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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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July 6, 2020

Michael Swartz, Capital Projects Director
Federal Way Public Schools
33330 8th Avenue South
Federal Way, WA 98003
mswartz@fwps.org

Re: Opinion on the Proposed Cleanup of a Property associated with the Asarco Tacoma Smelter Site

- **Property Name:** Star Lake Elementary
- **Property Address:** 4014 S 270th St S and 26630 40th Ave S, Kent, King County WA 98032
- **Facility/Site ID:** 7890
- **Cleanup Site ID:** 13055
- **VCP Project No.:** NW3271

Dear Michael Swartz:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed 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),[1] chapter 70.105D Revised Code of Washington (RCW).

Issues Presented and Opinion

Ecology has determined that no further remedial action will likely be necessary at the Property to clean up contamination associated with the Asarco Site.

Ecology has determined that further remedial action will likely still be necessary elsewhere at the Asarco Site, but no further remediation will be necessary for the Property.

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, Washington Administrative Code (WAC) chapter 173-340 (collectively "substantive requirements of MTCA"). The analysis is provided below.

[1] https://app.leg.wa.gov/RCW/default.aspx?cite=70.105D.

Description of the Property and the Asarco Site

This opinion applies only to the Property described below within Asarco Site. 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 King County, which were affected by the Asarco Site and will be addressed by your cleanup:

- 2722049112 (7.89 acres).
- 2722049152 (20.2 acres).

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.

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. PBS Engineering and Environmental (PBS), *Remedial Action Work Plan for Tacoma Smelter Plume Impact Star Lake Elementary School, 4014 S 270th Street, Kent Washington*, May 4, 2020.

2. PBS, *Star Lake Elementary School – Arsenic and Lead Soil Sampling*, February 14, 2020.

3. Kent Economic and Community Development, *Mitigated Determination of Nonsignificance*, June 25, 2019.

4. PBS, *Totem Middle School – Arsenic and Lead Soil Sampling*, November 30, 2018.

5. Ecology, *Initial Investigation: No Further Action (NFA) Determination Star Lake Elementary, 4014 @ 270th St, Kent, WA 98032, Facility Site ID: 7890, Cleanup Site ID: 13055.* June 9, 2016.

These documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. Information on viewing these records can be found on Ecology's public records requests web page.[2] Some site documents may be available on Ecology's Cleanup Site Search web page[3].

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, upon completion of your proposed cleanup, **no further remedial action** will likely be 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**.

Star Lake Elementary School is located east of the Interstate 5 in a residential area of Kent, Washington (Figure 1). The school is situated on one King County parcel that encompasses 7.89 acres. The Star Lake Elementary School is bordered to the west by 40th Avenue South, to the south by South 270th Street (Figure1), and to the north by Totem Middle School. Federal Way Public Schools (FWPS) plan to redevelop this school.

[2] https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests.
[3] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=13055.

They plan to construct a new building that will combine two schools: the Star Lake Elementary school and the Totem Middle school. The Totem Middle school is situated on one King County parcel that encompasses 20.2 acres. The Star Lake Elementary and the Totem Middle schools will be referred in this opinion letter as the Property.

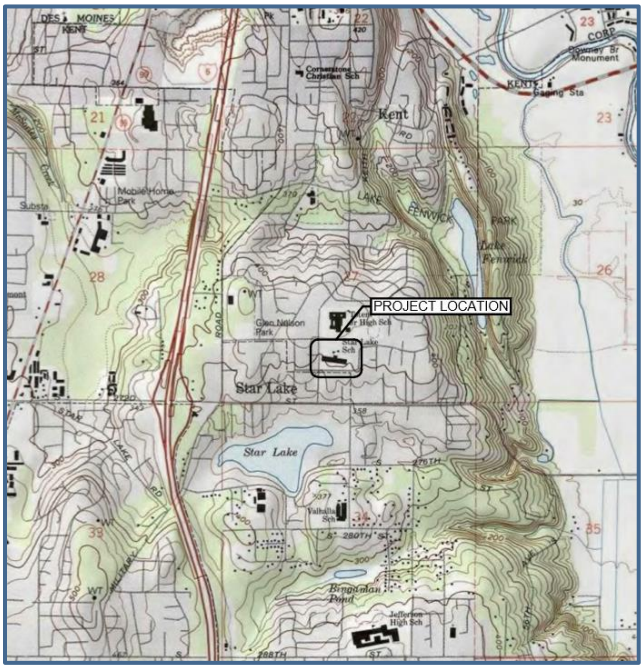

Figure 1. Vicinity map

The new school building will be situated between the two existing schools, which will be demolished once the new school is built. FWPS will retain the existing athletic fields, but will improve current parking, landscaping, and stormwater facilities on the Property.

As part of the planned redevelopment, FWPS contracted PBS to characterize the Tacoma Smelter Plume contamination on the Property. On November 5, 2018, PBS collected 60 discrete soil samples from 48 sampling locations within the Star Lake Elementary School (Figure 2). They collected 48 soil samples from 0 to 6 inches below ground surface (bgs) and 12 soil samples from 6 to 12 inches bgs.

On November 6, 2018, PBS collected 75 discrete samples from 61 locations within the Totem Middle School. They collected 61 samples from 0 to 6 inches bgs and 14 samples from 6 to 12 inches bgs.

PBS submitted all the samples to Friedman & Bruya Inc. laboratory in Seattle, WA for arsenic and lead analysis with Environmental Protection Agency (EPA) Method 6020B.

There have been previous partial characterization events at the Star Lake Elementary school. Ecology sampled children play areas at the Star Lake Elementary School in 2003 as part of the Soil Safety Program (SSP) with Ecology. Ecology found elevated arsenic concentrations in several play areas and consequently conducted remedial action in those areas. The remedial action consisted of removing the top six inches of contaminated soil and replacing it with clean soil or a layer of wood chips. For more information on the SSP cleanup action, refer to Enclosure D.

On behalf of Ecology, GeoEngineers collected additional soil samples north of the SSP cleanup action in May 2007 to identify more play areas needing cleanup actions. They collected nine soil samples from 0 to 6 inches bgs (Figure 2).

The concentrations of arsenic and lead were below the MTCA Method A cleanup level of 20 milligrams per kilogram (mg/kg) for arsenic and 250 mg/kg for lead. Ecology determined that no remedial actions were necessary in the play areas sampled.

The results of the 2007 soil sampling were included in calculating the average concentrations for arsenic and lead on the Property.

Altogether, 118 samples were collected from 0 to 6 inches bgs and 26 samples from 6 to 12 inches bgs. For a summary of sampling results, refer to Table 1. For the comprehensive results of the characterization sampling on the Property, refer to Enclosure C.

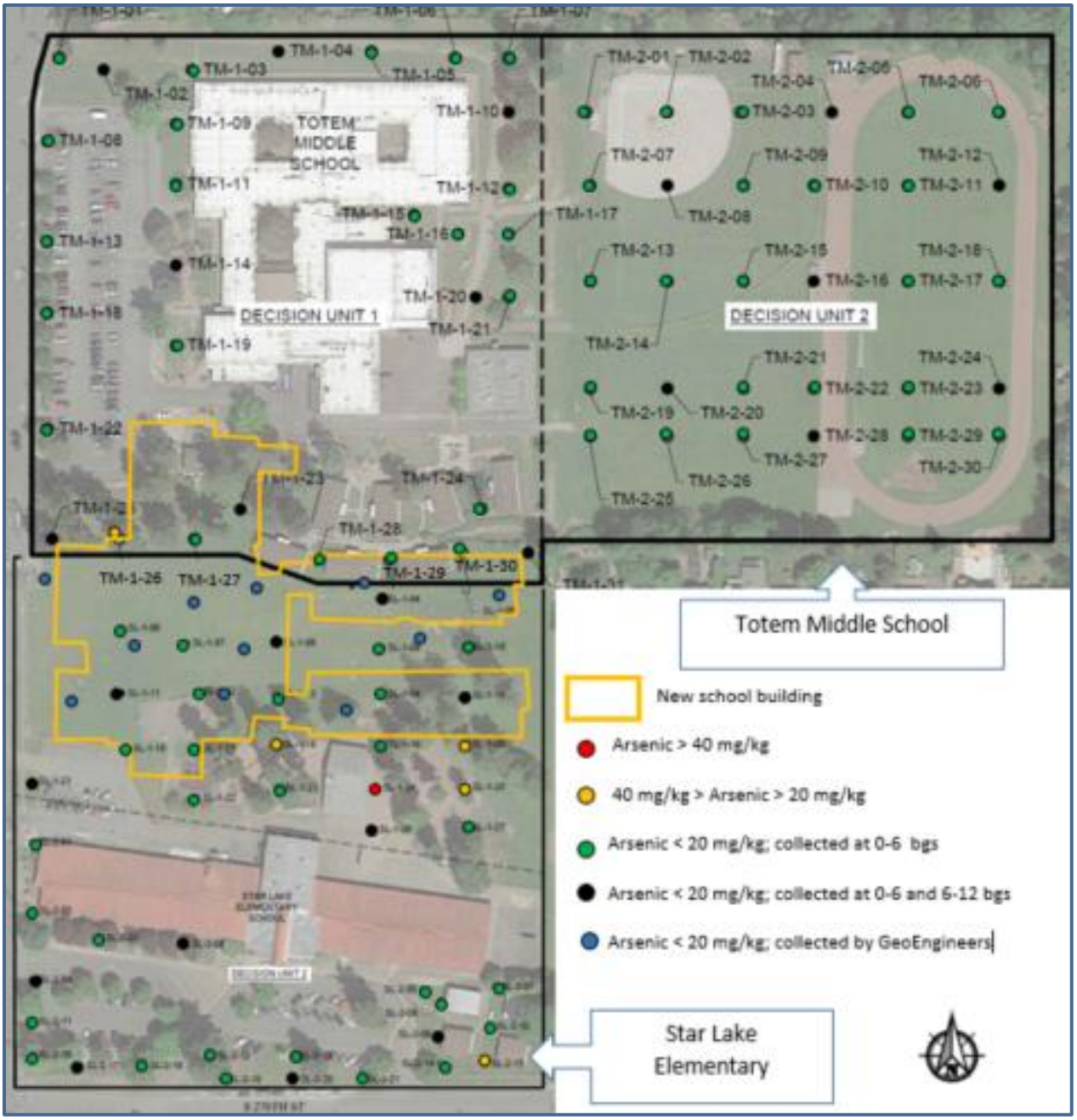

Figure 2. Approximate locations of soil samples.

Results of Soil Sampling

Samples collected at 0 to 6 inches bgs: Arsenic exceeded the MTCA Method A cleanup level of 20 (mg/kg) in six samples, with one exceeding the maximum allowable concentration for a single soil sample (40 mg/kg). Arsenic concentrations ranged from 1.91 mg/kg to 72.7 mg/kg. The average arsenic concentration was 8.99 mg/kg. None of the lead concentrations exceeded the MTCA Method A cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 3.53 mg/kg to 122 mg/kg. The average lead concentration was 16.43 mg/kg (Table 1 and Enclosure C).

Samples collected at 6 to 12 inches bgs: None of the soil samples exceeded the cleanup level of 20 mg/kg for arsenic. The arsenic concentrations ranged from 2.23 mg/kg to 13.8 mg/kg. The average arsenic concentration was 7.63 mg/kg. None of the lead concentrations in this depth interval exceeded the cleanup level of 250 mg/kg for lead. Lead concentrations ranged from 2.54 mg/kg to 42.5 mg/kg. The average lead concentration was 13.8 mg/kg.

Table 1. Summary of the 2008 and 2018 characterization sampling on the Property

	Arsenic (mg/kg)			Lead (mg/kg)		
Depth (inches)	**Minimum**	**Maximum**	**Average**	**Minimum**	**Maximum**	**Average**
0-6	1.91	**72.7**	8.99	3.53	122	16.43
6-12	2.23	13.8	7.63	2.54	42.5	13.08
MTCA Cleanup Level		40	20		500	250

Bold values represent concentrations above the MTCA Method A cleanup level.
Bold red values represent concentrations twice the MTCA Method A cleanup level

In October 2019, PBS conducted supplemental soil sampling to delineate the extent of arsenic and lead concentrations in two tree retention areas that exceeded the cleanup levels of 20 mg/kg for arsenic. PBS sampled five additional samples from 0 to 6 inches bgs in the vicinity of the three trees in the tree retention area (Figure 3). Two samples exceeded the cleanup level of 20 mg/kg, but none exceeded the maximum allowable concentration for a single soil sample of 40 mg/kg. All the lead concentrations were below the cleanup level of 250 mg/kg (Table 2).

Table 2. Supplemental soil sampling

Supplemental Samples Surrounding Trees 2575, 2578, and 2579					
Sample ID	**Sample Location**	**Sample Date**	**Sample Depth (inches)**	**Arsenic (mg/kg)**	**Lead (mg/kg)**
SL-1-28a	35' NW of 2575, 32' W of 2578	10/31/2019	0-6	3.25	6.10
SL-1-29a	25' N of 2575, 8' W of 2578	10/31/2019	0-6	7.55	6.88
SL-1-30a	16' E of 2578, 15' W of 2579	10/31/2019	0-6	**24.5**	51.6
SL-1-31a	50' E of 2579	10/31/2019	0-6	**24.9**	49.6
SL-1-32a	40' NW of 2575, 40' W of 2578	10/31/2019	0-6	8.41	5.75
MTCA Cleanup Level				40	500

Bold values represent concentrations above the MTCA Method A cleanup level.

In August 2015, two underground storage tanks were removed from the school's property. The contaminated soil detected after the removal of tanks was excavated and disposed off-Property. The Star Lake Elementary School obtained an NFA determination from Ecology on June 9, 2016, under a Facility Site ID 7890.

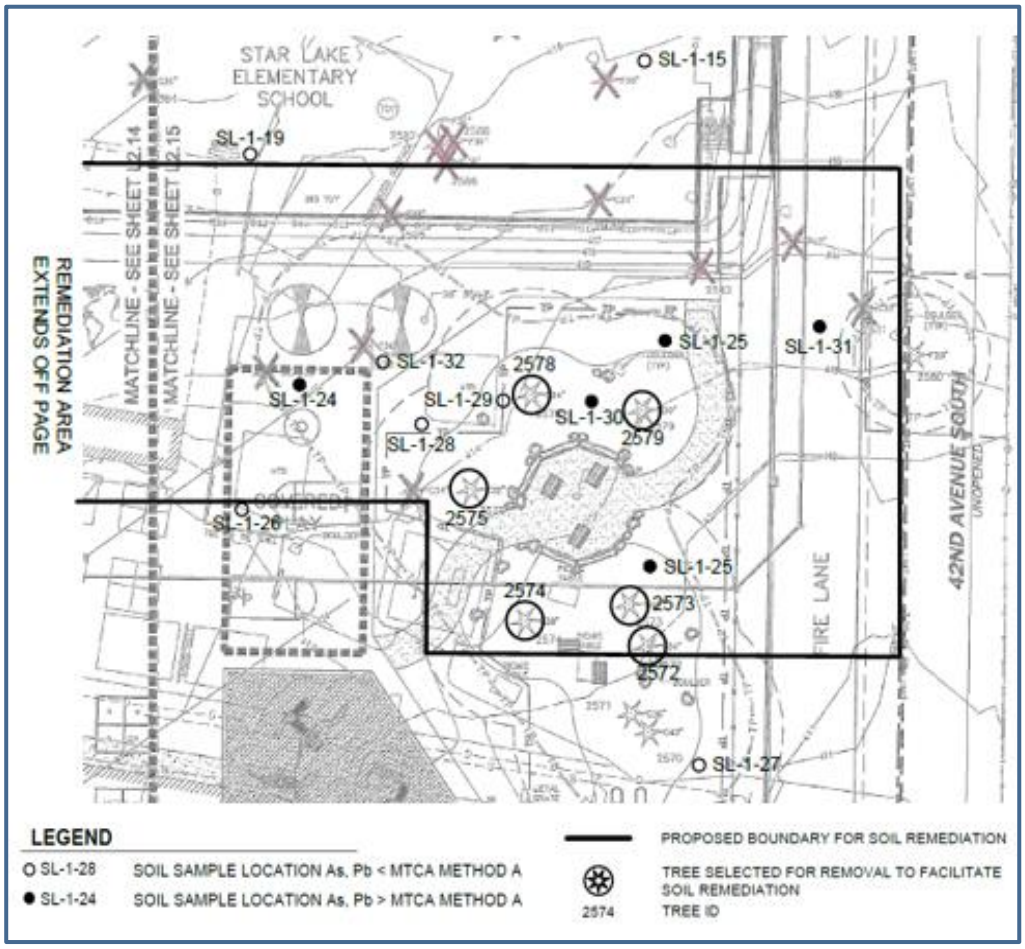

Figure 3. Supplemental soil sampling in the tree retention areas

b. Establishment of Cleanup Standards for the Asarco Site.

Ecology has determined the cleanup levels and points of compliance established for the Asarco Site will likely meet the substantive requirements of MTCA.

As part of the Interim Action Plan for the Asarco Tacoma Smelter Site (June 2012) (IAP), Ecology completed a terrestrial ecological evaluation for properties with only Tacoma Smelter Plume contamination. Ecology determined the MTCA Method A cleanup levels for both arsenic and lead were protective of both human health and the environment. The MTCA Method A cleanup levels for soil are as follows:

- Arsenic is 20 mg/kg.
- Lead is 250 mg/kg.

The IAP determined that the soil and duff cleanup levels are protective of human health and the environment for properties within the Asarco Tacoma Smelter Site are the following:

- Average arsenic detected in the soil is less than 20 mg/kg.
- Average lead detected in the soil is less than 250 mg/kg.
- Duff composite sample is less than 20 mg/kg for arsenic.
- Duff composite sample is less than 250 mg/kg for lead.
- No single soil sample has arsenic above 40 mg/kg.
- No single soil sample has lead 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.

FWPS decided to use mixing on the Property.

Property Cleanup: FWPS will conduct the soil cleanup at the Property in conjunction with its redevelopment. On May 4, 2020, on behalf of FWPS, PBS developed a Cleanup Action Plan (CAP). The CAP described the use the selected model remedy—mixing as a way to remediate the contamination associated with the Tacoma Smelter Plume on the Property. Ecology based this opinion letter on the information provided in this CAP.

The average arsenic concentration on the Property was below the cleanup level of 20 mg/kg. All lead concentrations were below cleanup level. Only one location on the Property exceed the maximum allowable concentration for a single soil sample for arsenic (40 mg/kg), requiring cleanup. FWPS, however, decided to remediate all the areas that exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic because of the future use of the areas by children.

PBS divided the Property into three remedial areas encompassing all the six locations that exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic (Figure 4). The contractor, Iliad, Inc., will mix the soil in place to a depth of at least six inches bgs. All the arsenic concentrations in the 6 to 12 inches bgs depth interval were below the cleanup level of 20 mg/kg for arsenic. The total area of soil mixing is approximately 1.5 acres. The contractor will mix the soil in place in the three remedial areas as follows:

Remedial area 1: The average arsenic in this area was 24.1 mg/kg; the contractor will mix soil in place to a depth of 12 inches bgs.

Remedial area 2: The average arsenic in this area was 18.2 mg/kg; the contractor will mix the soil in place to a depth of 6 inches bgs.

Remedial area 3: The average arsenic in this area was 12.9 mg/kg; the contractor will mix the soil in place to a depth of 6 inches bgs.

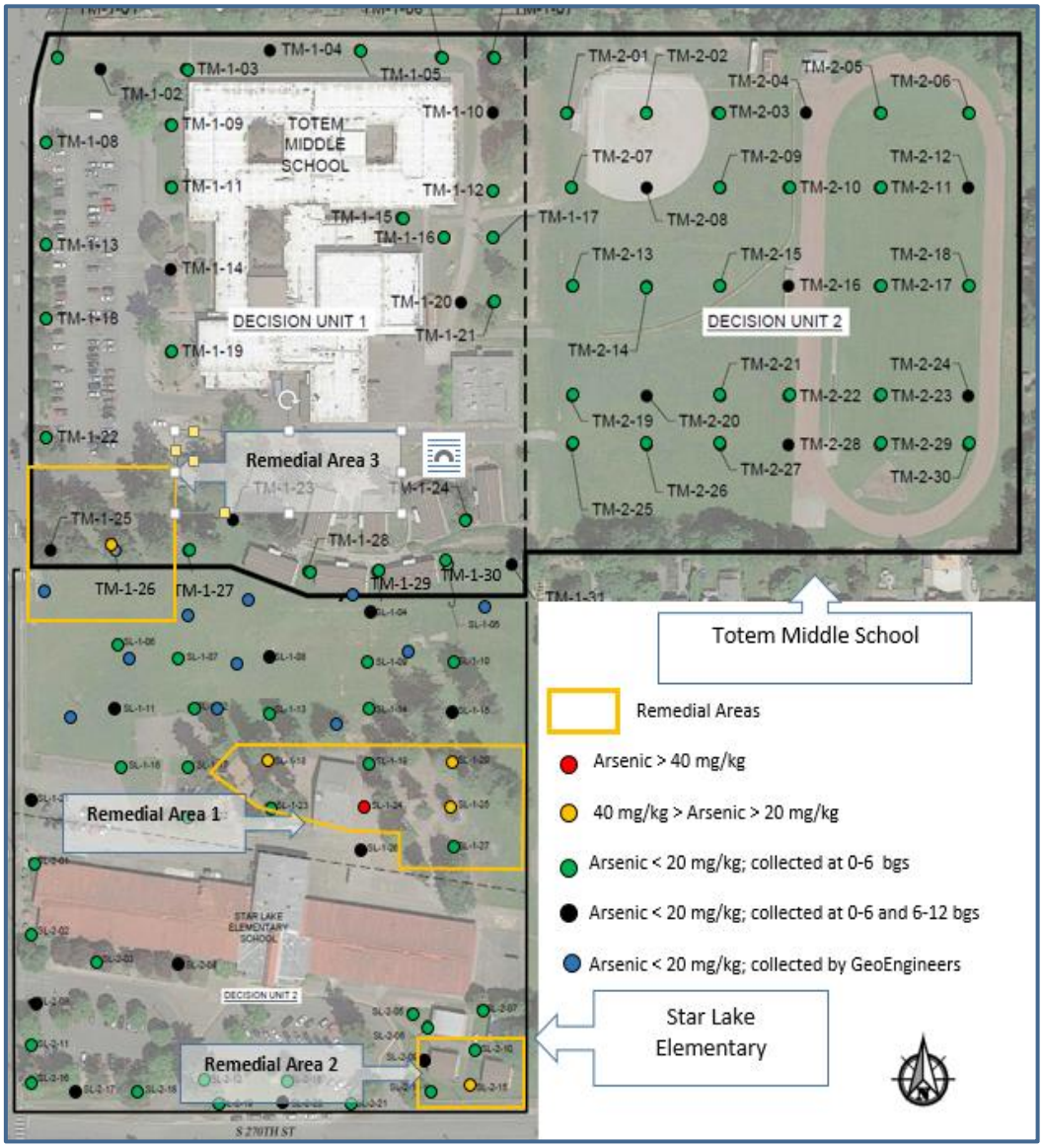

Figure 4. Proposed remedial areas

Confirmational Sampling: PBS will conduct confirmational sampling following soil mixing in three remedial areas. They will collect confirmational soil samples at six-inch depth intervals throughout the mixing depth. They will collect:

In Remedial area 1: This area is approximately 1.25 acres. PBS will collect 16 samples at 0 to 6 inches bgs and 16 samples at 6 to 12 inches bgs.

In Remedial area 2: This area is approximately 0.25 acres. PBS will collect 8 samples at 0 to 6 inches bgs.

In Remedial area 3: This area is approximately 1 acre. PBS will collect 16 samples at 0 to 6 inches bgs.

PBS will submit the samples to an analytical laboratory for an analysis of arsenic concentrations. All the lead concentrations were below the cleanup level 250 mg/kg, therefore no analysis is needed for lead.

If the confirmational soil sampling and analysis shows the average arsenic exceeding 20 mg/kg or any single soil sample exceeding 40 mg/kg, the contractor will conduct additional soil mixing. PBS will conduct additional confirmational sampling and analysis as described above.

As a reminder, in accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840[4] (Data Submittal Requirements), data generated for Independent Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website http://www.ecy.wa.gov/eim.

Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered. Please ensure that data generated during on-site activities is submitted pursuant to this policy.

Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination. Please be sure to submit all soil data collected to date, as well as any future data, in this format. Be advised that Ecology requires up to two weeks to process the data once it is received.

2. Cleanup of the Asarco Site as a Whole.

Ecology has concluded that **further remedial action** will still be necessary elsewhere within the ASARCO Site (Asarco Tacoma Smelter Site) upon completion of your proposed cleanup. In other words, while your proposed cleanup may constitute the final action for the Property, it will constitute only an **"interim action"** for the Asarco Site as a whole.

[4] https://fortress.wa.gov/ecy/publications/SummaryPages/1609050.html.

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 performed is substantially equivalent. Courts make that determination.
See RCW 70.105D.080 and WAC 173-340-545.

3. Opinion is Limited to Proposed Cleanup.

This letter does not provide an opinion on whether further remedial action will actually be necessary at the Property upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the Voluntary Cleanup Program (VCP).

4. 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.180.

Contact Information

Thank you for choosing to clean up your Property under the VCP. As you conduct your cleanup, please do not hesitate to request additional services. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our website: Voluntary Cleanup Program.[5] If you have any questions about this opinion, please contact me by phone at (360) 407-7094 or by e-mail at eva.barber@ecy.wa.gov.

Sincerely,

Eva Barber
Technical Assistance Coordinator
Toxics Cleanup Program
Southwest Regional Office

EB/tm

Enclosures:
A – Legal Description and General Description of the Property
B – Site Description of the Asarco Tacoma Smelter Site
C – Results of the Soil Characterization Sampling on the Property
D – Soil Safety Program Cleanup Action at Star Lake Elementary

cc by email:
James Welles, PBS Engineering and Environmental, james.welles@pbsusa.com
Sally McLean, Federal Way Public Schools, smclean@fwps.org
David Dorland, Iliad, david@iliadnw.com
Jannine McDonald, Federal Way Public Schools, jmcdonald@fwps.org
Amy Jankowiak, WQ – NWRO, amy.jankowiak@ecy.wa.gov
Mathew Kwartin, WQ – NWRO, mathew.kwartin@ecy.wa.gov
Nick Acklam, Ecology, nicholas.acklam@ecy.wa.gov
Connie Groven, Ecology, connie.groven@ecy.wa.gov
Ecology Site File

[5] http://www.ecy.wa.gov/vcp.

Enclosure A

Legal Description and General Description of the Property

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Legal Description of the Property

Parcel 2722049112: LOTS "Y" AND "Z" CITY OF KENT LOT LINE ADJUSTMENT NO LL-2010-5 RECORDING NO 20100922900001 (BEING A PORTION OF SW QTR AND SE QTR STR 27-22-04)

Parcel 2722049152: LOT "X" CITY OF KENT LOT LINE ADJUSTMENT NO LL-2010-5 RECORDING NO 20100922900001 (BEING A PORTION OF SW QTR AND SE QTR STR 27-22-04)

General Description of the Property

Star Lake Elementary School is located east of the Interstate 5 in a residential area of Kent, Washington. The Property consists of two schools that are situated on two King County parcels that encompass 28 acres. The Property is bordered to the north and east by residential properties, to the west by 40th Avenue South and to the south by South 270th Street. The existing Star Lake Elementary School was built in 1957, while the Totem Middle School was built in 1964.

The dominant geological feature of the landscape in this portion of King County is Vashon till (Pleistocene). The Vashon till is made up of predominantly fine-grained deposits consisting of unsorted and unstratified glacial sediments from clay to boulder in size that vary in compaction and composition throughout Puget Sound (Booth, 2004).

Based on surface topography, the likely direction of groundwater flow is interpreted to be south, following the Property and surrounding area topographic slope.

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Enclosure B

Site Description of the Asarco Tacoma Smelter Site

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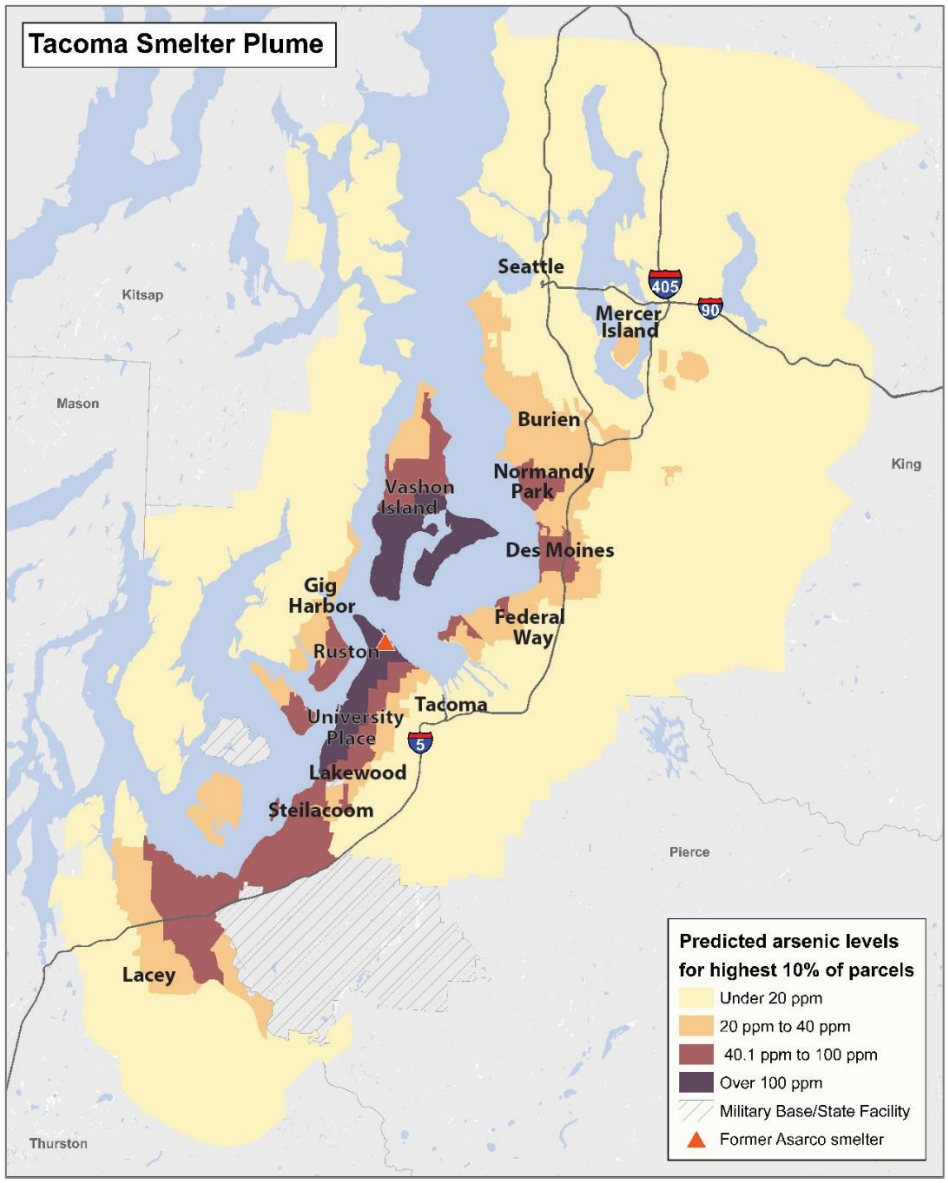
Asarco Tacoma Smelter Site



An interactive color map can be found at: https://dirtalert.info/

For almost 100 years, the Asarco Company operated a copper smelter in Tacoma. 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. Elevated levels of contamination are found as far south as the Nisqually Ridge and as far north as Seattle (West Seattle). Additionally, elevated levels of contamination are found as far west as the Kitsap Peninsula and as far east as Kent and Bellevue. Arsenic, lead, cadmium, and other heavy metals are still in the soil as a result of this pollution. The area has elevated levels of arsenic, lead, and cadmium in the soil due to air emissions from the Asarco smelter.

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Enclosure C

Results of the Soil Characterization on the Property

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Results of the Soil Characterization on the Property

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
1	5/30/2007	0-6	9	16
2	5/30/2007	0-6	9.4	16
3	5/30/2007	0-6	7.7	13
4	5/30/2007	0-6	13	29
5	5/30/2007	0-6	13	30
6	5/30/2007	0-6	8.7	14
7	5/30/2007	0-6	4.9	4.8
8	5/30/2007	0-6	17	42
9	5/30/2007	0-6	6.9	9.1
SL1-01	11/5/2018	0-6	6.37	8.35
SL1-02	11/5/2018	0-6	6.21	6.61
SL1-03	11/5/2018	0-6	4.73	5.32
SL1-04a	11/5/2018	0-6	7.43	7.09
SL1-05	11/5/2018	0-6	4.73	4.86
SL1-06	11/5/2018	0-6	6.96	10.8
SL1-07	11/5/2018	0-6	6.33	10.8
SL1-08a	11/5/2018	0-6	7.45	10.2
SL1-09	11/5/2018	0-6	8.31	17.2
SL1-10	11/5/2018	0-6	17	28.7
SL1-11a	11/5/2018	0-6	13.2	23.2
SL1-12	11/5/2018	0-6	13.8	17.5
SL1-13	11/5/2018	0-6	5.64	19.4
SL1-14	11/5/2018	0-6	5.66	21.3
SL1-15a	11/5/2018	0-6	4.99	16.9
SL1-16	11/5/2018	0-6	10.6	12.2
SL1-17	11/5/2018	0-6	6.49	18.8
SL1-18a	11/5/2018	0-6	**26.6**	11.3
SL1-19	11/5/2018	0-6	7.84	21.8
SL1-20	11/5/2018	0-6	**22.6**	51.1
SL1-21a	11/5/2018	0-6	12.5	27.4
SL1-22	11/5/2018	0-6	5.83	18.2
SL1-23	11/5/2018	0-6	7.69	17.6
SL1-24	11/5/2018	0-6	**72.7**	122
SL1-25	11/5/2018	0-6	**25.1**	39.8
SL1-26a	11/5/2018	0-6	9.38	17.3
SL1-27	11/5/2018	0-6	12.5	21
SL2-01	11/5/2018	0-6	5.9	19.4
SL2-02	11/5/2018	0-6	6.7	12.1
SL2-03	11/5/2018	0-6	5.1	10.2
SL2-04a	11/5/2018	0-6	11.4	15.5
SL2-05	11/5/2018	0-6	15.4	29.2

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
SL2-06	11/5/2018	0-6	11.5	18.4
SL2-07	11/5/2018	0-6	4.73	5.98
SL2-08a	11/5/2018	0-6	4.96	13.4
SL2-09a	11/5/2018	0-6	13.5	27.8
SL2-10	11/5/2018	0-6	19.1	26.8
SL2-11	11/5/2018	0-6	5.58	9.42
SL2-12	11/5/2018	0-6	17.5	15.7
SL2-13	11/5/2018	0-6	8.11	21.1
SL2-14	11/5/2018	0-6	17.50	35.6
SL2-15	11/5/2018	0-6	**22.6**	29.2
SL2-16	11/5/2018	0-6	9.33	11.9
SL2-17a	11/5/2018	0-6	4.53	8.7
SL2-18	11/5/2018	0-6	4.7	13
SL2-19	11/5/2018	0-6	5.93	10.6
SL2-20	11/5/2018	0-6	6.32	7.84
SL2-21	11/5/2018	0-6	8.23	13.4
TM1-01	11/6/2018	0-6	11.4	17.4
TM1-02a	11/6/2018	0-6	13.6	25.7
TM1-03	11/6/2018	0-6	7.1	11.1
TM1-04	11/6/2018	0-6	6.67	9.7
TM1-05	11/6/2018	0-6	9.21	21.3
TM1-06	11/6/2018	0-6	6.5	17.1
TM1-07	11/6/2018	0-6	11.4	15.9
TM1-08	11/6/2018	0-6	6.51	19.9
TM1-09	11/6/2018	0-6	10	26.3
TM1-10a	11/6/2018	0-6	13.5	20.7
TM1-11	11/6/2018	0-6	9.78	20.3
TM1-12	11/6/2018	0-6	7.71	14.0
TM1-13	11/6/2018	0-6	4.6	15.2
TM1-14a	11/6/2018	0-6	8.98	20.6
TM1-15	11/6/2018	0-6	8.99	18.6
TM1-16	11/6/2018	0-6	3.92	7.5
TM1-17	11/6/2018	0-6	6.09	10.8
TM1-18	11/6/2018	0-6	5.7	17.4
TM1-19	11/6/2018	0-6	8.78	20.3
TM1-20a	11/6/2018	0-6	6.42	15.6
TM1-21	11/6/2018	0-6	13.5	20
TM1-22	11/6/2018	0-6	4.78	12.5
TM1-23a	11/6/2018	0-6	8.99	24.8
TM1-24	11/6/2018	0-6	4.53	9.2
TM1-25a	11/6/2018	0-6	16.1	61.8
TM1-26	11/6/2018	0-6	**26**	48.8
TM1-27	11/6/2018	0-6	4.67	5.9
TM1-28	11/6/2018	0-6	5.66	5.4

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
TM1-29	11/6/2018	0-6	5.82	8.7
TM1-30	11/6/2018	0-6	7.84	11
TM1-31a	11/6/2018	0-6	5.96	12.1
TM2-01	11/6/2018	0-6	11.3	17.3
TM2-02	11/6/2018	0-6	11.5	16.4
TM2-03	11/6/2018	0-6	5.4	11.9
TM2-04a	11/6/2018	0-6	2.70	4.18
TM2-05	11/6/2018	0-6	7.95	6.25
TM2-06	11/6/2018	0-6	3.53	4.69
TM2-07	11/6/2018	0-6	5.98	9.75
TM2-08a	11/6/2018	0-6	11.1	15.6
TM2-09	11/6/2018	0-6	5.87	9.89
TM2-10	11/6/2018	0-6	6.45	11.1
TM2-11	11/6/2018	0-6	3.22	5.57
TM2-12a	11/6/2018	0-6	3.58	7.56
TM2-13	11/6/2018	0-6	5.79	12.3
TM2-14	11/6/2018	0-6	4.58	10.2
TM2-15	11/6/2018	0-6	2.76	3.53
TM2-16a	11/6/2018	0-6	4.50	7.39
TM2-17	11/6/2018	0-6	2.49	5.11
TM2-18	11/6/2018	0-6	2.11	3.75
TM2-19	11/6/2018	0-6	4.58	10.4
TM2-20a	11/6/2018	0-6	3.61	8.33
TM2-21	11/6/2018	0-6	4.50	8.73
TM2-22	11/6/2018	0-6	6.28	9.91
TM2-23	11/6/2018	0-6	1.91	4.42
TM2-24a	11/6/2018	0-6	3.19	5.93
TM2-25	11/6/2018	0-6	3.50	8.50
TM2-26	11/6/2018	0-6	4.69	5.36
TM2-27	11/6/2018	0-6	4.65	10.7
TM2-28a	11/6/2018	0-6	7.59	11.9
TM2-29	11/6/2018	0-6	3.75	6.83
TM2-30	11/6/2018	0-6	4.26	3.68
TM2-24b	11/6/2018	6-12	2.23	2.54
TM2-12b	11/6/2018	6-12	2.78	2.90
SL1-26b	11/5/2018	6-12	4.13	3.9
SL1-04b	11/5/2018	6-12	4.36	4.9
SL1-08b	11/5/2018	6-12	5.39	4.9
SL1-18b	11/5/2018	6-12	6.88	5.4
TM2-16b	11/6/2018	6-12	5.38	5.67
TM2-04b	11/6/2018	6-12	7.19	6.55
TM2-20b	11/6/2018	6-12	4.28	6.63
SL2-17b	11/5/2018	6-12	3.77	7.6
TM1-31b	11/6/2018	6-12	5.51	8.7
SL2-08b	11/5/2018	6-12	5.57	9.66

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
SL1-21b	11/5/2018	6-12	6.5	11.3
TM2-28b	11/6/2018	6-12	9.41	11.4
SL2-20b	11/5/2018	6-12	9.95	13.1
TM2-08b	11/6/2018	6-12	10.4	14.6
SL1-15b	11/5/2018	6-12	4.35	15.9
TM1-14b	11/6/2018	6-12	9.68	16.4
SL1-11b	11/5/2018	6-12	11.3	17.1
TM1-02b	11/6/2018	6-12	10.9	17.3
TM-10b	11/6/2018	6-12	12	18.1
TM1-20b	11/6/2018	6-12	7.4	18.2
SL2-09b	11/5/2018	6-12	11.7	19
SL2-04b	11/5/2018	6-12	11.3	23.4
TM1-23b	11/6/2018	6-12	12.2	32.5
TM1-25b	11/6/2018	6-12	13.8	42.5

Concentrations in **bold** represent values above the MTCA Method A cleanup level for unrestricted land use.
Concentrations in **bold red** represent values that are twice the cleanup level.

Enclosure D

Soil Safety Program Cleanup Action at Star Lake Elementary

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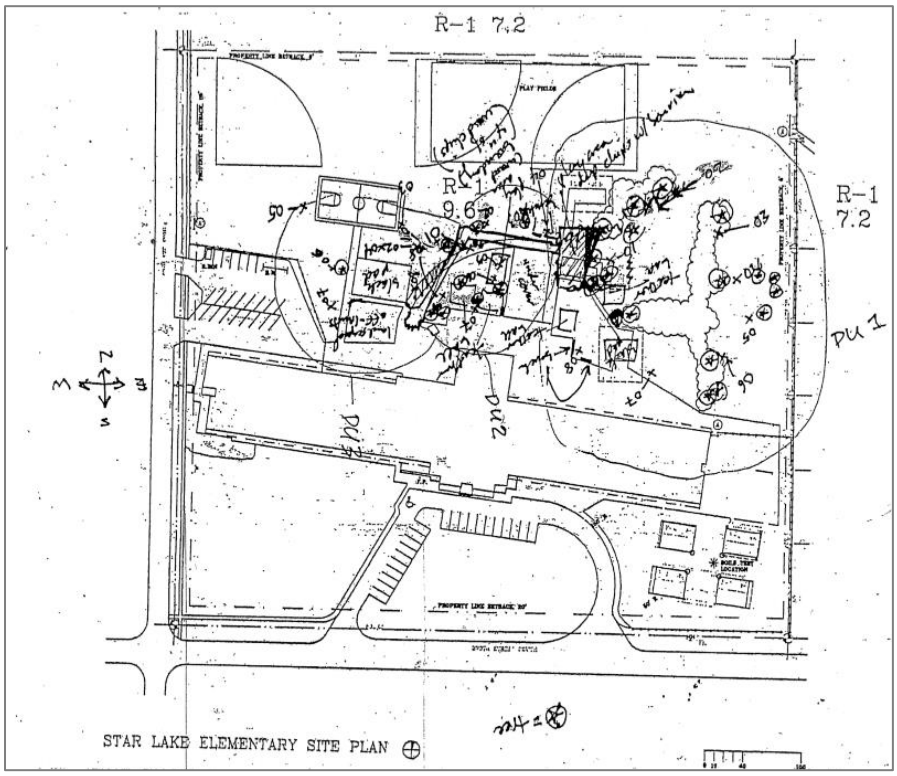
Characterization Sampling



Federal Way School District

513 Star Lake Elementary

Arsenic Results

	DU 1		DU 2		DU 3	
Boring	0-2	2-6	0-2	2-6	0-2	2-6
1	18.50	17.20	20.50	22.00	13.80	59.70
2	51.20	42.30	133.00	83.40	14.30	8.21
3	7.11	3.59	44.20	46.60	27.70	14.50
4	16.40	16.40	43.30	70.60	9.83	22.80
5	24.90	14.10	28.60	7.04	24.60	23.80
6	7.16	4.16	27.10	19.70	24.00	11.50
7	11.80	13.00	6.71	7.84	7.72	6.96
8	12.50	21.80	11.10	10.10	11.60	9.57
Average	18.70	16.57	39.31	33.41	16.69	19.63
Max	51.20	42.30	133.00	83.40	27.70	59.70

Lead Results

	DU 1		DU 2		DU 3	
Boring	0-2	2-6	0-2	2-6	0-2	2-6
1	38.70	43.10	29.10	43.80	25.90	152.00
2	116.00	102.00	252.00	183.00	29.80	15.50
3	11.00	6.66	111.00	77.10	70.20	29.40
4	29.80	24.70	93.80	63.50	8.13	14.70
5	58.30	24.10	61.00	10.40	42.50	42.00
6	13.40	7.86	63.50	32.30	62.50	22.90
7	18.80	14.70	12.30	13.60	26.10	23.80
8	63.10	18.80	21.80	19.20	40.60	23.00
Average	43.64	30.24	80.56	55.36	38.22	40.41
Max	116.00	102.00	252.00	183.00	70.20	152.00

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Completed Cleanup Action