.117.520
 Address: 333 SW 5th Ave #700 Portland OR 97204 Phone: 503 554 2108 Fax: 503 542 1081 Email: ckimmel@landaulab.com
 Sampled by: EMW

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST
1				420 1	AL Pb, As, Ba, Be, Cd, Cr, Cu, Ni, Pb, Se, Tl, V, Zn Hg, Meq. Na, TL, V, Zn TOTAL DISS TCLP 1190-COLS 1200-Z
2					
3					
4					
5					
6					
7					
8					
9					
10					

Site Location: OR WA
 Other: _____

SAMPLE ID
TRIP Blank

Normal Turn Around Time (TAT) = 7-10 Business Days
 YES NO

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS:
 ① VOC 38 List
 ② HOLD

RECEIVED BY: _____ RECEIVED BY: _____
 Signature: [Signature] Date: 8/12/17 Signature: _____ Date: _____
 Printed Name: Chris Kimmel Time: 11:15 Printed Name: _____ Time: _____
 Company: Landau Associates Company: Apex

Apex Laboratories

Lisa Domenighini

Lisa Domenighini, Client Services Manager

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Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
08/08/17 16:43

CHAIN OF CUSTODY

Lab # A7H0069 COC 1 of 3

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Landau Associates Project Mgr: Chris Kimmel Project Name: Boeing of Portland Project # 025116.117.520
 Address: 333 SW 5th Ave #100 Portland OR 97204 Phone: 5035421061 Fax: 5035421061 Email: CKimmel@landauinc.com

Sampled by: EMW

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						RCRA Metals (8)	TCLP Metals (8)
Castell-Side SW (5-5)	8117	7:40	5a	1			
Castell-Side SW (3-4)	8117	7:45	5a	1			
Castell-Base SW (5-5)	8117	7:50	5a	1			
Castell-Side W (2-3)	8117	7:55	5a	1			
Castell-Side W (3-4)	8117	8:00	5a	1			
Castell-Side NW (4-5)	8117	8:05	5a	1			
Castell-Base NW (5-5)	8117	8:10	5a	1			
Castell-Side NE (4-5)	8117	8:15	5a	1			
Castell-Side NE (5-5)	8117	8:20	5a	1			
Castell-Side NE (4-5)	8117	8:25	5a	1			

Normal Turn Around Time (TAT) = 7-10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: _____

SPECIAL INSTRUCTIONS: ① VOC 36 list
② Hold

RELINQUISHED BY: Signature: <u>E. Wibel</u> Date: <u>8/2/17</u>	RECEIVED BY: Signature: _____ Date: _____
Printed Name: <u>Erin Wibel</u> Time: <u>11:15</u>	Printed Name: _____ Time: _____
Company: <u>Landau Associates</u>	Company: _____

Apex Laboratories

Lisa Domenighini

Lisa Domenighini, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
08/08/17 16:43

CHAIN OF CUSTODY

Lab # A7H0064 c.c.c. 2 of 3

APEX LABS

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Landau Associates</u>		Project Mgr: <u>Chris Kimmel</u>		Project Name: <u>Boeing of Portland</u>		Project # <u>025116.117.520</u>	
Address: <u>333 SW 5th Ave #700 Portland, OR 97204</u>		Phone: <u>5035421080</u>		Fax: <u>5035421081</u>		Email: <u>CKimmel@landauinc.com</u>	
Sampled by: <u>EMW</u>							
Site Location: (OR) <u>WA</u>	ANALYSIS REQUEST						
Other:	SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTRH-CID	NWTRH-DX
	1 <u>Castell - Base SE (5-5)</u>	<u>8/1/17</u>	<u>1335</u>	<u>Soil</u>	<u>1</u>	<u>(2)</u>	<u>(2)</u>
	2 <u>Castell - Side E (2-3)</u>	<u>8/1/17</u>	<u>1455</u>	<u>Soil</u>	<u>2</u>	<u>(2)</u>	<u>(2)</u>
	3 <u>Castell - Side E (3-4)</u>	<u>8/1/17</u>	<u>1458</u>	<u>Soil</u>	<u>2</u>	<u>(2)</u>	<u>(2)</u>
	4 <u>Castell - Side E (4-5)</u>	<u>8/1/17</u>	<u>1500</u>	<u>Soil</u>	<u>2</u>	<u>(2)</u>	<u>(2)</u>
	5 <u>Castell - Side SE (2-3)</u>	<u>8/1/17</u>	<u>1445</u>	<u>Soil</u>	<u>1</u>	<u>(2)</u>	<u>(2)</u>
	6 <u>Castell - Side SE (3-5)</u>	<u>8/1/17</u>	<u>1448</u>	<u>Soil</u>	<u>2</u>	<u>(2)</u>	<u>(2)</u>
	7 <u>Castell - Side SE (4-5)</u>	<u>8/1/17</u>	<u>1450</u>	<u>Soil</u>	<u>1</u>	<u>(2)</u>	<u>(2)</u>
	8 <u>Castell - Side S (2:15-3:25)</u>	<u>8/1/17</u>	<u>1330</u>	<u>Soil</u>	<u>2</u>	<u>(2)</u>	<u>(2)</u>
	9 <u>Castell - Side S (4)</u>	<u>8/1/17</u>	<u>1310</u>	<u>Soil</u>	<u>1</u>	<u>(2)</u>	<u>(2)</u>
	10 <u>Castell - Side S (45-5)</u>	<u>8/1/17</u>	<u>1320</u>	<u>Soil</u>	<u>3</u>	<u>(2)</u>	<u>(2)</u>
Normal Turn Around Time (TAT) = 7-10 Business Days							
SPECIAL INSTRUCTIONS: <u>(1) VOC 38 List</u> <u>(2) Hold</u>							
TAT Requested (circle)				RECEIVED BY:			
1 Day 2 Day 3 Day				Signature: _____ Date: _____			
4 DAY 5 DAY Other:				Signature: _____ Date: _____			
SAMPLES ARE HELD FOR 30 DAYS							
RECEIVED BY:				RECEIVED BY:			
Signature: <u>Erin Wambel</u> Date: <u>8/2/17</u>				Signature: _____ Date: _____			
Printed Name: <u>Erin Wambel</u> Time: <u>11:15</u>				Printed Name: _____ Time: _____			
Company: <u>Landau Associates</u>				Company: _____			

Apex Laboratories

Lisa Domenighini

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Landau Associates
333 SW 5th Ave. Suite 700
Portland, OR 97204

Project: **Boeing of Portland**
Project Number: 025116.117.520
Project Manager: Chris Kimmel

Reported:
08/08/17 16:43

APEX LABS **CHAIN OF CUSTODY** Lab # A7H0069 COC 3 of 3

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: <u>Landau Associates</u> Address: <u>333 SW 5th Ave #700 Portland, OR 97204</u> Project Mgr: <u>Chris Kimmel</u> Phone: <u>503 5421086</u> Fax: <u>503 5421081</u> Project Name: <u>Boeing of Portland</u> Project # <u>025116.117.520</u> Email: <u>ckimmel@landauloc.com</u>	Project # <u>025116.117.520</u> Project Name: <u>Boeing of Portland</u> Project Mgr: <u>Chris Kimmel</u> Phone: <u>503 5421086</u> Fax: <u>503 5421081</u> Project # <u>025116.117.520</u> Project Name: <u>Boeing of Portland</u> Project Mgr: <u>Chris Kimmel</u> Phone: <u>503 5421086</u> Fax: <u>503 5421081</u>	ANALYSIS REQUEST AT, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Fe, Ni, Pb, PCP, Hg, Mn, Mo, Ni, N, K, Zn, Se, Ag, Na, Tl, V, TOTAL DISS TCLP 1200-Z 1200-COLS TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX 8260 RBDM VOCs 8260 VOC NWTPH-G NWTPH-D NWTPH-HCID # OF CONTAINERS MATRIX TIME DATE LAB ID # SAMPLE ID WA OR <input checked="" type="radio"/> WA Other: 1 <u>TRIP BLANK</u> 2 <u>H2O</u> 3 4 5 6 7 8 9 10
SPECIAL INSTRUCTIONS: ① VOC 38 list ② Hold		
TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: YES NO (YES) NO		
RECEIVED BY: <u>E. Warbel</u> Date: <u>8/2/17</u> Signature: <u>[Signature]</u> Date: <u>8/8/17</u> Signature: <u>E. Warbel</u> Date: <u>8/2/17</u> Signature: <u>[Signature]</u> Date: <u>8/8/17</u> Printed Name: <u>E. Warbel</u> Time: <u>11:15</u> Printed Name: <u>Charles Hoffman</u> Time: <u>11:15</u> Company: <u>Landau Associates</u> Company: <u>Apex Labs</u>		

Lisa Domenighini

Landau Associates 333 SW 5th Ave. Suite 700 Portland, OR 97204	Project: Boeing of Portland Project Number: 025116.117.520 Project Manager: Chris Kimmel	Reported: 08/08/17 16:43
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APEX LABS COOLER RECEIPT FORM

Client: Landau Element WO#: A7 H0069

Project/Project #: Boeing of Portland 025116.117.520

Delivery info:

Date/Time Received: 8/2/17 @ 11:15 By: CFH

Delivered by: Apex Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Inspected by: CFH : 8/2/17 @ 1300

Chain of Custody Included? Yes No Custody Seals? Yes No

Signed/Dated by Client? Yes No

Signed/Dated by Apex? Yes No

	<u>Cooler #1</u>	<u>Cooler #2</u>	<u>Cooler #3</u>	<u>Cooler #4</u>	<u>Cooler #5</u>	<u>Cooler #6</u>	<u>Cooler #7</u>
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Temperature (deg. C) 33

Received on Ice? (Y/N)

Temp. Blanks? (Y/N)

Ice Type: (Gel/Real/Other)

Condition: Good

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, we green dot applied to out of temperature samples? Yes/No (NA)

Samples Inspection: Inspected by: WJS : 8/2/17 @ 14:44

All Samples Intact? Yes No Comments:

Bottle Labels/COCs agree? Yes No Comments: D on trip blank reads

D on trip blank reads 7/24/17

Containers/Volumes Received Appropriate for Analysis? Yes No Comments:

Do VOA Vials have Visible Headspace? Yes No NA

Comments:

Water Samples: pH Checked and Appropriate (except VOAs): Yes No NA

Comments:

Additional Information:

Labeled by: _____ Witness: _____ Cooler Inspected by: _____ See Project Contact Form: Y





Lisa Domenighini