Soils and Hydrology Report

[redacted]

Pierce County, WA



August 2018

SCJ ALLIANCE
CONSULTING SERVICES

Townsmith Developments LLC
Soils and Hydrology Report

Project Information

Project: [redacted]
Soils and Hydrology Report

Prepared for: [redacted]

Reviewing Agency

Jurisdiction: Pierce County

Project Representative

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Project Reference: SCJ # 2529.01

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1. INTRODUCTION

1.1 PROJECT OVERVIEW

The purpose of this report is to provide results of onsite soils and hydrology assessment work on a 2.9-acre Study Site is located at 3561 Pacific Avenue in Tacoma, WA, TPN 7470021282) (Figure 1). It is our understanding that the site is being evaluated as a site for building a multi-family apartment complex.

On April 24, 2018, SCJ soil scientist (Lisa Palazzi, CPSS, PWS) evaluated and logged soil pit descriptions for 12 soil pits onsite. As limited by soil conditions, soil pit depth ranged from 11 feet to a maximum 17 feet depth. The soils pits were located in a grid pattern across the site to ensure that the full range of soil conditions were assessed. Soil samples were collected in various soil horizons and were sent to a soils lab to test for presence of hydrocarbons (oil, diesel and gas) and RCRA-8 heavy metals.

These soil pits were also viewed by Sean Schlitt from Intertek PSI, a geotechnical engineering firm. In addition, Intertek documented deeper soil conditions from 6 hollow stem auger borings (advanced to 36.5-50.5 FBGS) on April 26, 2018 and from 3 sonic borings (advanced to 86.5-106.5 FBGS) on July 27-29, 2018. Intertek provided a geotechnical report including geotechnical lab data (dated July 13, 2018) that describes potential for construction, and which covers some of the same soils and geology background that this report would provide. For that reason, to save time and budget, we will limit this report to subjects not already adequately covered in the Intertek report.

Figure 1. Site location map.

2.0 METHODS

2.1 Soil Characterization Protocols

NRCS soil profile description standards were followed – specifically, processes and conventions described in Chapter 3 of the Soil Survey Manual[1] and in the Soil Survey Field Book for Describing and Sampling Soils (2012, Version 3)[2], were applied.

2.2 Soil Lab Testing

Soil samples were collected in glass jars and sent to Spectra Labs in Tacoma, WA, using standard chain of custody forms. Samples were initially screened for presence of hydrocarbons, then some samples were re-tested for actual levels of hydrocarbons. Samples were also tested for presence and concentration of RCRA-8 metals.

2.3 Background Research Materials

To help determine the site conditions that might affect soil and hydrology conditions onsite, SCJ Alliance staff reviewed the following information:

- Pierce County GIS system
- US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic database online Web Soil Service. (WEBS Soil Survey).
- USGS National Geologic Map Database
- DNR Geology and LiDAR portal
- Google Earth historic timeline aerial photos of the project area.

3.0 FINDINGS

3.1 General Project and Site Description

The [redacted] Project Site is a 2.9-acre Study Site is located at 3561 Pacific Avenue in Tacoma, WA (TPN 7470021282) (Figure 1). It is proposed to build a multi-family apartment complex on the site.

An assessment of historic aerial photos, 1955 Soil Survey and historic USGS topography maps indicate that the eastern portion of the site was once a north to south trending ravine that extended from the Port of Tacoma to south of 38th Street East (Figure 2). By the late 1960s, USGS maps indicate that the southern end of the ravine was partially filled, and by 1968, aerial photos indicate the entire Project Site was filled to a relatively flat surface (Figure 3). The ravine to the north is also partially filled. This report as well as the geotechnical report prepared by Intertek describe the depth and type of fill materials onsite.

[1] Chapter 3 of the Soil Survey Manual:
https://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054253
[2] Soil Survey Field Book, 2012, Version 3:
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052523.pdf

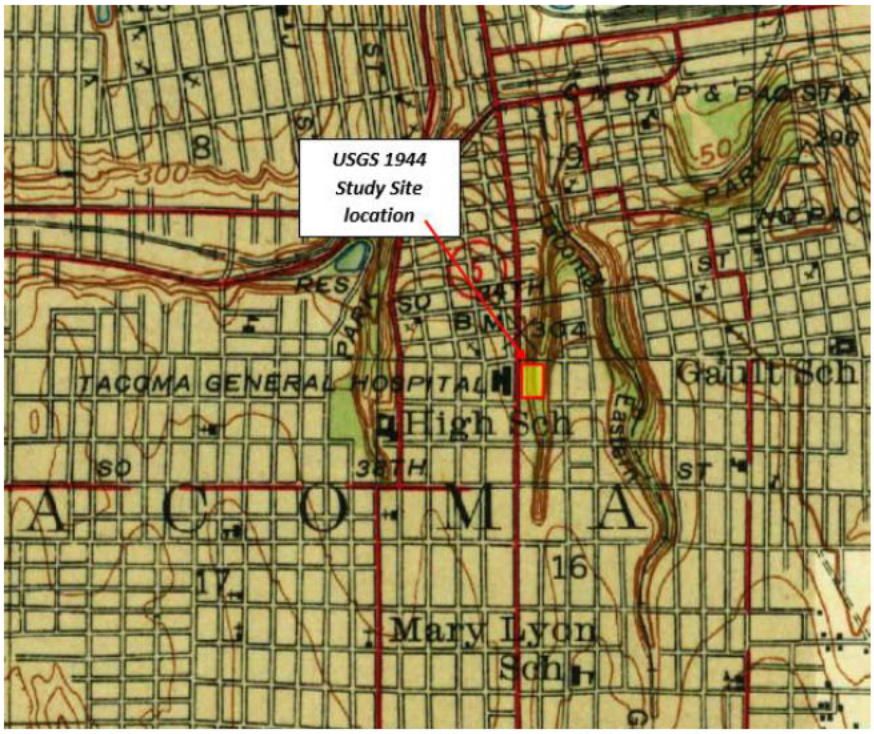

Figure 2. Showing a 1944 USGS map of the area with a ravine to the east. The approximate Project Area parcel boundaries are displayed as a yellow

Figure 3. Showing 1968 aerial photo with site mostly filled.

Current topography from the Pierce County GIS system shows the site as a broad, flat swale sloping to the north Between about 310 feet to 304 feet elevation (Figure 4). Only small areas along Portland Avenue to the west and in the far southwest corner of the parcel are higher than 310 feet elevation. A surface drain in the northeast portion of the parcel has formed from surface compaction, but this is not a natural stream system. The original stream that ran through the previous ravine would be 50+ feet below the surface, (below about 200 feet elevation in USGS topography maps). Some online stream mapping systems do show a stream in the ravine base, but those maps are applying the original, pre-fill terrain conditions.

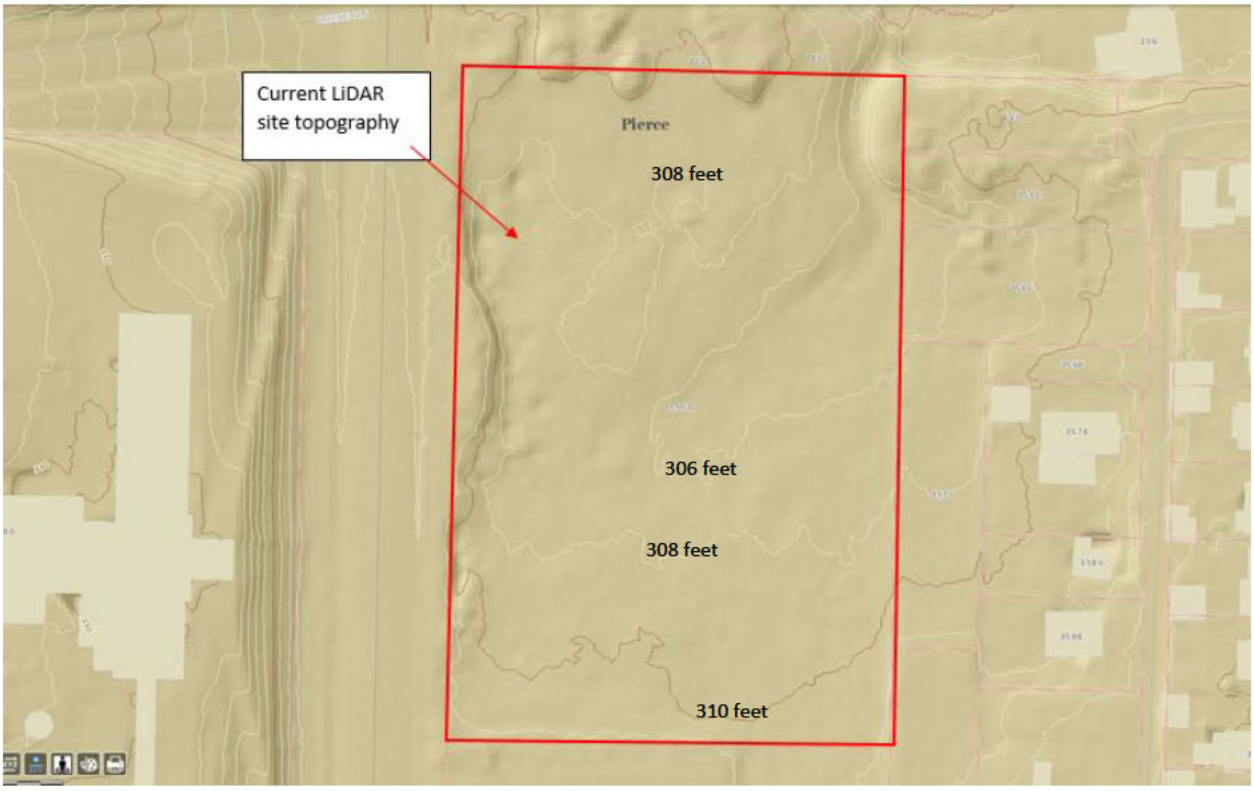

Figure 4. Pierce County GIS system LiDAR topography map of the project parcel.

3.2 Mapped Geology and Soils in Site Vicinity

Geology in the site vicinity is mapped as being Quaternary Vashon glacial till, with cemented till substrate across the surrounding uplands. Densic glacial till underlays most of the neighborhood and will send seasonally perched water toward drainageways and low-lying areas.

The most recent Soil Survey map of the Tacoma area is from 1955 (Figure 5; Table 1) shows the area surrounding the Project Site mapped as Alderwood soils (Ac), which develop in areas with shallow densic glacial till as a base. Generally, the densic till is within 3-4 feet of the surface with this soil type. The ravine is mapped as "Rd", or "rough, broken land, which is described as "areas of steep or broken relief along drainageways, on escarpments or bluffs". As mentioned above, the ravine was filled during the mid to late 1960s.

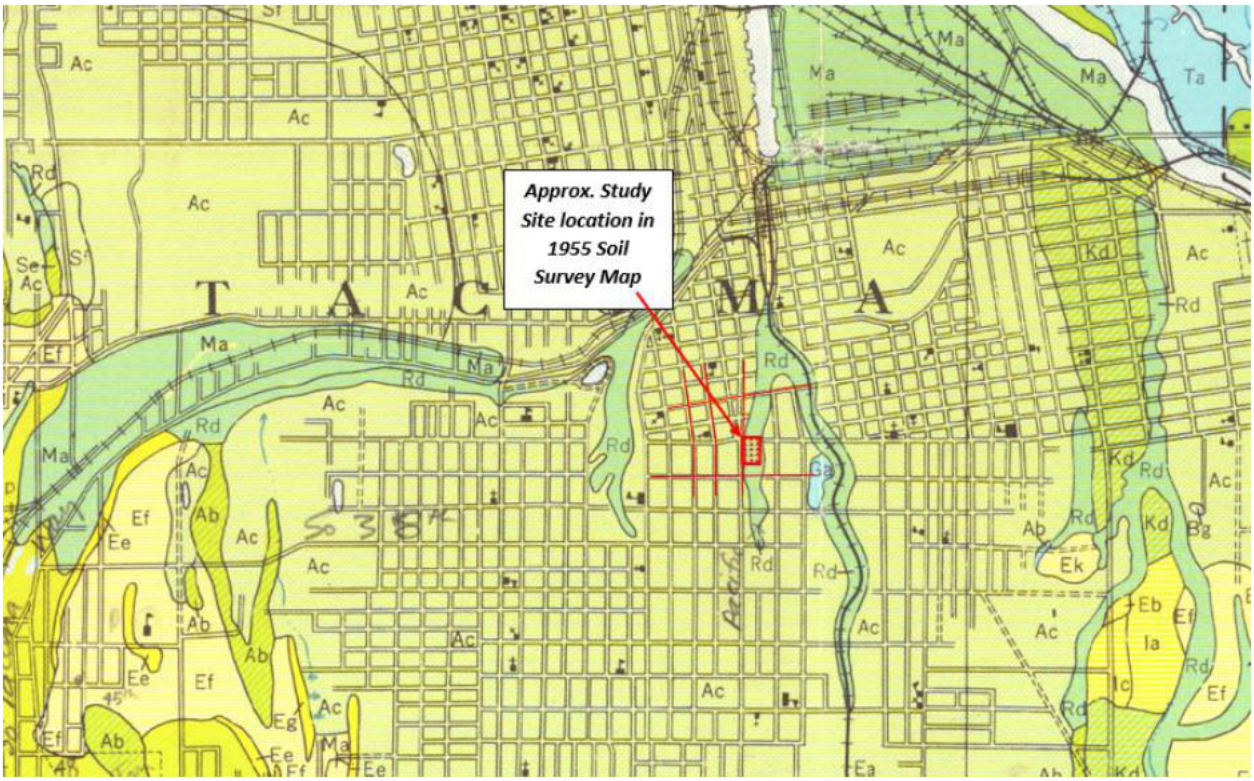

Figure 5. Soil Survey from 1955.

Table 1. Soil Map Units in the area surrounding the project site (Figure 5 Soil Map)		
Soil Map Unit	**Soil Name**	**Critical Characteristics**
Ab, Ac	Alderwood gravelly sandy loam, 3-8% and 8-15% slopes	Gravelly sandy loam surface soils over shallow compact glacial till at 3-4 ft depth; seasonal water table develops above the till during winter months
Eb, Ef, Ek	Everett very gravelly sandy loam, various slope classes	Extremely gravelly loamy sand glacial outwash flood deposits; no seasonal water table expected within 6 ft of the surface.
Rd	Rough Broken Land	Areas of steep or broken relief along drainageways, on escarpments or bluffs

3.3 Soil Assessment Results

A total of 12 soil pits were dug to depths ranging from 11 to 17 feet across the site. 15 soil pits were originally proposed in a 3 by 5 grid pattern across the site, however, the far northern row of 3 pits was close to an onsite public water supply line, and therefore, were not excavated to avoid potential impacts to underground utilities.

As mentioned above, Intertek engineers were onsite when these 12 soil pits were dug, and they carried out additional onsite soil profile assessment work later, supervising and logging results from two different types of deeper soil borings. Results of their work describing geotechnical characteristics of

the onsite soil/fill materials is provided in a separate report. Please refer to the Intertek report for details on geotechnical functions.

The purpose of this report is to assess potential soil contaminants that might impact development choices. Soil profile conditions in each of the 12 soil pits were documented and representative soil samples were collected from various layers in various pits to send to the lab to screen for potential hydrocarbon and heavy metal content, primarily to assess the type of fill present. Recent Google Earth images document the soil pit locations (Figure 6).

None of the 12 soil pits evaluated had undisturbed native soil profiles. However, some of the fill materials appeared to be displaced native soil – possibly from regrading onsite or imported mineral materials from nearby project areas. Therefore, some of the fill layers had textures similar to local glacial till sediments. Other fill layers included chunks of concrete mixed with the native sediments which appeared to come from either road or parking lot reconstruction projects. Some of the fill layers were mixed with woody debris.

Some of the fill layers trapped infiltrating stormwater, and therefore, were seeping during the onsite soil pit investigations. However, depth to the seeping zones was not consistent across the site and thus appears to be an artifact of soil layering from filling and compaction and was not a reflection of a shallow groundwater table across the site.

Near-surface compaction of fill materials in the low elevation swale base in the eastern portion of the site appears to cause water to pond over the surface in some areas during winter months. No surface ponding was present during the April site visit, but there was evidence of past ponding. That ponded water drains across the surface to the northeast, leaving the site via a swale feature (mentioned previously) that exits the site near the northeast parcel corner. None of these hydrologic features is a result of natural hydrology, but rather they are a result of surface compaction of fill materials.

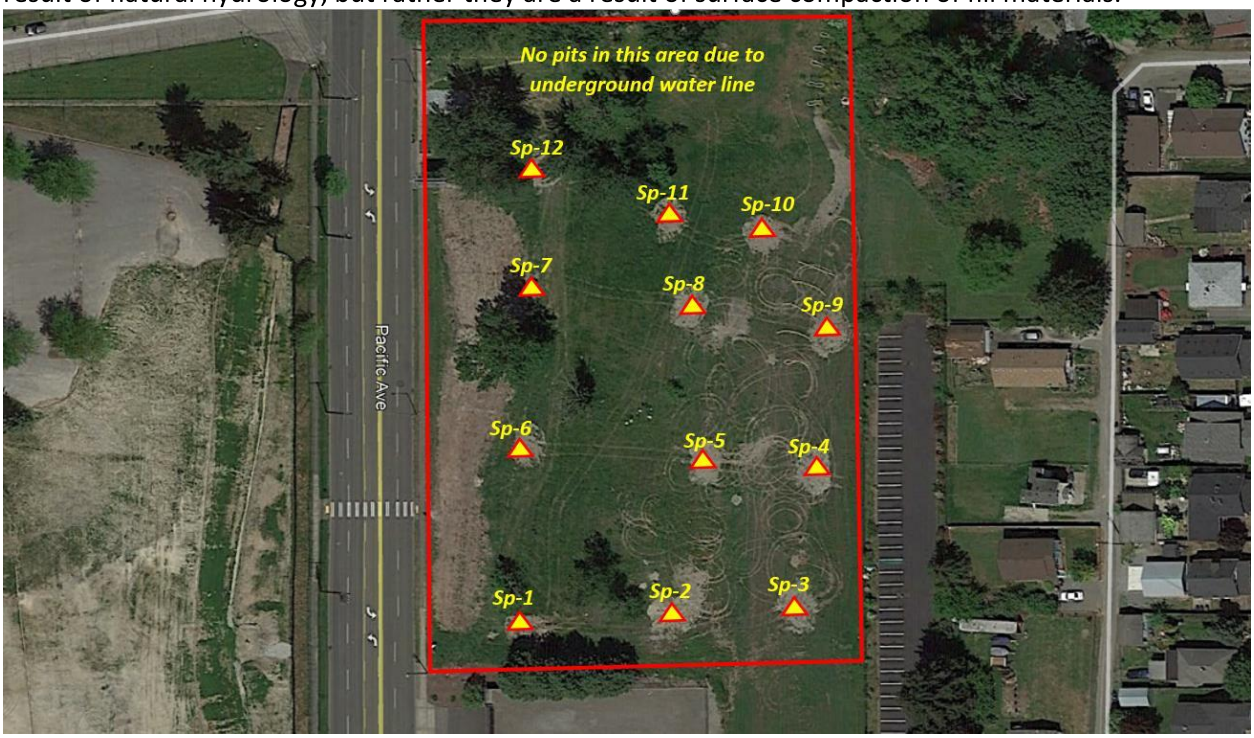

Figure 6. Showing final soil pit locations.

Infiltration of onsite stormwater may not be possible due to limited infiltration potential in these compacted fill sediments.

Samples collected from various layers in the soil pits across the site. 10 representative samples were sent to the lab to test for hydrocarbons (heavy oils, diesel and gasoline) and RCA-8 heavy metals. Table 2 provides cleanup level limits for each of these potential pollutants. Table 3 provides results of lab work for the 10 samples. None of the soil samples indicated levels of heavy metals or hydrocarbons that require clean up.

Table 2. Heavy Metal and Hydrocarbon clean up limits[3]

Heavy Metal	**Soil Clean Up Levels**
Arsenic (As) Method A Unrestricted Land Use	20 Mg/Kg
Barium (Ba) Method B, non-cancer	16,000 Mg/Kg
Cadmium (Cd) Method A Unrestricted Land Use	2 Mg/Kg
Chromium (Cr-total [4]) Method A Unrestricted Land Use	100 Mg/Kg
Lead (Pb) Method A Unrestricted Land Use	250 Mg/Kg
Mercury (Hg) Method A Unrestricted Land Use	2 Mg/Kg
Selenium (Se) Method B, non-cancer	400 Mg/Kg
Silver (Au)	400 Mg/Kg
Hydrocarbons	**Soil Clean up Levels**
Weathered gasoline	100 mg/kg
Diesel	2000 mg/kg
Heavy Oils	2000 mg/kg

Table 3. Soil chemical testing results (mg/kg).

Sample #	As	Ba	Cd	Cr	Pb	Se	Au	Hg	Gas	Diesel	Oils
Pit 1: 0-5 in	5.2	57.4	<0.3	30.3	7.4	<2.5	<0.7	<0.05	<20	<50	<100
Pit 3: 9-11 in	<2.5	37.6	<0.3	20.8	<2.5	<2.5	<0.7	1.13	<20	<50	<100
Pit 4: 0-2 in	<2.5	41	<0.3	20.2	2.5	<2.5	<0.7	<0.05	<20	<50	<100
Pit 5: 14-15ft	<2.5	37.6	<0.3	20.8	2.5	<2.5	<0.7	<0.05	<20	<50	P/ND
Pit 6: 0-5 in	8.5	68.2	<0.3	35.8	35.0	<2.5	<0.7	006	<20	<50	P/ND
Pit 7: 9-10 ft	5.4	79.4	<0.3	37.2	27.6	<2.5	<0.7	0.05	<20	<50	<100
Pit 9: 0-5 in	<2.5	29	<0.3	21.8	5.0	<2.5	<0.7	<0.05	<20	<50	<100
Pit 10: 0-2 ft	5.0	71.6	<0.3	24.2	24.4	<2.5	<0.7	0.05	<20	<50	P/65
Pit 10: 10-11 ft	4.4	77.4	<0.3	34.4	32.2	<2.5	<0.7	<0.05	<20	<50	<100
Pit 11: 0-5 in	<2.5	49.4	<0.3	19.8	4.4	<2.5	<0.7	<0.05	<20	<50	P/ND

Cells shaded gray are below the detection limit. In the HCID columns (gas, diesel and oils), cells shaded yellow initially resulted in a detection of "presence" of some type of oil; but follow up testing indicated either "ND" (i.e., the positive initial ID was most likely due to soil organic carbon and not true pollutant hydrocarbons), or, in one case, 65mg/kg content of oil – well below the 2000 mg/kg clean-up level.

[3] Per Ecology's CLARC Master Spreadsheet, https://fortress.wa.gov/ecy/clarc/

[4] The Cr result is a combined value for both Cr III and Cr VI. Chromium III is an essential human dietary nutrient found in many vegetables, fruits, meats, grains, and yeast, and the unrestricted Land Use soil lean up level is 2000 mg/kg. Chromium VI also occurs naturally but is more toxic and is used in industrial and manufacturing processes such as electroplating, tanning, and pulp processing. The drinking water clean-up limit is 19 mg/kg. Unless the combined value is greater than 100, we do not test further to separate into Cr III versus Cr VI components.

4.0 SUMMARY AND CONCLUSIONS

The soils that were assessed in the upper 11-17 feet of the project site are a mixture of displaced native sediments, quarry spalls, concrete chunks and some woody debris. The fills were placed during several different events over time, and the main source appears to be from road or parking lot reconstruction projects.

Lab test results indicate that the various fill components are relatively clean, in that no oils or heavy metals tested were documented to be above clean up levels.

The layered fill soils are severely compacted in some areas, which causes infiltrating winter stormwater to perch in some subsoil layers or pond on the surface rather than infiltrate. There was evidence of surface ponding in the eastern part of the site and drainage to the northeast as a result of this soil condition, but the hydrology expressed in these surface water systems is not natural. The original terrain indicated by old USGS maps and aerial photos was a deep ravine at the Project Site location with a stream in the base, but that previous stream was 100+ feet below the current surface elevation at the site.

APPENDIX B
SOIL LAB RESULTS

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06/26/2018

SCJ Alliance
8730 Tallon Ln
Suite 200
Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 1- Pit 1 0-5in
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 1

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	5.2	mg/Kg	SW846 6010C
Total Barium	57.4	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	30.3	mg/Kg	SW846 6010C
Total Lead	7.4	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	55	NWTPH-HCID
p-Terphenyl	71	NWTPH-HCID

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Jeffrey Cooper, Laboratory Manager

aS/jac

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Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 5- Pit 3 9-11ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 2

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	< 2.5	mg/Kg	SW846 6010C
Total Barium	37.6	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	20.8	mg/Kg	SW846 6010C
Total Lead	< 2.5	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	1.13	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	58	NWTPH-HCID
p-Terphenyl	79	NWTPH-HCID

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Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 8- Pit 4 0-2ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 3

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	< 2.5	mg/Kg	SW846 6010C
Total Barium	41	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	20.2	mg/Kg	SW846 6010C
Total Lead	< 2.5	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	53	NWTPH-HCID
p-Terphenyl	87	NWTPH-HCID

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Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 13- Pit 5 15ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 4

Analyte	Result	Units	Method
Diesel	<10**	mg/Kg	NWTPH-D
Oil	<50**	mg/Kg	NWTPH-D
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	Present	mg/Kg	NWTPH-HCID
Total Arsenic	< 2.5	mg/Kg	SW846 6010C
Total Barium	51.6	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	23.6	mg/Kg	SW846 6010C
Total Lead	< 2.5	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

**Sample were extracted outside of method holding time.

Surrogate	% Recovery	Method
4-Bromofluorobenzene	60	NWTPH-HCID
p-Terphenyl	102	NWTPH-HCID
p-Terphenyl	86	NWTPH-D

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Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 14- Pit 6 0-5in
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 5

Analyte	Result	Units	Method
Diesel	<10**	mg/Kg	NWTPH-D
Oil	<50**	mg/Kg	NWTPH-D
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	Present	mg/Kg	NWTPH-HCID
Total Arsenic	8.5	mg/Kg	SW846 6010C
Total Barium	68.2	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	35.8	mg/Kg	SW846 6010C
Total Lead	35	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	0.06	mg/Kg	SW846 7471B

**Sample were extracted outside of method holding time. *Low surrogate recovery most likely due to sample matrix. Sample was reextracted and cleaned and low surrogate recoveries were repeated.

Surrogate	% Recovery	Method
4-Bromofluorobenzene	58	NWTPH-HCID
p-Terphenyl	110	NWTPH-HCID
p-Terphenyl	53*	NWTPH-D

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P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 16- Pit 7 >9ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 6

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	5.4	mg/Kg	SW846 6010C
Total Barium	79.4	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	37.2	mg/Kg	SW846 6010C
Total Lead	27.6	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	0.05	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	53	NWTPH-HCID
p-Terphenyl	103	NWTPH-HCID

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P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 19- Pit 9 0-5in
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 7

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	< 2.5	mg/Kg	SW846 6010C
Total Barium	29	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	21.8	mg/Kg	SW846 6010C
Total Lead	5.0	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	53	NWTPH-HCID
p-Terphenyl	78	NWTPH-HCID

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P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 22- Pit 10 2ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 8

Analyte	Result	Units	Method
Diesel	<10**	mg/Kg	NWTPH-D
Oil	65**	mg/Kg	NWTPH-D
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	Present	mg/Kg	NWTPH-HCID
Total Arsenic	5.0	mg/Kg	SW846 6010C
Total Barium	71.6	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	24.2	mg/Kg	SW846 6010C
Total Lead	24.4	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	0.05	mg/Kg	SW846 7471B

**Sample were extracted outside of method holding time. *Low surrogate recovery most likely due to sample matrix. Sample was reextracted and cleaned and low surrogate recoveries were repeated.

Surrogate	% Recovery	Method
4-Bromofluorobenzene	48	NWTPH-HCID
p-Terphenyl	90	NWTPH-HCID
p-Terphenyl	10*	NWTPH-D

SPECTRA LABORATORIES

Jeffrey Cooper, Laboratory Manager

a5/jac

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06/26/2018

SCJ Alliance
8730 Tallon Ln
Suite 200
Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 24- Pit 10 11ft
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 9

Analyte	Result	Units	Method
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	<100	mg/Kg	NWTPH-HCID
Total Arsenic	4.4	mg/Kg	SW846 6010C
Total Barium	77.4	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	34.4	mg/Kg	SW846 6010C
Total Lead	32.2	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

Surrogate	% Recovery	Method
4-Bromofluorobenzene	61	NWTPH-HCID
p-Terphenyl	87	NWTPH-HCID

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06/26/2018

SCJ Alliance
8730 Tallon Ln
Suite 200
Lacey, WA 98516

P.O.#: COD
Project: 2529.01 Pac Ave Developments
Client ID: 25- Pit 11 0-5in
Sample Matrix: Soil
Date Sampled: 04/28/2018
Date Received: 05/04/2018
Spectra Project: 2018050134
Spectra Number: 10

Analyte	Result	Units	Method
Diesel	<10**	mg/Kg	NWTPH-D
Oil	<50**	mg/Kg	NWTPH-D
HCID- Gasoline	<20	mg/Kg	NWTPH-HCID
HCID-Diesel	<50	mg/Kg	NWTPH-HCID
HCID-Oil	Present	mg/Kg	NWTPH-HCID
Total Arsenic	< 2.5	mg/Kg	SW846 6010C
Total Barium	49.4	mg/Kg	SW846 6010C
Total Cadmium	< 0.3	mg/Kg	SW846 6010C
Total Chromium	19.8	mg/Kg	SW846 6010C
Total Lead	4.4	mg/Kg	SW846 6010C
Total Selenium	< 2.5	mg/Kg	SW846 6010C
Total Silver	< 0.7	mg/Kg	SW846 6010C
Total Mercury	<0.05	mg/Kg	SW846 7471B

**Sample were extracted outside of method holding time.

Surrogate	% Recovery	Method
4-Bromofluorobenzene	42	NWTPH-HCID
p-Terphenyl	110	NWTPH-HCID
p-Terphenyl	84	NWTPH-D

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Jeffrey Cooper, Laboratory Manager

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