STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300*
*711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341*

October 21, 2016

Ms. Crystal Mattison
Land Development Manager
Azure Northwest Homes
33400 8th Avenue S, Suite 230
Federal Way, WA 98003

**Re: No Further Action at a Property associated with the Asarco Tacoma Smelter Site:**

- Name: Eagle Quest Residential Development
- Property Address: 8700 Block 24th Avenue NW, Gig Harbor, WA 98332
- Facility/Site No.: 15165
- Cleanup Site ID: 13013
- VCP Project No.: SW1519

Dear Ms. Mattison:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of a Property associated with the Asarco Tacoma Smelter Site (**Asarco Site**). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

## Issues Presented and Opinion

1. Is further remedial action necessary at the Property to clean up contamination associated with the Asarco Site?

   **NO. Ecology has determined that no further remedial action is necessary at the Property to clean up contamination associated with the Asarco Site.**

2. Is further remedial action still necessary elsewhere at the Asarco Site?

   **YES. Ecology has determined that further remedial action is still necessary elsewhere at the Asarco Site.**

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

**Description of the Property and the Asarco Site**
This opinion applies only to the Property and the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

**1. Description of the Property.**

The Property includes the following tax parcels in Pierce County that were affected by the Asarco Site and addressed by your cleanup:

- 0221054017
- 0221054059

**Enclosure A** includes a legal description of the Property and details of the Property as currently known to Ecology.

**2. Description of the Asarco Site.**

The Asarco Site is defined by the nature and extent of contamination associated with the following releases:

- Arsenic into the Soil.
- Lead into the Soil.

Those releases have affected more than one parcel of real property, including the parcels identified above.

**Enclosure B** includes a detailed description and diagram of the Asarco Site, as currently known to Ecology.

**3. Identification of other sites that may affect the Property.**

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the Property is affected by other sites.

**Basis for the Opinion**

This opinion is based on the information contained in the following documents:

1) Terra Associates, Inc. (Terra), Tacoma Smelter Cleanup Action Summary, Eagle Quest, 8700 Block 24th Avenue NW, Pierce County, Washington, Pierce County Tax Parcels 0221054017 and 4059, dated August 29, 2016.

2) Terra, Tacoma Smelter Plume Site Assessment/ Cleanup Action Plan, Project No. T-7331, Eagle Quest, 8700 Block 24th Avenue NW, Pierce County, Washington, Pierce County Tax Parcels 0221054017 and 4059dated April 12, 2016.

3) Opinion on the Proposed Cleanup of a Property associated with the Asarco Tacoma Smelter Site, Eagle Quest Residential Development, Eagle Quest, 8700 Block 24th Avenue NW, Pierce County, Washington, Pierce County Tax Parcels 0221054017 and 4059dated June 9, 2016.

4) Terra, Supplemental Discussion Tacoma Smelter Plume Impact Assessment/ Cleanup Action Plan, Eagle Quest, 8700 Block 24th Avenue NW, Pierce County, Washington, Pierce County Tax Parcels 0221054017 and 4059, dated April 12, 2016.

5) Terra, Tacoma Smelter Plume Impact Assessment/Cleanup Action Plan, Eagle Quest, 8700 Block 24th Avenue NW, Pierce County, Washington, Pierce County Tax Parcels 0221054017 and 4059, dated February 10, 2016.

6) Eva Barber (Ecology), e-mail correspondence with Chuck Lie (Terra) regarding characterization sampling guidance in the open areas December 28, 2015, dated May 13, 2015.

7) Eva Barber (Ecology), e-mail correspondence with Crystal Mattison (Azure Northwest) regarding additional information needed, dated 03/24/2016.

These documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

## Analysis of the Cleanup

### 1. Cleanup of the Property located within the Asarco Site.

Ecology has concluded that **no further remedial action** is necessary at the Property to clean up contamination associated with the Asarco Site. That conclusion is based on the following analysis:

**a. Characterization of the Asarco Site.**

The Asarco Site is described in **Enclosure B**.

For almost 100 years, the Asarco Company operated a copper smelter in Tacoma, Washington. Air pollution from the smelter settled on the surface soil over a vast region -- more than 1,000 square miles of the Puget Sound basin. Arsenic, lead, and other heavy metals are still in the soil as a result of this pollution. Ecology has found elevated levels of arsenic and lead as far south as Lacey and as far north as Seattle (West Seattle), and as far west as the Kitsap Peninsula and as far east as Kent and Bellevue.

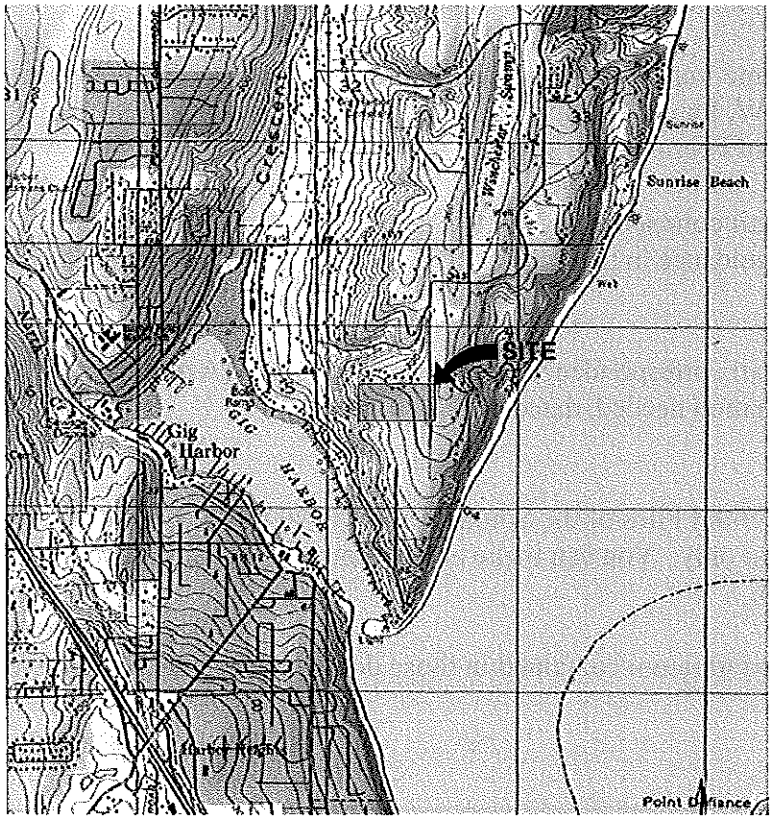



Figure 1. Vicinity map

Eagle Quest Development is located on 20 acres, near 24th Avenue NW in Gig Harbor, Washington. The Property is currently undeveloped and forested. Azure Northwest Homes (Azure) plans to construct 25 residential single-family homes and small storm drainage area on 12.5 contiguous acres of the 20-acre Property.

Azure intends to leave the remaining 7.5 acres undeveloped. This area contains forested slopes, bisected by ravines. There are no roads or trails on the Property that could be used by passersby. For more information about the Property, see Figure1 and Enclosure A.

For sampling purposes, Terra divided the Property into two Decision Units (Figure 2):

- Decision Unit A (DUA) – is located in the western part of the Property. This portion of Eagle Quest will remain undeveloped. This area includes second and third growth forest on steep slopes.
- Decision Unit B (DUB) – is the proposed development area, located in the eastern part of the Property.

Apex Engineering (Apex) conducted characterization sampling on the Property in 2008. Apex conducted the sampling prior to the publication of the 2012 Tacoma Smelter Plume Model Remedies Guidance (MR Guidance). Terra did not include the results of the 2008 sampling in their characterization of the Property; however, they noted that the results matched the results of the current sampling.

In January 2016, Terra conducted characterization sampling within the DUB following the MR Guidance. Ecology provided sampling guidance within natural area (DUA). Terra collected soil samples from four depths at 29 locations in the DUA and from two depths at 51 locations in DUB. Terra collected one composite of 8 duff subsamples in DUA and one composite of 11 duff subsamples from DUB.

Results of the characterization sampling:

**DUA:** Table 1 shows the results of the 2016 characterization sampling within DUA. In the DUA, the average arsenic and lead concentrations in the soil were below their respective MTCA Method A cleanup levels of 20 milligrams per kilogram (mg/kg) and 250 mg/kg in all the four sample depth intervals. No single sample exceeded arsenic concentration of 40 mg/kg and no single sample exceeded lead concentration of 500 mg/kg. Ecology evaluated the sampling results in terms of ecological risk assessment according to the MTCA Terrestrial Ecological Evaluation (TEE) requirements. All soil concentrations were below the MTCA TEE requirements.

The concentration of arsenic in the duff layer within DUA was 24 mg/kg, exceeding MTCA Method A cleanup level. The concentration of lead in the duff layer was 65 mg/kg and was below the cleanup level.

Table 1. Soil Characterization Sampling

| Sample ID | Sample Date | Depth (inches) | Arsenic (mg/kg) | Lead (mg/kg) |
|---|---|---|---|---|
| TP-1 | 1/13/2016 | 0-6 | 13 | 13 |
| | 1/13/2016 | 6-12 | 7.4 | 7.6 |
| | 1/13/2016 | 12-24 | 3 | 3.5 |
| | 1/13/2016 | 24-36 | 3.2 | 3.8 |
| TP-2 | 1/13/2016 | 0-6 | 11 | 27 |
| | 1/13/2016 | 6-12 | 5.6 | 37 |
| | 1/13/2016 | 12-24 | 2.9 | 7.8 |
| | 1/13/2016 | 24-36 | 2.2 | 13 |
| TP-3 | 1/13/2016 | 0-6 | 19 | 33 |
| | 1/13/2016 | 6-12 | 20 | 37 |
| | 1/13/2016 | 12-24 | 8.5 | 10 |
| | 1/13/2016 | 24-36 | 4.3 | 7.6 |
| TP-4 | 1/13/2016 | 0-6 | 19 | 39 |
| | 1/13/2016 | 6-12 | **30** | 66 |
| | 1/13/2016 | 12-24 | **30** | 21 |
| | 1/13/2016 | 24-36 | 11 | 9.6 |
| TP-5 | 1/13/2016 | 0-6 | **28** | 96 |
| | 1/13/2016 | 6-12 | 14 | 25 |
| | 1/13/2016 | 12-24 | 6.2 | 10 |
| | 1/13/2016 | 24-36 | 1.9 | 3.3 |
| TP-6 | 1/13/2016 | 0-6 | 13 | 17 |
| | 1/13/2016 | 6-12 | **21** | 46 |
| | 1/13/2016 | 12-24 | 7.2 | 11 |
| | 1/13/2016 | 24-36 | 5.8 | 7.4 |
| TP-7 | 1/13/2016 | 0-6 | 15 | 21 |
| | 1/13/2016 | 6-12 | 13 | 15 |
| | 1/13/2016 | 12-24 | 11 | 19 |
| | 1/13/2016 | 24-36 | 9.5 | 7.6 |
| TP-8 | 1/13/2016 | 0-6 | 20 | 37 |
| | 1/13/2016 | 6-12 | 7.4 | 8.4 |
| | 1/13/2016 | 12-24 | 3.9 | 5.6 |
| | 1/13/2016 | 24-36 | 3.4 | 5.1 |
| TP-9 | 1/13/2016 | 0-6 | 7.3 | 13 |
| | 1/13/2016 | 6-12 | 5.8 | 13 |
| | 1/13/2016 | 12-24 | 2.3 | 3.7 |
| | 1/13/2016 | 24-36 | 1.7 | 2.9 |
| TP-10 | 1/13/2016 | 0-6 | 7.6 | 12 |

Table 1. Soil Characterization Sampling

| Sample ID | Sample Date | Depth (inches) | Arsenic (mg/kg) | Lead (mg/kg) |
|---|---|---|---|---|
| | 1/13/2016 | 6-12 | 4.4 | 7 |
| | 1/13/2016 | 12-24 | 2.4 | 3.4 |
| | 1/13/2016 | 24-36 | 1.9 | 2.7 |
| TP-11 | 1/13/2016 | 0-6 | **24** | 41 |
| | 1/13/2016 | 6-12 | **32** | 46 |
| | 1/13/2016 | 12-24 | 8.7 | 17 |
| | 1/13/2016 | 24-36 | 2.5 | 3.9 |
| TP-12 | 1/13/2016 | 0-6 | 6.9 | 4.9 |
| | 1/13/2016 | 6-12 | 20 | 21 |
| | 1/13/2016 | 12-24 | 6.5 | 7 |
| | 1/13/2016 | 24-36 | 4.9 | 5.7 |
| TP-13 | 1/13/2016 | 0-6 | 6.5 | 8 |
| | 1/13/2016 | 6-12 | 3.2 | 5.6 |
| | 1/13/2016 | 12-24 | 3 | 5 |
| | 1/13/2016 | 24-36 | 2 | 2.6 |
| TP-14 | 1/13/2016 | 0-6 | 8.7 | 12 |
| | 1/13/2016 | 6-12 | 8.2 | 12 |
| | 1/13/2016 | 12-24 | 5.6 | 7.2 |
| | 1/13/2016 | 24-36 | 3 | 3.8 |
| TP-15 | 1/13/2016 | 0-6 | 4.8 | 7 |
| | 1/13/2016 | 6-12 | 3 | 5.1 |
| | 1/13/2016 | 12-24 | 2.8 | 4.4 |
| | 1/13/2016 | 24-36 | 1.5 | 2.3 |
| TP-16 | 1/13/2016 | 0-6 | 15 | 7.4 |
| | 1/13/2016 | 6-12 | 7.1 | 4.5 |
| | 1/13/2016 | 12-24 | 2.3 | 3 |
| | 1/13/2016 | 24-36 | 1.7 | 2.4 |
| TP-17 | 1/13/2016 | 0-6 | 8.8 | 16 |
| | 1/13/2016 | 6-12 | 5.7 | 9 |
| | 1/13/2016 | 12-24 | 12 | 18 |
| | 1/13/2016 | 24-36 | 11 | 16 |
| TP-18 | 1/13/2016 | 0-6 | 17 | 29 |
| | 1/13/2016 | 6-12 | 3.7 | 4.4 |
| | 1/13/2016 | 12-24 | 3.4 | 4.1 |
| | 1/13/2016 | 24-36 | 2.1 | 2.6 |
| TP-19 | 1/13/2016 | 0-6 | **32** | 98 |
| | 1/13/2016 | 6-12 | **26** | 22 |

Table 1. Soil Characterization Sampling

| Sample ID | Sample Date | Depth (inches) | Arsenic (mg/kg) | Lead (mg/kg) |
|---|---|---|---|---|
| | 1/13/2016 | 12-24 | 5.1 | 4.6 |
| | 1/13/2016 | 24-36 | 2 | 2.3 |
| TP-20 | 1/13/2016 | 0-6 | **21** | 20 |
| | 1/13/2016 | 6-12 | 17 | 15 |
| | 1/13/2016 | 12-24 | 2.6 | 2.8 |
| | 1/13/2016 | 24-36 | 1.9 | 2.3 |
| TP-21 | 1/13/2016 | 0-6 | 6.6 | 9.7 |
| | 1/13/2016 | 6-12 | 4.2 | 5.4 |
| | 1/13/2016 | 12-24 | 3.4 | 4 |
| | 1/13/2016 | 24-36 | 2.6 | 2.9 |
| TP-22 | 1/13/2016 | 0-6 | **24** | 15 |
| | 1/13/2016 | 6-12 | **27** | 20 |
| | 1/13/2016 | 12-24 | 8.3 | 3.6 |
| | 1/13/2016 | 24-36 | 4.5 | 3.3 |
| TP-23 | 1/13/2016 | 0-6 | 12 | 20 |
| | 1/13/2016 | 6-12 | 13 | 23 |
| | 1/13/2016 | 12-24 | 11 | 14 |
| | 1/13/2016 | 24-36 | 6.1 | 9.8 |
| TP-24 | 1/13/2016 | 0-6 | 9.9 | 6.6 |
| | 1/13/2016 | 6-12 | 3.2 | 2.6 |
| | 1/13/2016 | 12-24 | 1.6 | 1.9 |
| | 1/13/2016 | 24-36 | 1.3 | 1.5 |
| TP-25 | 1/13/2016 | 0-6 | 8.4 | 17 |
| | 1/13/2016 | 6-12 | 7.3 | 16 |
| | 1/13/2016 | 12-24 | 1.7 | 2.7 |
| | 1/13/2016 | 24-36 | 1.9 | 3.3 |
| TP-26 | 1/13/2016 | 0-6 | 11 | 15 |
| | 1/13/2016 | 6-12 | 8.4 | 11 |
| | 1/13/2016 | 12-24 | 2.7 | 3.6 |
| | 1/13/2016 | 24-36 | 3.9 | 5.2 |
| TP-27 | 1/13/2016 | 0-6 | 9.9 | 18 |
| | 1/13/2016 | 6-12 | 5.4 | 10 |
| | 1/13/2016 | 12-24 | 3.5 | 6.5 |
| | 1/13/2016 | 24-36 | 5.7 | 9 |
| TP-28 | 1/13/2016 | 0-6 | 11 | 16 |
| | 1/13/2016 | 6-12 | 7.7 | 12 |
| | 1/13/2016 | 12-24 | 18 | 36 |

Table 1. Soil Characterization Sampling

| Sample ID | Sample Date | Depth (inches) | Arsenic (mg/kg) | Lead (mg/kg) |
|---|---|---|---|---|
| | 1/13/2016 | 24-36 | 20 | 48 |
| TP-29 | 1/13/2016 | 0-6 | 19 | 38 |
| | 1/13/2016 | 6-12 | 11 | 20 |
| | 1/13/2016 | 12-24 | 2.9 | 5.5 |
| | 1/13/2016 | 24-36 | 23 | 4.1 |
| Average: | | 0-6 | 14.4 | 24.4 |
| | | 6-12 | 11.8 | 18.1 |
| | | 12-24 | 6.1 | 8.3 |
| | | 24-36 | 5.3 | 7.2 |
| Duff | 1/13/2016 | | **24** | 65 |
| MTCA Method A Cleanup Level | | | 20 | 250 |

**Bolded** numbers represent concentrations above the MTCA Method A cleanup levels

**DUB:**

Eleven samples exceeded the MTCA Method A cleanup level for arsenic. The concentrations of lead were below the cleanup level in all the samples collected. Although the average concentrations of arsenic and lead were below their respective cleanup levels of 20 mg/kg and 250 mg/kg, two of the samples exceeded the maximum arsenic cleanup level for a single sample of 40 mg/kg. Arsenic concentration in the duff was 22 mg/kg, exceeding the cleanup level. The concentration of lead was 60 mg/kg and below the cleanup level (See Tables 2 and 3).

Table 2. Summary of the characterization sampling in DUB

| Sample Type | Arsenic mg/kg (EPA 6020A) | | | Lead mg/kg (EPA 6020A) | | |
|---|---|---|---|---|---|---|
| | Minimum | Maximum | Average | Minimum | Maximum | Average |
| Soil Depth 0-6" | 1.5 | 44 | 16 | 2.9 | 120 | 30.5 |
| Soil Depth 6-12" | 6.6 | 21 | 11.9 | 9.5 | 37 | 20.6 |
| Duff | | | 22 | | | 60 |
| MTCA Cleanup Levels | | 40 | 20 | | 500 | 250 |

Table 3. Characterization sampling in DUB (residential development)

| Sample ID | Depth (inches) | Arsenic (mg/kg) EPA 6020A | Lead (mg/kg) EPA 6020A |
|---|---|---|---|
| TP-30 | 0-6 | 19 | 26 |
| | 6-12 | 16 | 25 |
| TP-31 | 0-6 | 20 | 44 |
| TP-32 | 0-6 | 17 | 29 |
| TP-33 | 0-6 | 15 | 28 |
| TP-34 | 0-6 | 18 | 37 |
| | 6-12 | 11 | 14 |
| TP-35 | 0-6 | 14 | 22 |
| TP-36 | 0-6 | 2.1 | 3.9 |
| TP-37 | 0-6 | 13 | 11 |
| TP-38 | 0-6 | **27** | 68 |
| | 6-12 | 18 | 36 |
| TP-39 | 0-6 | 16 | 30 |
| TP-40 | 0-6 | **21** | 48 |
| TP-41 | 0-6 | 13 | 13 |
| TP-42 | 0-6 | 19 | 38 |
| | 6-12 | 9.2 | 14 |
| TP-43 | 0-6 | **44** | 62 |
| TP-44 | 0-6 | 11 | 19 |
| TP-45 | 0-6 | 16 | 31 |
| TP-46 | 0-6 | 8.8 | 20 |
| | 6-12 | 11 | 24 |
| TP-47 | 0-6 | 11 | 5.9 |
| TP-48 | 0-6 | **26** | 38 |
| TP-49 | 0-6 | 11 | 12 |
| TP-50 | 0-6 | 9.3 | 17 |
| TP-51 | 0-6 | 19 | 34 |
| TP-52 | 0-6 | 19 | 26 |
| | 6-12 | 13 | 20 |
| TP-53 | 0-6 | **21** | 53 |
| TP-54 | 0-6 | 11 | 21 |
| TP-55 | 0-6 | 14 | 28 |
| | 6-12 | 8.7 | 16 |
| TP-56 | 0-6 | **21** | 44 |
| TP-57 | 0-6 | 14 | 36 |

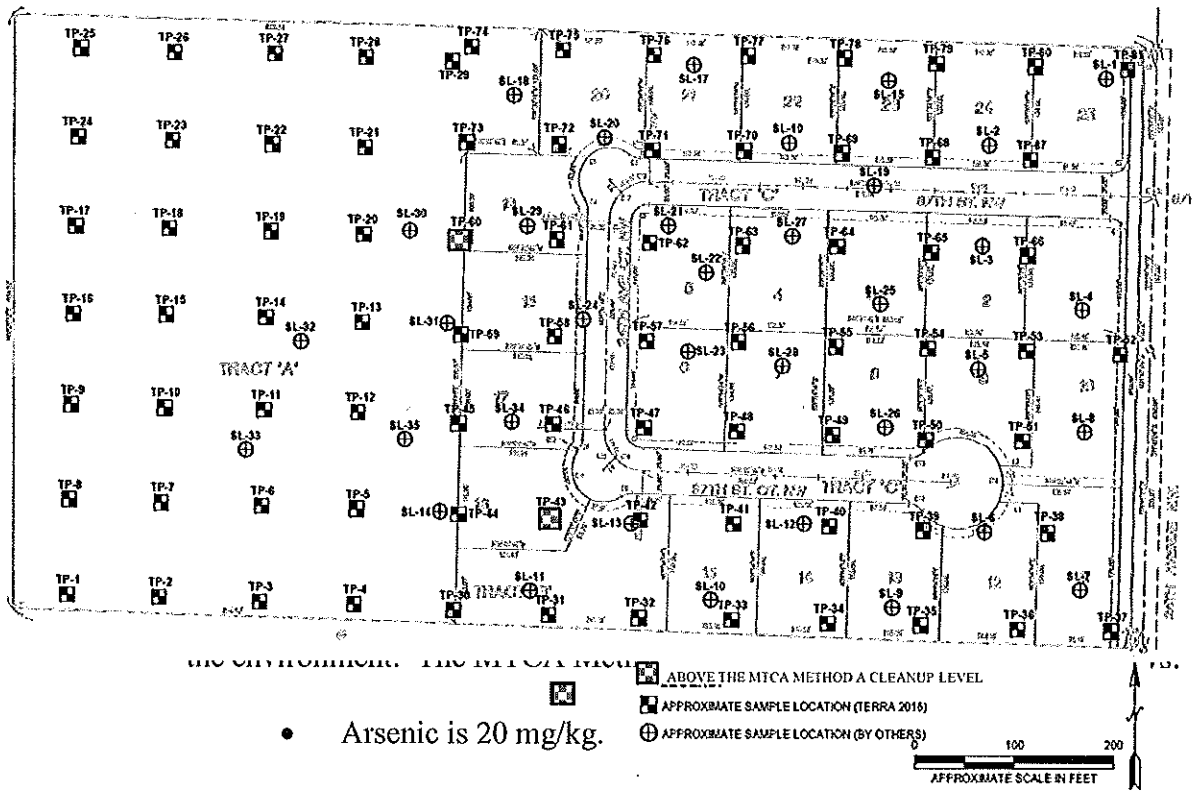
Table 3. Characterization sampling in DUB (residential development)

| Sample ID | Depth (inches) | Arsenic (mg/kg) EPA 6020A | Lead (mg/kg) EPA 6020A |
|---|---|---|---|
| TP-58 | 0-6 | **21** | 34 |
| TP-59 | 0-6 | 14 | 25 |
| | 6-12 | 10 | 19 |
| TP-60 | 0-6 | **41** | 120 |
| TP-61 | 0-6 | 15 | 31 |
| TP-62 | 0-6 | 11 | 17 |
| | 6-12 | 6.6 | 9.5 |
| TP-63 | 0-6 | 17 | 42 |
| TP-64 | 0-6 | 12 | 19 |
| TP-65 | 0-6 | 6.9 | 13 |
| TP-66 | 0-6 | 20 | 37 |
| | 6-12 | 16 | 32 |
| TP-67 | 0-6 | 14 | 20 |
| TP-68 | 0-6 | 18 | 32 |
| TP-69 | 0-6 | **27** | 73 |
| | 6-12 | **21** | 37 |
| TP-70 | 0-6 | **28** | 57 |
| TP-71 | 0-6 | 10 | 19 |
| TP-72 | 0-6 | 13 | 26 |
| TP-73 | 0-6 | 12 | 22 |
| | 6-12 | 6.8 | 13 |
| TP-74 | 0-6 | 17 | 30 |
| TP-75 | 0-6 | 3.5 | 7.3 |
| | 6-12 | 10 | 16 |
| TP-76 | 0-6 | 14 | 22 |
| TP-77 | 0-6 | 18 | 39 |
| TP-78 | 0-6 | 1.5 | 2.9 |
| TP-79 | 0-6 | 8.3 | 17 |
| | 6-12 | 9.6 | 13 |
| TP-80 | 0-6 | 6.1 | 8.9 |
| TP-81 | 0-6 | 15 | 27 |
| TP-74 | 0-6 | 17 | 30 |
| TP-75 | 0-6 | 3.5 | 7.3 |
| | 6-12 | 10 | 16 |
| TP-76 | 0-6 | 14 | 22 |
| TP-77 | 0-6 | 18 | 39 |
| TP-78 | 0-6 | 1.5 | 2.9 |

Table 3. Characterization sampling in DUB (residential development)

| Sample ID | Depth (inches) | Arsenic (mg/kg) EPA 6020A | Lead (mg/kg) EPA 6020A |
|---|---|---|---|
| TP-79 | 0-6 | 8.3 | 17 |
| | 6-12 | 9.6 | 13 |
| TP-80 | 0-6 | 6.1 | 8.9 |
| TP-81 | 0-6 | 15 | 27 |
| TP-77 | 0-6 | 18 | 39 |
| TP-78 | 0-6 | 1.5 | 2.9 |
| TP-79 | 0-6 | 8.3 | 17 |
| | 6-12 | 9.6 | 13 |
| TP-80 | 0-6 | 6.1 | 8.9 |
| TP-81 | 0-6 | 15 | 27 |
| DUFF | | **22** | 60 |
| Average: | 0-6 | 16 | 30.5 |
| Average: | 6-12 | 11.9 | 20.6 |

**Bolded** values represent the concentrations above the MTCA Method A cleanup levels




the environment. The MTCA Method A cleanup levels are:

- Arsenic is 20 mg/kg.

- Lead is 250 mg/kg.

The IAP determined the following cleanup levels were protective of human health and the environment for properties within the Asarco Site:

- Average arsenic concentration detected in the soil less than 20 mg/kg.
- Average lead concentration detected in the soil less than 250 mg/kg.

OR

- No single soil sample has arsenic concentration above 40 mg/kg.
- No single soil sample has lead concentration above 500 mg/kg.

**c. Selection of cleanup for the Property.**

Ecology has determined the cleanup you proposed for the Property will likely meet the substantive requirements of MTCA and the IAP. Your proposed cleanup meets the minimum cleanup requirements and will not exacerbate conditions or preclude reasonable cleanup alternatives elsewhere at the Asarco Site.

Ecology proposed four model remedies in the IAP:

- Excavation and removal
- Mixing
- Capping in place
- Consolidation and capping

Azure decided they would use Mixing as a way to remediate their Property.

Azure conducted the cleanup action at the Property in conjunction with Property development. They conducted the cleanup in the areas that will be developed in the residential housing. Azure did not remediate soil in the areas that will remain undeveloped. The duff layer within the undeveloped area had arsenic concentration at 24 mg/kg, slightly above the cleanup level. Ecology determined that the slightly elevated arsenic in the duff layer does not warrant remediation or the implementation of institutional controls. Ecology issued an opinion letter on the proposed cleanup on June 9, 2016.

**d. Cleanup of the Property.**

Ecology has determined the cleanup you performed meets the applicable Asarco Site cleanup standards within the Property.

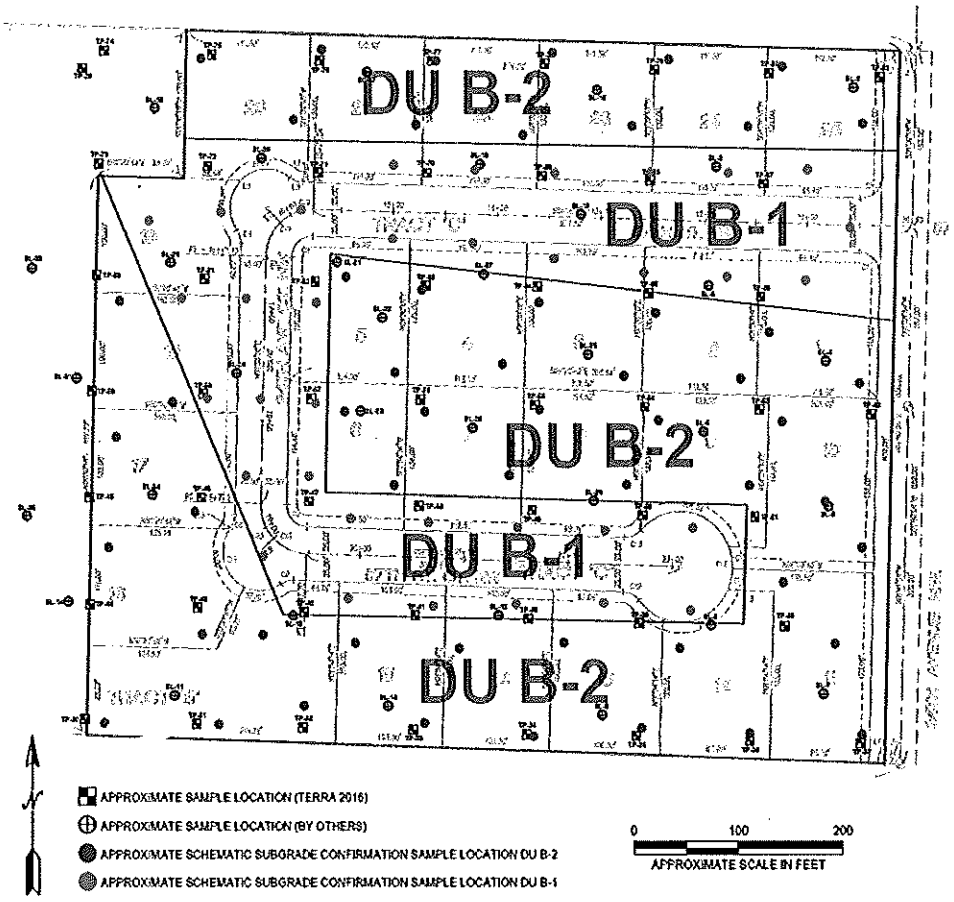



Figure 2. Remediation areas in the future residential area

Azure conducted the cleanup in conjunction with Property development. They conducted soil remediation in areas of future residential development, in the area designated as DUB. They further divided DUB into two subunits to facilitate remediation. Azure designated the future residential road area as DU B-1 and the future residential housing area into DU B-2 (See Figure 3).

DU B-1: Azure removed the surface vegetation from DU B-1 as part of the land clearing activities. They scraped the duff and then the top six inches of the underlying soil and combined it into a single stockpile. Under the MR Guidance if any of the duff composite samples have concentrations greater than 20 mg/kg for arsenic or 250 mg/kg for lead, then the duff must be disposed at appropriate disposal facility. Ecology agreed to a deviation from the MR Guidance because the average soil concentration in the upper soil layers did not exceed the cleanup level for arsenic and the duff layer only slightly exceeded the cleanup level. The scraping and stockpiling process homogenizes the soil and duff, reducing the concentrations of arsenic in the process. Additionally, all the soil and duff lead concentrations were below the cleanup level.

Table 4. Stockpile Sampling

| Location | Stockpile Volume (CY) | Date Sampled | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| A-1 | 200 | 6/27/2016 | 6.6 | 12 |
| A-2 | | 6/27/2016 | 5.2 | 8.6 |
| B-1 | 200 | 6/27/2016 | 10 | 18 |
| B-2 | | 6/27/2016 | 9.8 | 19 |
| C-1 | 850 | 6/27/2016 | 5.5 | 11 |
| C-2 | | 6/27/2016 | 6.3 | 11 |
| C-3 | | 6/27/2016 | 4.2 | 7.2 |
| C-4 | | 6/27/2016 | 5.5 | 9.1 |
| D-1 | 300 | 6/27/2016 | 6.5 | 13 |
| D-2 | | 6/27/2016 | 6.6 | 11 |
| E-1 | 800 | 6/27/2016 | 5.4 | 10 |
| E-2 | | 6/27/2016 | 4.1 | 8 |
| E-3 | | 6/27/2016 | 4.5 | 8.4 |
| E-4 | | 6/27/2016 | 4.7 | 10 |
| F-1 | 200 | 6/27/2016 | 6.8 | 14 |
| F-2 | | 6/27/2016 | 6.7 | 12 |
| MTCA Method A | | | 20 | 250 |

Azure disposed of the trees and brush as a regular yard waste. Prior to disposal, they inspected the root balls to make sure they did not contain contaminated soil.

Azure visually divided the stockpile into six segments and collected composite samples from each segment. Each composite sample consisted of six subsamples. Terra collected 16 stockpile samples from the six stockpiles on the Property. The six stockpiles (A through F) were of different sizes. None of the arsenic or lead concentrations collected from the six stockpiles exceeded the cleanup level for arsenic or lead (Table 4).

Following mixing of the soil, Terra collected 36 compliance samples to verify that arsenic and lead levels were below the MTCA Method A cleanup levels for unrestricted land use of 20 mg/kg and 250 mg/kg, respectively. They collected

samples from 0 to 4 inches bgs of the graded DU B-1 area (See Figure 3 and Table 5).
The following results showed no further cleanup actions within the DU B-1were needed:

- The levels of arsenic ranged from 3.4 mg/ kg to 20 mg/kg and averaged 4.4 mg/kg.
- The lead levels ranged from 5 mg/kg to 82 mg/kg and averaged 9.6 mg/kg

Table 5. Confirmational Sampling in DU-B1

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B1525-1 | 5/25/2016 | 0-4 | 3.4 | 5.2 |
| B1525-2 | 5/25/2016 | 0-4 | 20 | 32 |
| B1525-3 | 5/25/2016 | 0-4 | 5.9 | 7.4 |
| B1525-4 | 5/25/2016 | 0-4 | 1.4 | 2.3 |
| B1610-1 | 6/10/2016 | 0-4 | 2.5 | 4.6 |
| B1610-2 | 6/10/2016 | 0-4 | 1.7 | 2.5 |
| B1610-3 | 6/10/2016 | 0-4 | 1.6 | 2.8 |
| B1610-4 | 6/10/2016 | 0-4 | 2.2 | 3.4 |
| B1610-5 | 6/10/2016 | 0-4 | 1.7 | 2.2 |
| B1610-6 | 6/10/2016 | 0-4 | 8.7 | 30 |
| B1607-1 | 6/7/2016 | 0-4 | 1.4 | 1.7 |
| B1607-2 | 6/7/2016 | 0-4 | 1.9 | 2.6 |
| B1607-3 | 6/7/2016 | 0-4 | 1.4 | 1.3 |
| B1607-4 | 6/7/2016 | 0-4 | 1.7 | 2.1 |
| B1607-5 | 6/7/2016 | 0-4 | 1.6 | 2.2 |
| B1615-1 | 6/15/2016 | 0-4 | 1.1 | 2.2 |
| B1615-2 | 6/15/2016 | 0-4 | 2.5 | 3.4 |
| B1615-3 | 6/15/2016 | 0-4 | 2.6 | 5.3 |
| B1615-4 | 6/15/2016 | 0-4 | 8.9 | 8 |
| B1615-5 | 6/15/2016 | 0-4 | 1.3 | 1.3 |
| B1615-6 | 6/15/2016 | 0-4 | 1.4 | 1.4 |
| B1615-7 | 6/15/2016 | 0-4 | 1.5 | 2.1 |
| B1615-8 | 6/15/2016 | 0-4 | 1.5 | 2.2 |
| B1615-9 | 6/15/2016 | 0-4 | 1.9 | 2.9 |
| B1615-10 | 6/15/2016 | 0-4 | 1.2 | 1.9 |
| B1615-11 | 6/15/2016 | 0-4 | 15 | 27 |
| B1615-12 | 6/15/2016 | 0-4 | 2.5 | 5 |
| B1615-13 | 6/15/2016 | 0-4 | 7.7 | 12 |
| B1617-1 | 6/17/2016 | 0-4 | 9.9 | 32 |

Table 5. Confirmational Sampling in DU-B1

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B1617-2 | 6/17/2016 | 0-4 | 13 | 85 |
| B1617-3 | 6/17/2016 | 0-4 | 2.1 | 2.9 |
| B1617-4 | 6/17/2016 | 0-4 | 3.3 | 6.2 |
| B1617-5 | 6/17/2016 | 0-4 | 8.9 | 17 |
| B1617-6 | 6/17/2016 | 0-4 | 10 | 17 |
| B1617-7 | 6/17/2016 | 0-4 | 2.8 | 4.3 |
| B1630-1 | 6/30/2016 | 0-4 | 1.7 | 3 |
| MTCA Method A | | | 20 | 250 |

DU B-2: Cleanup in this subunit involved blending surficial soil and duff with cleaner underlying soil t4o depths of 12 inches bgs. Following the removal of vegetation, the contractor worked the soil back and forth using heavy equipment during the cutting and filling required to establish the pad elevation grade.

In DU B-2 area, Terra collected samples from two depth intervals from the entire mixing depth of 12 inches bgs. They collected samples from 0 to 6 inches bgs and from 6 to 12 inches bgs at 54 locations to verify that soil mixing successfully reduced the arsenic concentrations below the cleanup level (Table 6). Given that none of the lead concentrations exceeded the cleanup level, Ecology agreed to the request of reducing the soil analysis for lead to every fourth sample location throughout the DUB area. If lead concentrations at any location were found to be above MTCA cleanup level for lead, Terra would analyze the remainder of the collected samples for lead.

Table 6. Confirmational Sampling in DU-B2

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B2629-1 | 6/29/2016 | 0-6 | 1.6 | 3.1 |
| B2629-1 | 7/7/2016 | 6-12 | 1.1 | 2.7 |
| B2629-2 | 6/29/2016 | 0-6 | 4.1 | 6.4 |
| B2629-2 | 7/7/2016 | 6-12 | 1.9 | 3.2 |
| B2629-3 | 6/29/2016 | 0-6 | 1.1 | 1.7 |
| B2629-3 | 7/7/2016 | 6-12 | 2.8 | 6 |
| B2629-4 | 6/29/2016 | 0-6 | 2.1 | 3.5 |

Table 6. Confirmational Sampling in DU-B2

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B2629-4 | 7/7/2016 | 6-12 | 0.83 | 2.6 |
| B2630-1A | 6/30/2016 | 0-6 | 1.8 | 2.6 |
| B2630-1B | 7/7/2016 | 6-12 | 3.9 | 7.2 |
| B2630-2A | 6/30/2016 | 0-6 | 2.9 | 5.3 |
| B2630-2B | 7/7/2016 | 6-12 | 2.6 | 4.4 |
| B2630-3A | 6/30/2016 | 0-6 | 2.4 | 3.9 |
| B2630-3B | 7/7/2016 | 6-12 | 1.1 | 2.1 |
| B2630-4A | 6/30/2016 | 0-6 | 1.2 | 1.4 |
| B2630-4B | 7/7/2016 | 6-12 | 1.5 | 1.7 |
| B2630-5A | 6/30/2016 | 0-6 | 7.4 | 13 |
| B2630-5B | 7/7/2016 | 6-12 | 2 | 3.5 |
| B2630-6A | 6/30/2016 | 0-6 | 2.1 | 3 |
| B2630-6B | 7/7/2016 | 6-12 | 1.4 | 1.7 |
| B2630-7A | 6/30/2016 | 0-6 | 2.4 | 3.8 |
| B2630-7B | 7/7/2016 | 6-12 | 1.7 | 2.7 |
| B2630-8A | 6/30/2016 | 0-6 | 4.2 | 7.2 |
| B2630-8B | 7/7/2016 | 6-12 | 6.2 | 5.6 |
| B2630-9A | 6/30/2016 | 0-6 | 3.5 | 6.5 |
| B2630-9B | 7/7/2016 | 6-12 | 1.7 | 2.2 |
| B2630-10A | 6/30/2016 | 0-6 | 4.7 | 11 |
| B2630-10B | 7/7/2016 | 6-12 | 2.1 | 3.4 |
| B2630-11A | 6/30/2016 | 0-6 | 2.5 | 4.6 |
| B2630-11B | 7/7/2016 | 6-12 | 12 | 23 |
| B2630-12A | 6/30/2016 | 0-6 | 1.6 | 2.6 |
| B2630-12B | 7/7/2016 | 6-12 | 1.2 | 2.1 |
| B2630-13A | 6/30/2016 | 0-6 | 5.9 | 10 |
| B2630-13B | 7/7/2016 | 6-12 | 1.9 | 2.7 |
| B2630-14A | 6/30/2016 | 0-6 | 2.2 | 3.4 |
| B2630-14B | 7/7/2016 | 6-12 | 2.1 | 3.4 |
| B2630-15A | 6/30/2016 | 0-6 | 6.9 | 17 |
| B2630-15B | 7/7/2016 | 6-12 | 1.4 | 2.1 |
| B2630-16A | 6/30/2016 | 0-6 | 5.2 | 9.8 |

Table 6. Confirmational Sampling in DU-B2

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B2630-16B | 7/7/2016 | 6-12 | 1.1 | 1.9 |
| B2630-17A | 6/30/2016 | 0-6 | 7.9 | 16 |
| B2630-17B | 7/7/2016 | 6-12 | 1.3 | 2.7 |
| B2630-18A | 6/30/2016 | 0-6 | 2.9 | 4.1 |
| B2630-18B | 7/7/2016 | 6-12 | 1.2 | 2 |
| B2630-19A | 6/30/2016 | 0-6 | 6.1 | 13 |
| B2630-19B | 7/7/2016 | 6-12 | 1.2 | 1.2 |
| B2630-20A | 6/30/2016 | 0-6 | 2.2 | 3.6 |
| B2630-20B | 7/7/2016 | 6-12 | 1.3 | 1.8 |
| B2630-21A | 6/30/2016 | 0-6 | 1.4 | 1.8 |
| B2630-21B | 7/7/2016 | 6-12 | 1.1 | 2.2 |
| B2630-22A | 6/30/2016 | 0-6 | 1.1 | 2.7 |
| B2630-22B | 7/7/2016 | 6-12 | 1.2 | 1.4 |
| B2630-23A | 6/30/2016 | 0-6 | 1.8 | 3.3 |
| B2630-23B | 7/7/2016 | 6-12 | 1.9 | 3.3 |
| B2715-1A | 7/15/2016 | 0-6 | 12 | 20 |
| B2715-1B | 7/15/2016 | 6-12 | 1.6 | NT |
| B2715-2A | 7/15/2016 | 0-6 | 10 | NT |
| B2715-2B | 7/15/2016 | 6-12 | 5.9 | NT |
| B2715-3A | 7/15/2016 | 0-6 | 2.5 | 3.8 |
| B2715-3B | 7/15/2016 | 6-12 | 1.5 | NT |
| B2715-4A | 7/15/2016 | 0-6 | 2.5 | NT |
| B2715-4B | 7/15/2016 | 6-12 | 1.8 | NT |
| B2715-5A | 7/15/2016 | 0-6 | 11 | 19 |
| B2715-5B | 7/15/2016 | 6-12 | 11 | NT |
| B2715-6A | 7/15/2016 | 0-6 | 19 | NT |
| B2715-6B | 7/15/2016 | 6-12 | 4 | NT |
| B2715-7A | 7/15/2016 | 0-6 | 13 | 19 |
| B2715-7B | 7/15/2016 | 6-12 | 8.9 | NT |
| B2715-8A | 7/15/2016 | 0-6 | 4.2 | NT |
| B2715-8B | 7/15/2016 | 6-12 | 2.6 | NT |
| B2715-9A | 7/15/2016 | 0-6 | 10 | 4.7 |

Table 6. Confirmational Sampling in DU-B2

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B2715-9B | 7/15/2016 | 6-12 | 2.8 | NT |
| B2715-10A | 7/15/2016 | 0-6 | 4.3 | NT |
| B2715-10B | 7/15/2016 | 6-12 | 4.2 | NT |
| B2715-11A | 7/15/2016 | 0-6 | **22** | 39 |
| B2715-11B | 7/15/2016 | 6-12 | 5 | NT |
| B2715-11C | 7/25/2016 | 0-6 | 1.1 | NT |
| B2715-11D | 7/25/2016 | 6-12 | 1 | NT |
| B2715-12A | 7/15/2016 | 0-6 | 8.1 | NT |
| B2715-12B | 7/15/2016 | 6-12 | 8.2 | NT |
| B2715-13A | 7/15/2016 | 0-6 | 4.4 | 3.6 |
| B2715-13B | 7/15/2016 | 6-12 | 2.7 | NT |
| B2715-14A | 7/15/2016 | 0-6 | 2.9 | NT |
| B2715-14B | 7/15/2016 | 6-12 | 1.7 | NT |
| B2715-15A | 7/15/2016 | 0-6 | **33** | 18 |
| B2715-15B | 7/15/2016 | 6-12 | 2.7 | NT |
| B2715-15C | 7/25/2016 | 0-6 | 1.5 | NT |
| B2715-15D | 7/25/2016 | 6-12 | 1.3 | NT |
| B2715-16A | 7/15/2016 | 0-6 | **25** | NT |
| B2715-16B | 7/15/2016 | 6-12 | 8.9 | NT |
| B2715-10C | 7/25/2016 | 0-6 | 1.1 | NT |
| B2715-10D | 7/25/2016 | 6-12 | 0.86 | NT |
| B2715-17A | 7/15/2016 | 0-6 | 13 | 18 |
| B2715-17B | 7/15/2016 | 6-12 | 11 | NT |
| B2715-18A | 7/15/2016 | 0-6 | 2.2 | NT |
| B2715-18B | 7/15/2016 | 6-12 | 1.9 | NT |
| B2715-19A | 7/15/2016 | 0-6 | 2 | 3.2 |
| B2715-19B | 7/15/2016 | 6-12 | 1.8 | NT |
| B2715-20A | 7/15/2016 | 0-6 | 2.2 | NT |
| B2715-20B | 7/15/2016 | 6-12 | 3.8 | NT |
| B2715-21A | 7/15/2016 | 0-6 | 2.8 | 4.1 |
| B2715-21B | 7/15/2016 | 6-12 | 1.2 | NT |
| B2715-22A | 7/15/2016 | 0-6 | 2.1 | NT |

Table 6. Confirmational Sampling in DU-B2

| Location | Date Sampled | Depth (Inches) | Arsenic mg/kg | Lead mg/kg |
|---|---|---|---|---|
| B2715-22B | 7/15/2016 | 6-12 | 1.4 | NT |
| B2715-23A | 7/15/2016 | 0-6 | 3.7 | 5.5 |
| B2715-23B | 7/15/2016 | 12-Jun | 2.3 | NT |
| B2715-24A | 7/15/2016 | 0-6 | 4 | NT |
| B2715-24B | 7/15/2016 | 12-Jun | 1.5 | NT |
| B2715-25A | 7/15/2016 | 0-6 | 1.8 | 3 |
| B2715-25B | 7/15/2016 | 12-Jun | 1.9 | NT |
| B2715-26A | 7/15/2016 | 0-6 | 2.9 | NT |
| B2715-26B | 7/15/2016 | 12-Jun | 1.5 | NT |
| B2715-27A | 7/15/2016 | 0-6 | 15 | 14 |
| B2715-27B | 7/15/2016 | 12-Jun | 1.4 | NT |
| MTCA Method A | | | 20 | 250 |

**Bolded** values represent the concentrations above the MTCA Method A cleanup levels
NT – Not analyzed (reduced analysis agreed upon by Ecology)
Shaded rows indicate the three locations where soil was remixed and resampled

The average arsenic concentration in each grid was above the cleanup level at three of the sample locations throughout the mixing area (B2715-11, B2715-15, and B2715-10). The soil mixing in this area was extended to additional 12 inches bgs and re-sampled. A total of 114 samples were collected during the soil mixing in the DU B-2. All the final confirmation sample results indicate arsenic and lead concentrations were below the respective MTCA Method A soil cleanup levels for unrestricted land use:

- Arsenic levels ranging from 0.89 mg/kg to 19 mg/kg and averaging 4.3 mg/kg.
- Lead levels ranging from 1.2 mg/kg to 39 mg/kg and averaging 6.4 mg/kg

## 2. Cleanup of the Asarco Site as a whole.

Ecology has concluded that **further remedial action** under MTCA is still necessary elsewhere at the Asarco Site. In other words, while your cleanup constitutes the final action for the Property, it is only an **"interim action"** for the Asarco Site as a whole.

## Listing of the Site

Based on this opinion, Ecology will update the status of remedial action at the Asarco Site on our database of hazardous waste sites. However, because further remedial action is still necessary elsewhere at the Asarco Site, we will not remove the Asarco Site from our lists of hazardous waste sites. Furthermore, the Property will remain listed as part of the Asarco Site because the cleanup of the Property does not change the boundaries of the Asarco Site.

## Limitations of the Opinion

**1. Opinion does not settle liability with the state.**

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Property. This opinion **does not**:

- Change the boundaries of the Asarco Site.
- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

**2. Opinion does not constitute a determination of substantial equivalence.**

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you proposed will be substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

**3. State is immune from liability.**

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

**Termination of Agreement**

Thank you for cleaning up your Property under the Voluntary Cleanup Program (VCP). This opinion terminates the VCP Agreement governing this project (#SW1519).

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me by phone at 360-407-7094 or by e-mail at Eva.Barber@ecy.wa.gov.

Sincerely,

Eva L. Barber
SWRO Toxics Cleanup Program

EB: hd

By certified mail [91 7108 2133 3939 7042 7162]

Enclosures: Enclosure A: Legal Description and general description of the Property
Enclosure B: Site description of Asarco Tacoma Smelter Site

cc:

Charles R. Lie, LHG,
Peter Katich, Senior Planner, City of Gig Harbor, Planning Department
Sharon Bell, Tacoma-Pierce County Health Department
Marian Abbett, Ecology
Nick Acklam, Ecology
Matthew Alexander, Ecology
Carol Serdar, SWRO WQ, Ecology
Amy Moon, HQ WQ, Ecology

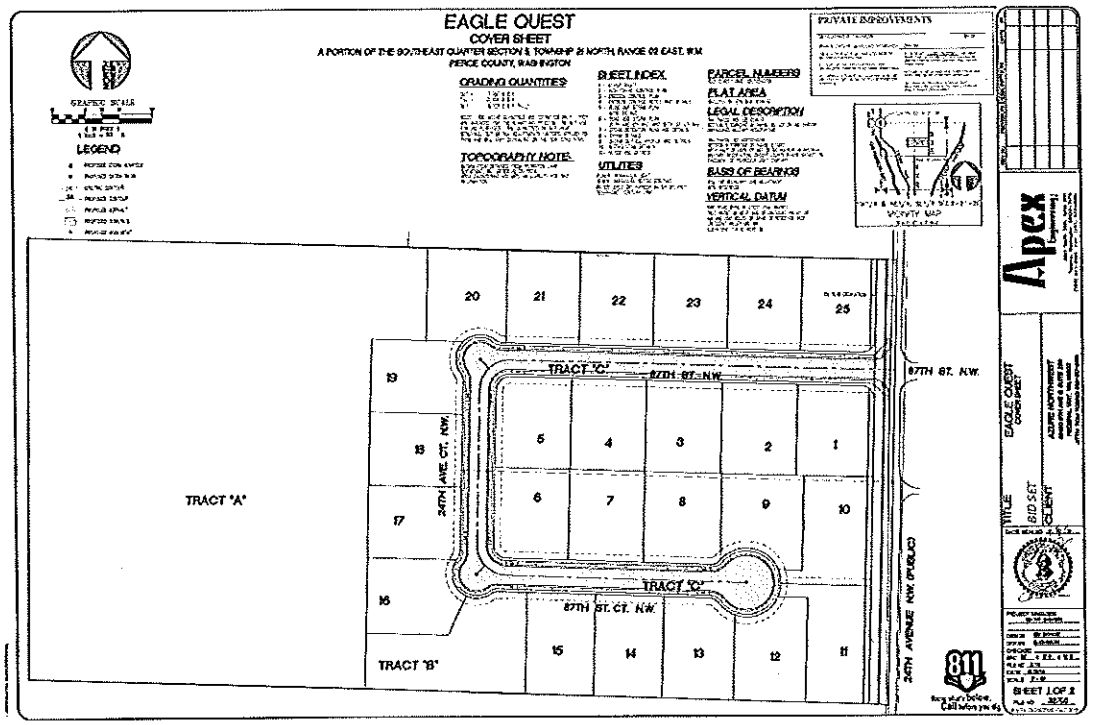
# Enclosure A
# Legal Description of the Property

Form No. 1068-2 Commitment No.: **4215-2562907**
ALTA Plain Language Commitment Page 10 of 10
First American Title

**FIRST AMERICAN TITLE INSURANCE COMPANY**
**Exhibit "A"**

Vested Owner: ARVEIDA E. LIVINGSTON FAMILY, LLC, A WASHINGTON LIMITED LIABILITY COMPANY
Real property in the County of Pierce, State of Washington, described as follows:
PARCEL A:
LOT 29 OF GIG HARBOR ABANDONED MILITARY RESERVATION IN SECTION 5, TOWNSHIP 21 NORTH, RANGE 2 EAST OF THE WILLAMETTE MERIDIAN, IN PIERCE COUNTY, WASHINGTON.
EXCEPT COUNTY ROAD.
PARCEL B:
WEST HALF OF LOTS 27 AND 28 OF GIG HARBOR ABANDONED MILITARY RESERVATION IN SECTION 5, TOWNSHIP 21 NORTH, RANGE 2 EAST OF THE WILLAMETTE MERIDIAN, IN PIERCE COUNTY, WASHINGTON.
EXCEPT COUNTY ROAD.

Tax Parcel Number: 022105-4017 and 022105-4059




# Property Description

The Property is located on the east side of Gig Harbor glacial upland, in Pierce County, Washington. The Property is bounded by the Spyglass residential development on the north, 24th Avenue NW on the east, undeveloped forested land to the south, and several single-family residence to the west. The Property is currently undeveloped. The proposed development includes the construction of 25 single-family residential homes and associated roadways, which will be located on 7.5 contiguous acres (DUB) of the 20-acre Property. The remaining 12.5 acres (DUA) will remain undeveloped and undisturbed.

The residential development area and the area that will remain undeveloped are densely vegetated with native shrub and second and third growth trees consisting of alder, maple, and evergreen trees. No significant roads cross the Property. An extensive network of mot-cross trails provides access across the site.

The ground surface slopes down to the west. The eastern portion of the Property generally slopes down at inclinations of less than 20 percent; with a narrow band of 25 to 30 percent slopes located along 24th Avenue NW and in the east central portion of the Property. Beginning in the

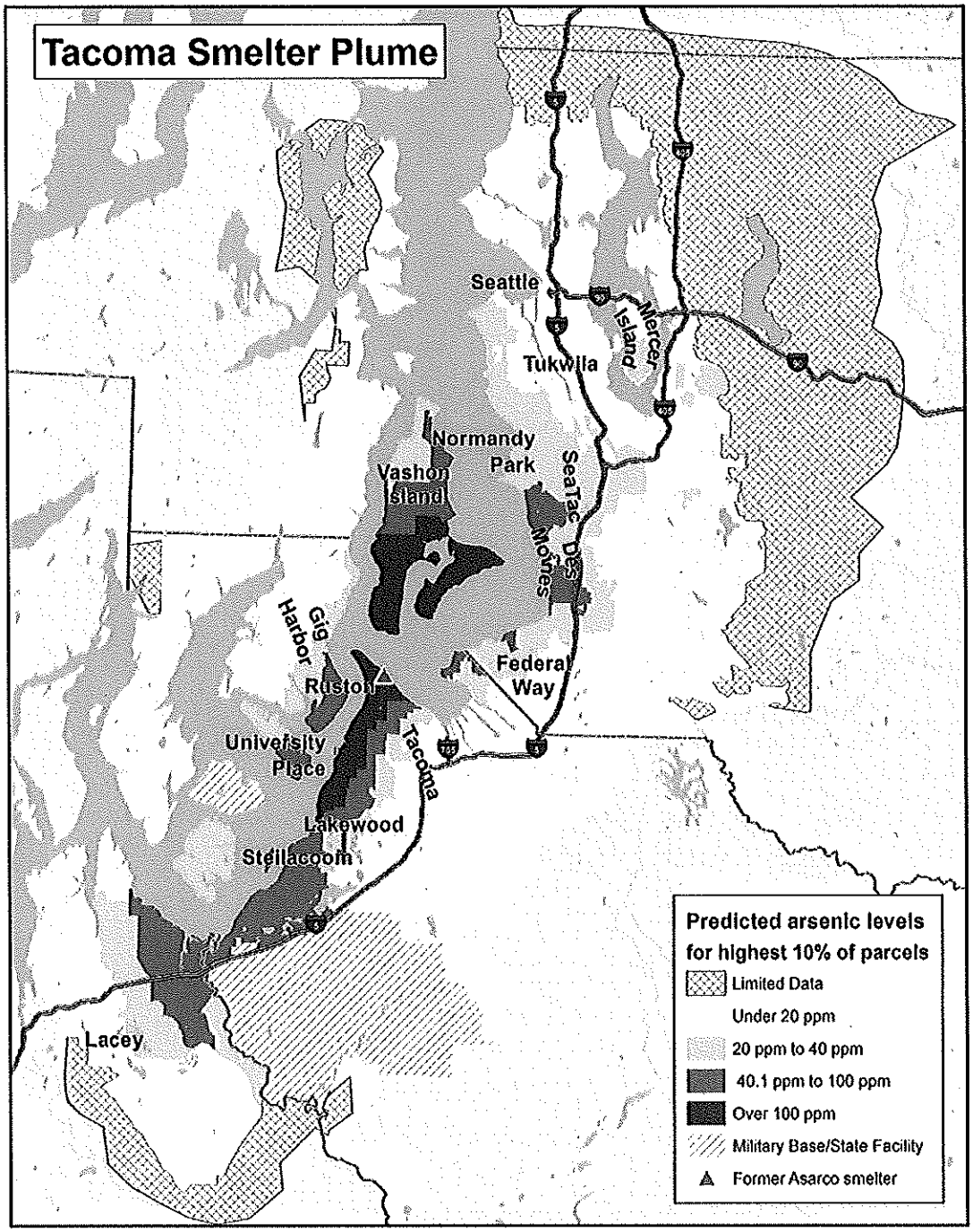
center of the Property, the slopes steepen to about 25 to 30 percent increasing to as steep as 50 percent.

There is no evidence of seepage, landslide activity, or significant erosion. There is no surface water; however, some minor gullying occurs along the trails in the drainages of the western portion of the Property.

A review of the Soil Conservancy of Pierce County indicates that the soils consist of the Harstine sandy gravelly loam (16C and 16D) derived from glacial till. The Property is underlain by glacial till (Qvt), advance glacial outwash (QVA) and older outwash (Qpogc1) and tills (Qpogt). The native glacial till and advance outwash were deposited during the Vashon stage of the Frasier Glaciation.

# Enclosure B

**Asarco Tacoma Smelter Site**



An interactive color map can be found at https://fortress.wa.gov/ecy/smeltersearch/

For almost 100 years the Asarco Company operated a copper smelter in Tacoma, Washington. Air pollution from the smelter settled on the surface soil over a vast region -- more than 1,000 square miles of the Puget Sound basin. Arsenic, lead, and other heavy metals are still in the soil as a result of this pollution. Ecology has found elevated levels of arsenic and lead as far south as Lacey and as far north as Seattle (West Seattle), and as far west as the Kitsap Peninsula and as far east as Kent and Bellevue.