



**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

Southwest Region Office

PO Box 47775 • Olympia, WA 98504-7775 • 360-407-6300

December 30, 2024

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

Re: No Further Action opinion for the following Property associated with the Asarco Tacoma Smelter Site

Site 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 on November 4, 2024, for an opinion regarding the sufficiency of the Property cleanup associated with the Asarco Tacoma Smelter (Asarco Site) under the Voluntary Cleanup Program (VCP).¹ This letter provides our opinion and analysis. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter [70A.305](#) RCW.²

¹ <https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Voluntary-Cleanup-Program>

² <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305>

Opinion

Ecology has determined that no further remedial action is necessary at the Property to clean up contamination associated with the Asarco Site. However, further remedial action remains necessary elsewhere at the Asarco Site to clean up contamination.

Ecology bases this opinion on an analysis of whether the remedial action meets the substantive requirements of MTCA and its implementing regulations, which are specified in Chapter 70A.305 RCW and Chapter [173-340](#) WAC³ (collectively called “MTCA”).

Property Description

This opinion applies only to the Property described in this section, which was affected by release(s) at the Asarco Site and addressed by your cleanup. The Property includes the following parcel of real property in King County.

- 2722049152 (28.06 acres)

Prior to Property redevelopment, the property was comprised of the two parcels listed below.

- 2722049112 (7.89 acres) – Former Star Lake Elementary Property
- 2722049152 (20.2 acres) – Former Totem Middle School Property

Enclosure A includes a legal description of the Property. Enclosure B includes a detailed description and diagram of the Asarco Site. Figure 1 shows where the Property is located within the Asarco Site.

Asarco Site Description

This opinion applies to only the Asarco Site described in this section. The Asarco Site is defined by the nature and extent of contamination associated with the following releases:

- Arsenic in soil.
- Lead in soil.

³ <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340>

Enclosure B includes the Asarco Site description, history, and diagrams.

This opinion does not apply to any other sites that may affect the Property.

Please note that releases from multiple sites can affect a parcel of real property. At this time, Ecology has no information that other sites affect the Property.

Basis for the Opinion

Ecology bases this opinion on information in the documents listed in Enclosure C. You can request these documents by filing a [records request](#).⁴ For help making a request, contact the Public Records Officer at recordsofficer@ecy.wa.gov or call (360) 407-6040. Before making a request, check if the documents are available on the [Star Lake Elementary webpage](#).⁵

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

Analysis of the Cleanup

Ecology has concluded that no further remedial action is necessary at the Property to clean up contamination associated with the Asarco Site. However, Ecology has also concluded that further remedial action is still necessary to clean up contamination elsewhere at the Asarco Site. Ecology bases its conclusions on the following analysis:

Characterizing the Asarco Site

Federal Way Public Schools (FWPS) planned to redevelop a property that previously contained two school campuses, combining the two school buildings into one newly constructed building. The original Star Lake Elementary School was situated on a 7.89-acre parcel, while the former Totem Middle School, was situated on a 20.2-acre parcel. The schools will be referred to in this opinion letter as the Property. The Property is located east of Interstate 5 in a residential area of Kent, Washington (Figure 1), and encompasses a total of 28.09 acres.

⁴ <https://ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests>

⁵ <https://apps.ecology.wa.gov/cleanupsearch/site/13055>

The new school building is situated between the two original school buildings, which were demolished once the new school was built. FWPS retained the existing athletic fields, but improved 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, Washington for arsenic and lead analysis by Environmental Protection Agency (EPA) Method 6020B.

There had been previous partial characterization events at the Star Lake Elementary School. Ecology sampled children's 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.

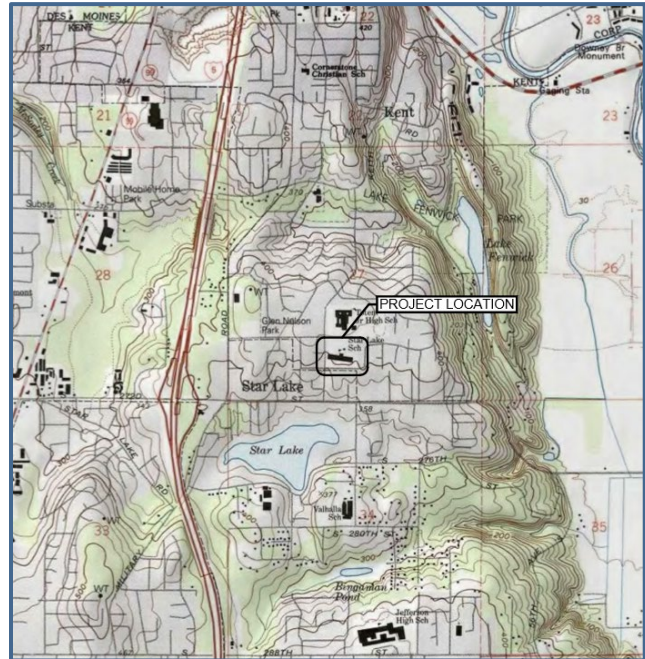


Figure 1. Vicinity map

Ecology's SSP sampled play areas at the Totem Middle School Property in August 2006. All sample results indicated arsenic and lead were below cleanup levels. No remediation was needed on the Totem Middle School Property as part of Ecology's SSP.

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 on the Star Lake Elementary School Property. 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 characterizations sampling on the Property, refer to Enclosure D.

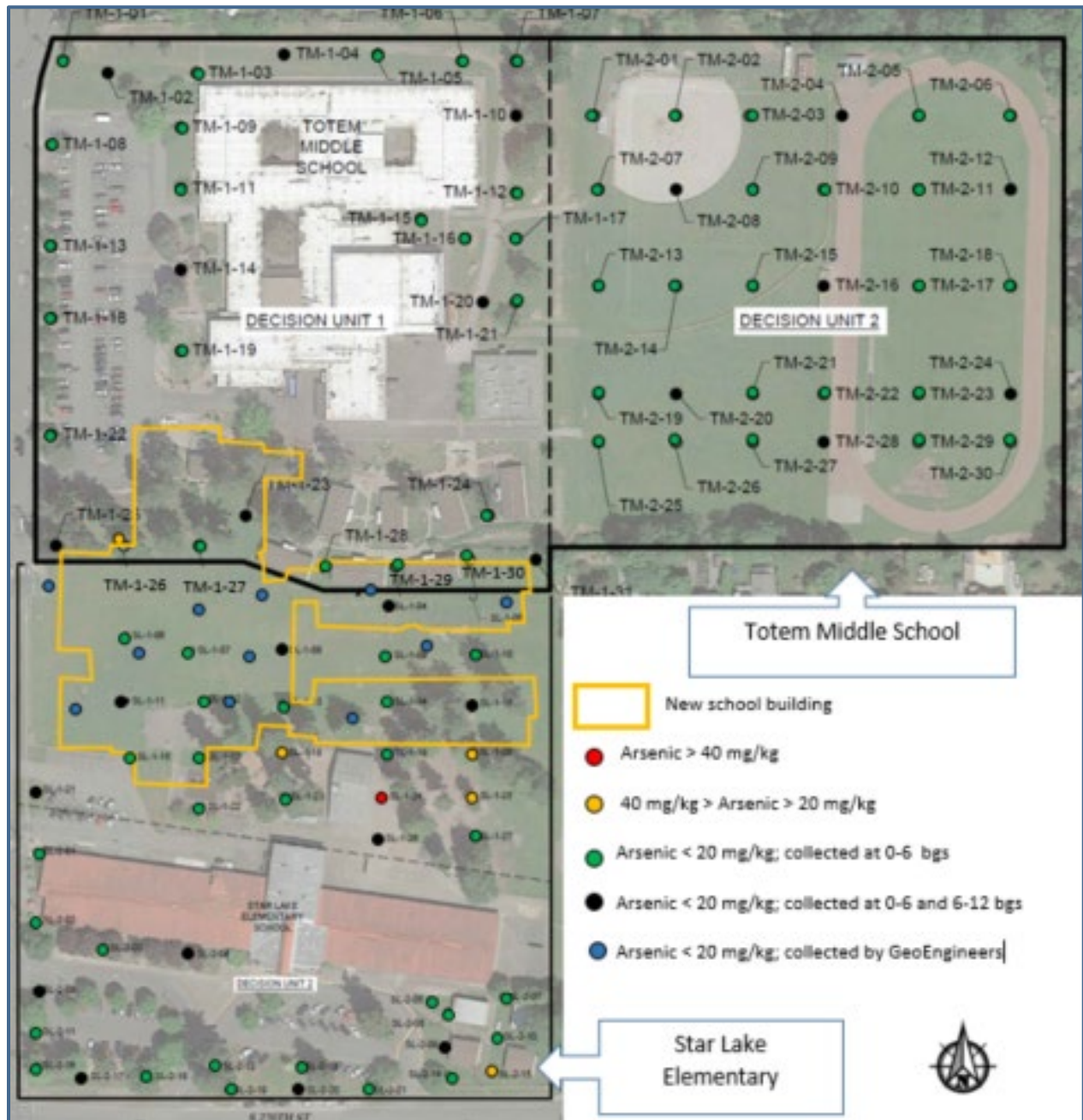


Figure 2. Approximate locations of soil characterization samples.

Results of Soil Characterization 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 D).

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 13.08 mg/kg.

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

Depth (inches)	Arsenic (mg/kg) Minimum	Arsenic (mg/kg) Maximum	Arsenic (mg/kg) Average	Lead (mg/kg) Minimum	Lead (mg/kg) Maximum	Lead (mg/kg) 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 more than 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

Supplemental Samples Surrounding Trees 2575, 2578, and 2579					
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.

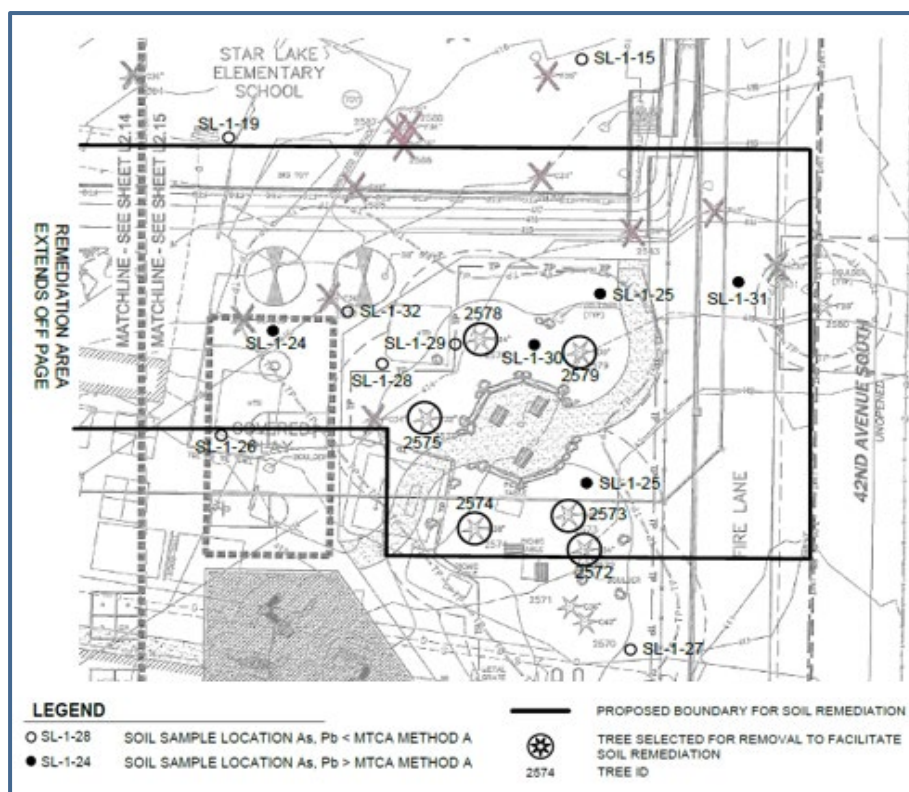


Figure 3. Supplemental soil sampling in the tree retention areas

In August 2015, two underground storage tanks were removed from the Property. After the tank removal, diesel-range TPH above the MTCA Method A cleanup level was detected in the soil. The contaminated soil was excavated and disposed of at an approved disposal site off the Property. The Star Lake Elementary Heating Oil Tank project received a No Further Action (NFA) determination from Ecology on June 6, 2019, under Facility Site ID 7890 (CSID 15323).

Setting cleanup standards for the Site

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

As part of the Interim Action Plan for the Asarco 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 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.
- 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 concentration above 40 mg/kg.
- No single soil sample has lead concentration above 500 mg/kg.

Selecting the cleanup action for the Property

Ecology has determined the cleanup action you selected for the Property meets the substantive requirements of MTCA and the IAP. The cleanup meets the minimum cleanup requirements and does 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.

PBS decided to use mixing on the Property.

Implementing the cleanup action

Ecology has determined your cleanup of the Property meets the standards set for the Asarco Site.

On May 4, 2020, on behalf of FWPS, PBS developed a Remedial Action Work Plan for Tacoma Smelter Plume Impacts (RAWP). The average arsenic concentration on the Property was below the cleanup level of 20 mg/kg. All lead concentrations were below the cleanup level of 250 mg/kg. Only one location on the Property exceeded the maximum allowable concentration for a single soil sample for arsenic (40 mg/kg), requiring cleanup. The sample result of 72.7 mg/kg for arsenic was detected at sample location SL1-24. However, FWPS 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 locations that exceeded the MTCA Method A cleanup level of 20 mg/kg for arsenic (Figure 4). In the three remedial areas, soil was planned to be mixed in place during property development. Following mixing, confirmational samples would be collected, as described in the [Tacoma Smelter Plume Model Remedies Guidance](#),⁶ to confirm arsenic concentrations are successfully reduced to below the cleanup level of 20 mg/kg. On July 6, 2020, Ecology issued a Likely No Further Action Opinion letter based on the information provided in the RAWP.

⁶ <https://apps.ecology.wa.gov/publications/documents/1909101.pdf>

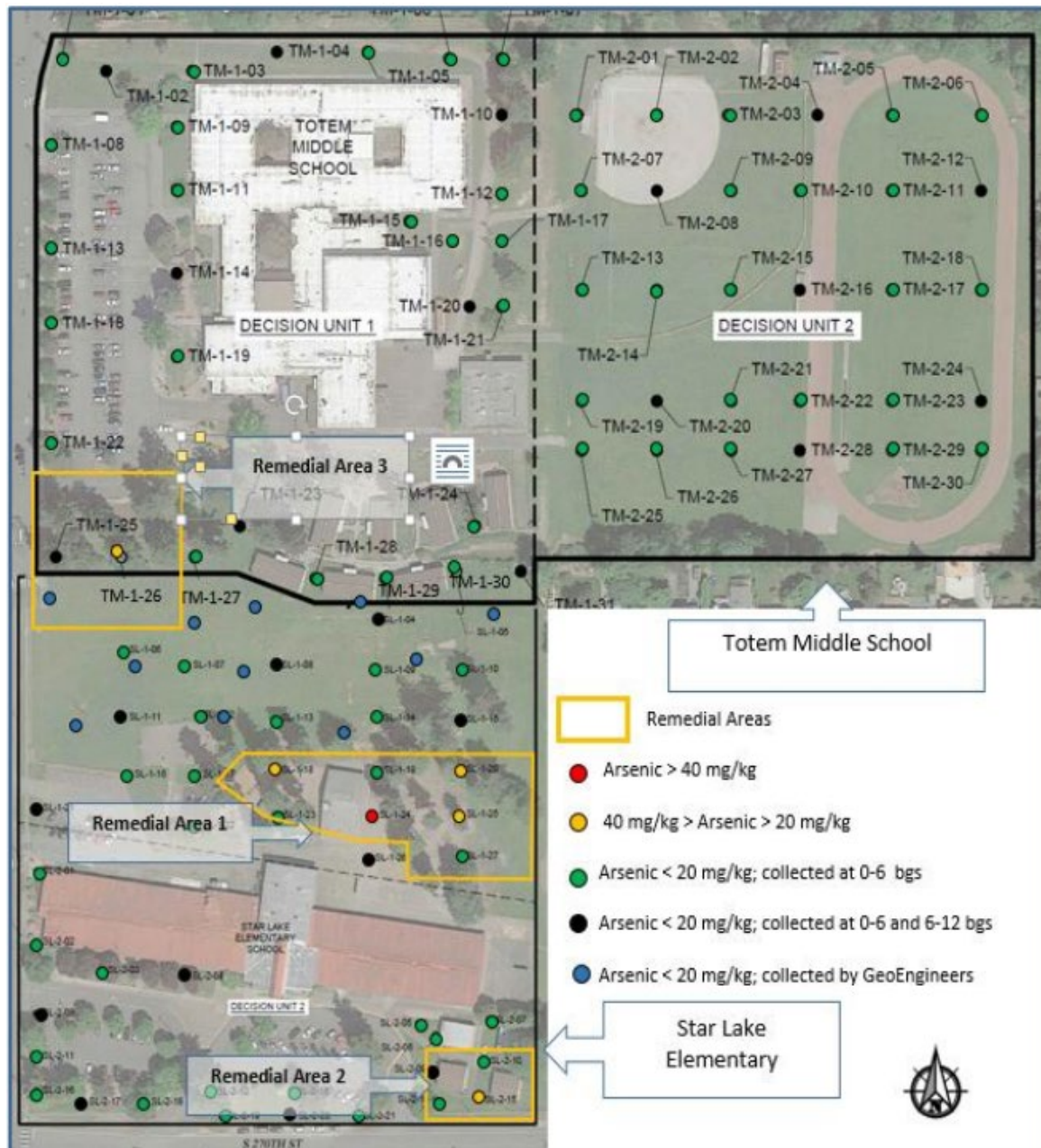


Figure 4. Three Remedial Areas

Between June and November 2020, Iliad Construction Inc (Iliad) performed soil remediation.

In Remediation Area 1: On June 9, 2020, soil was initially mixed in place to a depth of 12 inches. Confirmational samples in grid sections R1-1, R1-7, and R1-12 indicated arsenic remained above CULs, so Iliad performed additional mixing in place to a depth of 18 inches bgs in these areas. Analysis of confirmation soil samples collected from these grid sections following the second

remediation event indicated that arsenic concentrations were successfully reduced to below the CUL (Figure 5).

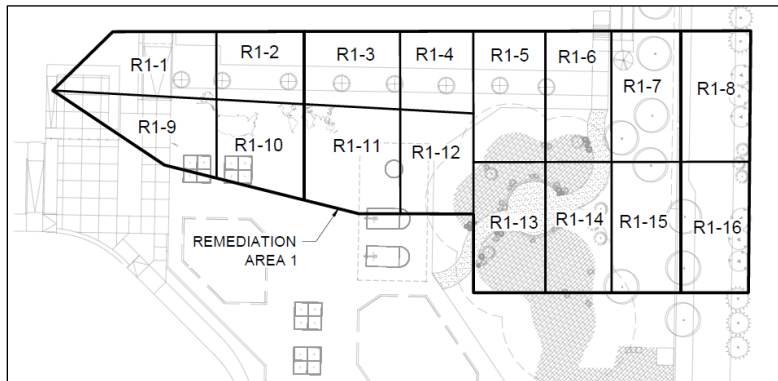


Figure 5. Remedial Area 1 Confirmation Sample Locations

In Remediation Area 2: On June 15, 2020, soil in the eastern half of RA2 was initially mixed to a depth of six inches. The presence of portable classrooms on the western half of RA2 prevented remediation of these soils at the time. Laboratory analysis of confirmational soil samples collected in grid sections R2-3, and R2-7 indicated arsenic remained above the CUL. Iliad performed additional mixing in place to a depth of 12 inches bgs in grid sections R2-3 and R2-7. Analysis of confirmation soil samples collected from these grid sections following the second remediation event indicated arsenic concentrations remained above the CUL in grid section R2-7. As such, grid section R2-7 was mixed in place to a depth of 18 inches bgs on June 23, 2020, and additional confirmational sampling was performed. Analysis of this additional mixing confirmed arsenic concentrations remained elevated. On October 15, 2020, approximately 12 inches of clean soil was imported to grid section R2-7 from the central portion of the site and mixed to a depth of 24 inches bgs. By this time, the portable classrooms within the western portion of RA2 had been removed, and Iliad performed mixing in place of grid sections R2-1, R2-2, R2-5, and R2-6 to a depth of 6 inches bgs. Confirmational sampling indicated that arsenic concentrations in all grid sections had been reduced to below the CUL (Figure 6).

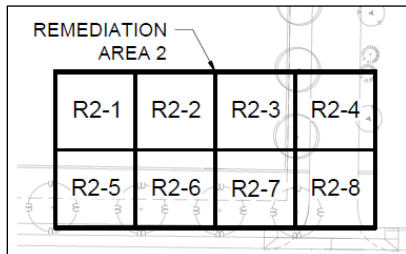


Figure 6. Remedial Area 2 Confirmation Sample Locations

In Remediation Area 3: Soil was mixed to a depth of six inches bgs. Confirmation soil sampling following mixing in place indicated that arsenic concentrations were reduced to below the CUL (Figure 7).

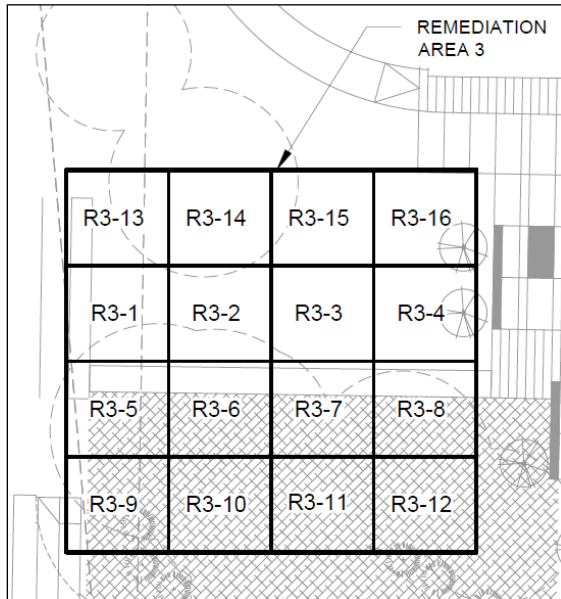


Figure 7. Remedial Area 3 Confirmation Sample Locations

Listing of the Asarco Site

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

Limitations of the Opinion

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 Site. 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 [70A.305.040](#)(4).⁷

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 if the action you performed is substantially equivalent. Courts make that determination. See RCW [70A.305.080](#)⁸ and WAC [173-340-545](#).⁹

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 [70A.305.170](#)(6).¹⁰

Termination of Agreement

Thank you for cleaning up the Property under the Standard VCP process. This opinion terminates the VCP Agreement governing VCP Project No. NW3271.

⁷ <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.040>

⁸ <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.080>

⁹ <https://apps.leg.wa.gov/WAC/default.aspx?cite=173-340-545>

¹⁰ <https://app.leg.wa.gov/RCW/default.aspx?cite=70A.305.170>

Questions

If you have any questions about this opinion, please contact me at 360-999-9593 or diana.ison@ecy.wa.gov.

Sincerely,



Diana Ison
Technical Assistance Coordinator
Southwest Region Office, Toxics Cleanup Program

DI:at

Enclosures (5):

- A – Property Legal Description and General Description
- B – Asarco Site Description, History, and Diagrams
- C – Basis for the Opinion: List of Documents
- D – Results of Soil Characterization and Confirmational Sampling
- E – Soil Safety Program Documents for Star Lake Elementary and Totem Middle School

cc:

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Tim Mullin, TCP-SWRO, tim.mullin@ecy.wa.gov
Fiscal, VCP Fiscal Analyst (w/o encl)
TCP, Operating Budget Analyst (w/o encl)

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Enclosure A

Property Legal Description and General Description

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Legal Description of the Property

Parcel 2722049152:

PCL "A" OF KENT BLA# LL-2020-7 REC# 20210729900001 SD BLA BEING POR OF SE 1/4 OF NE 1/4 OF SW 1/4 STR 27-22-04 TGW POR OF NE 1/4 OF SW 1/4 OF SW 1/4 STR 27-22-04 TGW POR SW 1/4 OF NW 1/4 OF SE 1/4 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 one new school building that is situated on one approximately 28-acre King County parcel. 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. This newly constructed school building replaces the former Star Lake Elementary School building, which was built in 1957, and the Totem Middle School building, which 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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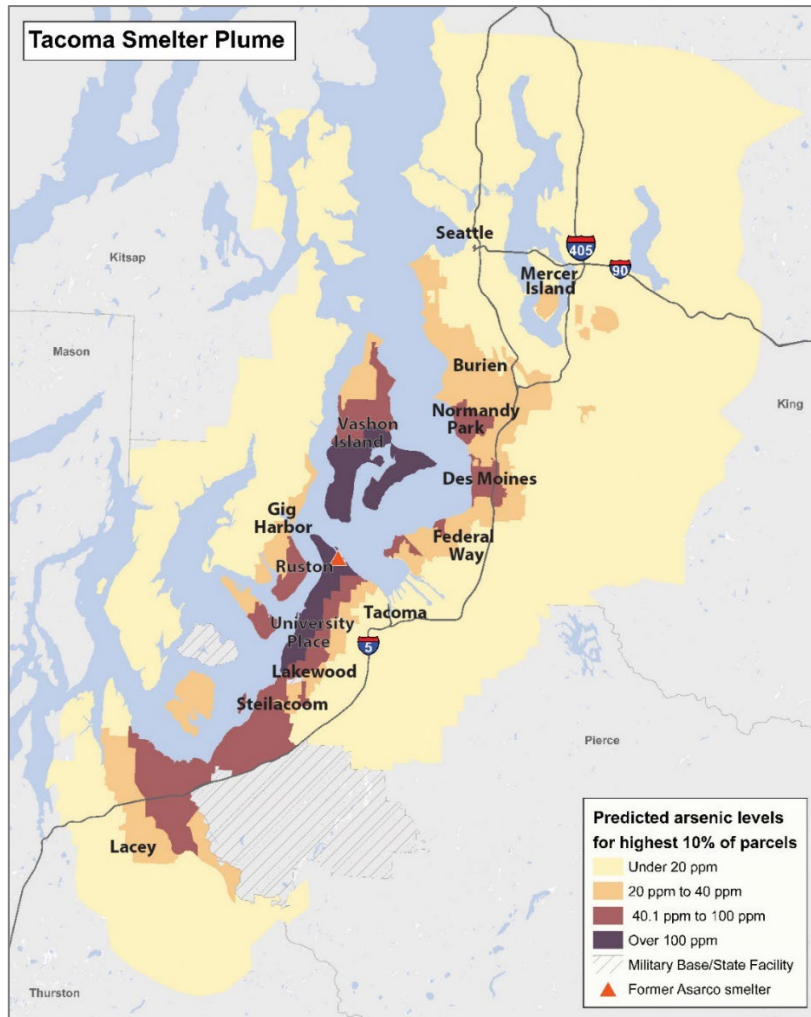
Enclosure B

Asarco Site Description, History, and Diagrams

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Asarco Tacoma Smelter Site

An interactive color map can be found at: <https://apps.ecology.wa.gov/dirtalert>



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

Basis for the Opinion: List of Documents

1. PBS Engineering and Environmental (PBS), *Lead and Arsenic Contaminated Soil Closure Report – Star Lake Elementary School and Totem Middle School*. May 12, 2023.
2. Ecology, *Opinion on the Proposed Cleanup of a Property Associated with the Asarco Tacoma Smelter Site*, July 6, 2020.
3. PBS, *Remedial Action Work Plan for Tacoma Smelter Plume Impact Star Lake Elementary School, 4014 S 270th Street, Kent, Washington*, May 4, 2020
4. PBS, *Star Lake Elementary School – Arsenic and Lead Soil Sampling*, February 14, 2020.
5. Kent Economic and Community Development, *Mitigated Determination of Nonsignificance*, June 25, 2019.
6. PBS, *Totem Middle School – Arsenic and Lead Soil Sampling*, November 30, 2018.
7. 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.

Enclosure D

Results of Soil Characterization and Confirmational Sampling

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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

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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
SL-1-28a	10/31/2019	0-6	3.25	6.10
SL-1-29a	10/31/2019	0-6	7.55	6.88
SL-1-30a	10/31/2019	0-6	24.5	51.6
SL-1-31a	10/31/2019	0-6	24.9	49.6
SL-1-32-a	10/31/2019	0-6	8.41	5.75

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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
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

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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
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

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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
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

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
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.

Results of the Confirmational Soil Sampling on the Property

Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
R1-1a	6/9/2020	0-6	16.5	5.66
R1-1aa	6/12/2020	0-6	14.9	11.6
R1-1b	6/9/2020	6-12	25.1	6.47
R1-1bb	6/12/2020	6-12	16.5	13.9
R1-2a	6/9/2020	0-6	6.63	6.97
R1-2b	6/9/2020	6-12	3.92	3.25
R1-3a	6/9/2020	0-6	4.56	4.85
R1-3b	6/9/2020	6-12	9.52	8.92
R1-4a	6/9/2020	0-6	4.01	4.12
R1-4b	6/9/2020	6-12	3.13	3
R1-5a	6/9/2020	0-6	11.5	13.9
R1-5b	6/9/2020	6-12	17.2	31.6

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
R1-6a	6/9/2020	0-6	3	4.51
R1-6b	6/9/2020	6-12	12.6	19
R1-7a	6/9/2020	0-6	25.4	28.9
R1-7aa	6/12/2020	0-6	14.5	19.5
R1-7b	6/9/2020	6-12	44.4	41.4
R1-7bb	6/12/2020	6-12	16.2	24.5
R1-8a	6/9/2020	0-6	11.3	10.4
R1-8b	6/9/2020	6-12	14.6	30.1
R1-9a	6/9/2020	0-6	2.6	3.31
R1-9b	6/9/2020	6-12	3.25	4.98
R1-10a	6/9/2020	0-6	5.28	3.17
R1-10b	6/9/2020	6-12	8.04	7.49
R1-11a	6/9/2020	0-6	6.82	11.2
R1-11b	6/9/2020	6-12	7.28	13.6
R1-12a	6/9/2020	0-6	18.9	3.85
R1-12aa	6/12/2020	0-6	15.2	7.01
R1-12b	6/9/2020	6-12	71.3	15.1
R1-12bb	6/12/2020	6-12	13.3	7.94
R1-13a	6/9/2020	0-6	10.8	9.05
R1-13b	6/9/2020	6-12	13.8	10.8
R1-14a	6/9/2020	0-6	14	24.8

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
R1-14b	6/9/2020	6-12	15.4	26
R1-15a	6/9/2020	0-6	17.8	34.7
R1-15b	6/9/2020	6-12	9.39	4.46
R1-16a	6/9/2020	0-6	11.4	12.2
R1-16b	6/9/2020	6-12	17.4	28.3
R2-1a	10/15/2020	0-6	12.7	19.1
R2-2a	10/15/2020	0-6	9.86	14.5
R2-3a	6/15/2020	0-6	20.4	23.6
R2-3aa	6/17/2020	0-6	17.9	24.3
R2-4a	6/15/2020	0-6	14.8	28.8
R2-5a	10/15/2020	0-6	9.55	10.1
R2-6a	10/15/2020	0-6	51.9	24
R2-6aa	11/10/2020	0-6	7.54	11.1
R2-7a	6/15/2020	0-6	24.9	27.8
R2-7aa	6/17/2020	0-6	30.5	24.8
R2-7aaa	10/23/2020	0-6	31.8	20.6
R2-7aaaa	11/10/2020	0-6	8.16	10.3
R2-8a	6/15/2020	0-6	14.8	26.7
R3-1a	6/11/2020	0-6	11.3	37.1
R3-2a	6/11/2020	0-6	9.6	32.1
R3-3a	6/11/2020	0-6	8.51	16.7

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Sample No.	Sample Date	Sample Depth (inches)	Arsenic (mg/kg)	Lead (mg/kg)
R3-4a	6/11/2020	0-6	7.63	14.7
R3-7a	6/11/2020	0-6	13.1	30
R3-8a	6/11/2020	0-6	8.87	25.2
R3-9a	6/11/2020	0-6	6.31	35.7
R3-10a	6/11/2020	0-6	9.13	20.5
R3-11a	6/11/2020	0-6	10.8	25
R3-12a	6/11/2020	0-6	7.98	20.8
RA-3-13a	2/7/2022	0-6	6.88	6.36
RA-3-14a	2/7/2022	0-6	3.29	4.99
RA-3-15a	2/7/2022	0-6	4.33	4.88
RA-3-16a	2/7/2022	0-6	4.11	5.46

Concentrations in **bold** represent values above the MTCA Method A cleanup level for unrestricted land use. ~~strike through~~ indicates soil represented by this sample was remediated by mixing in place after receipt of sample results.

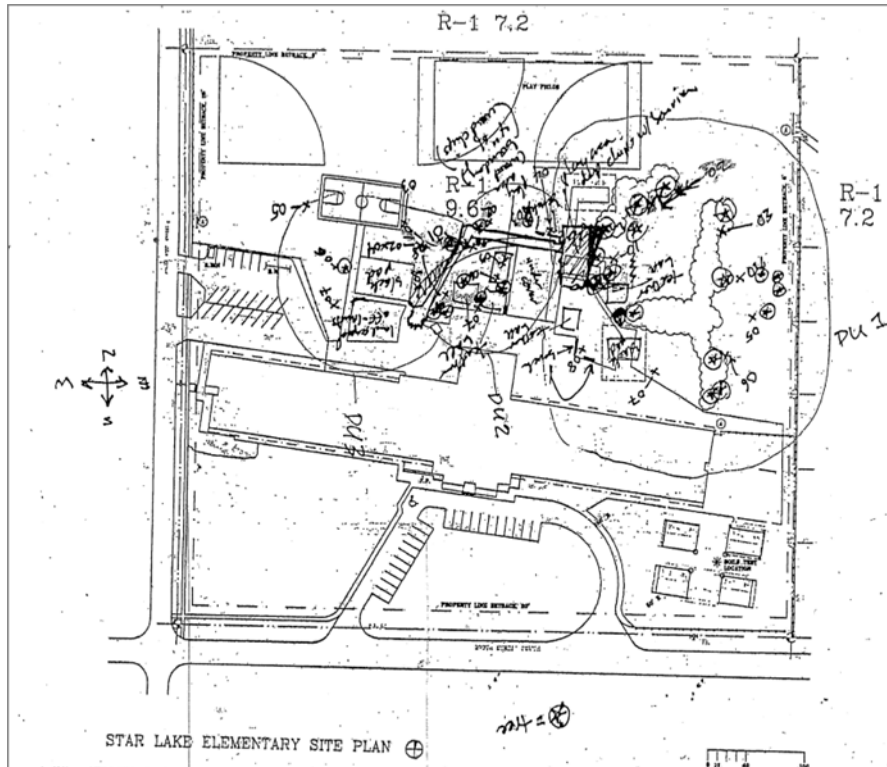
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Enclosure E

Soil Safety Program Documents for Star Lake Elementary and Totem
Middle School

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Soil Safety Program Soil Characterization Sampling for Star Lake Elementary



Federal Way School District

513 Star Lake Elementary

Arsenic Results

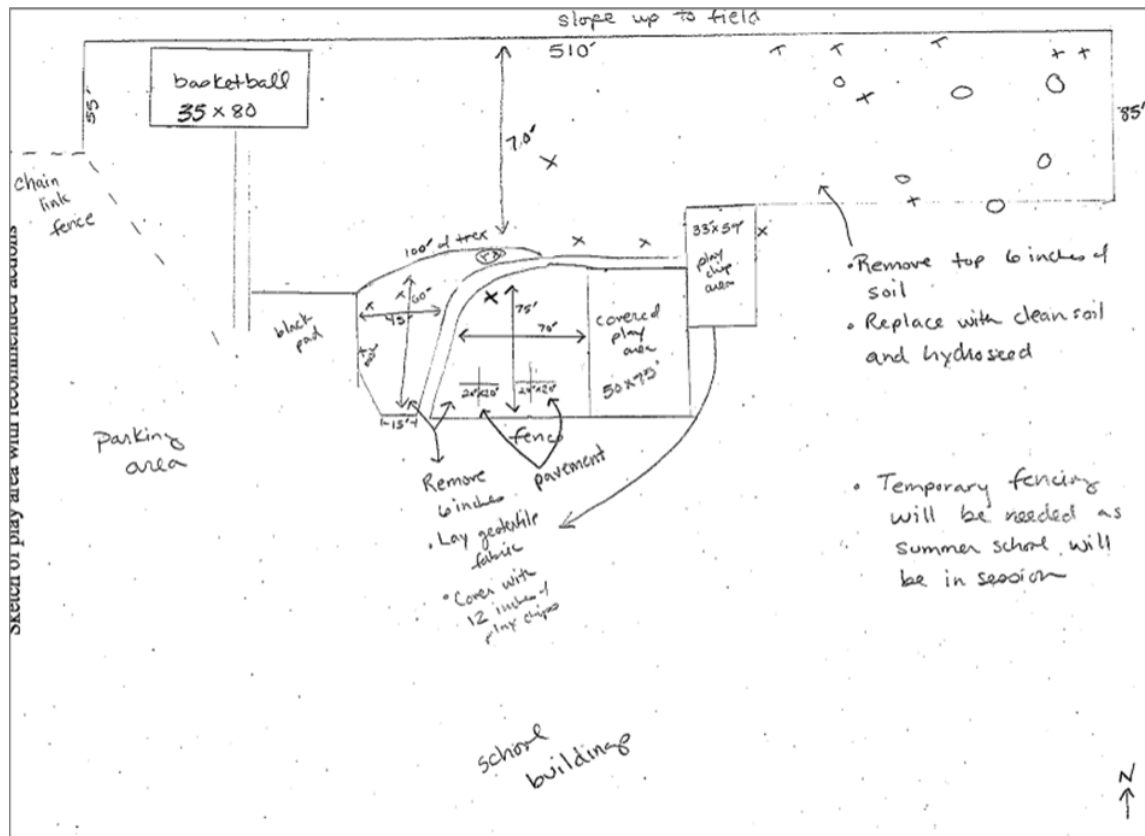
Boring	DU 1		DU 2		DU 3	
	0-2	2-6	0-2	2-6	0-2	2-6
1	18.50	17.20	20.50	22.00	13.80	59.70
2	51.20	42.30	133.00	83.40	14.30	8.21
3	7.11	3.59	44.20	46.60	27.70	14.50
4	16.40	16.40	43.30	70.60	9.83	22.80
5	24.90	14.10	28.60	7.04	24.60	23.80
6	7.16	4.16	27.10	19.70	24.00	11.50
7	11.80	13.00	6.71	7.84	7.72	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

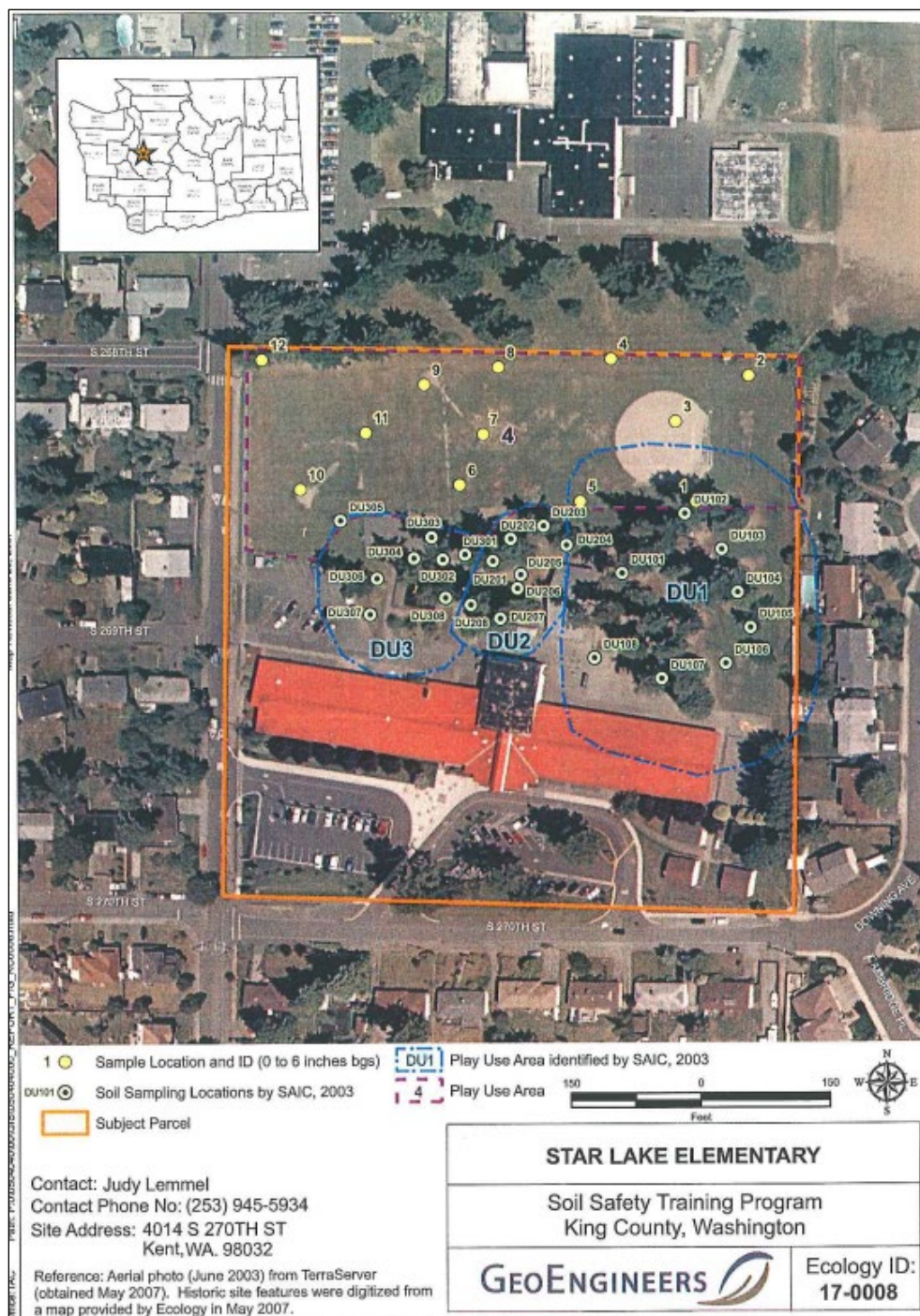
Boring	DU 1		DU 2		DU 3	
	0-2	2-6	0-2	2-6	0-2	2-6
1	38.70	43.10	29.10	43.80	25.90	152.00
2	116.00	102.00	252.00	183.00	29.80	15.50
3	11.00	6.66	111.00	77.10	70.20	29.40
4	29.80	24.70	93.80	63.50	8.13	14.70
5	58.30	24.10	61.00	10.40	42.50	42.00
6	13.40	7.86	63.50	32.30	62.50	22.90
7	18.80	14.70	12.30	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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Soil Safety Program Completed Cleanup Action for Star Lake Elementary



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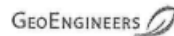
STAR LAKE ELEMENTARY
Ecology's Soil Safety Program - King County, WA.
Ecology ID: 17-0008
X, Y: 1198877, 744436

ARSENIC (mg/kg)	Play Area 4
Sample Location	5/30/2007
1	9.0
2	9.4
3	7.7
4	13
5	13
6	8.7
7	4.9
8	17
9	6.9
<hr/>	
Average	10.0
Max	17

LEAD (mg/kg)	Play Area 4
Sample Location	5/30/2007
1	16
2	16
3	13
4	29
5	30
6	14
7	4.8
8	42
9	9.1
<hr/>	
Average	19
Max	42

Notes: TAC\0050404000\Database\Soil_Safety_Program.mdb\MAIN REPORT-4
Sample depth interval = 0 to 6 inches below ground surface (bgs).

X, Y coordinates for the facility are provided in NAD 83 Washington State Plane South, feet.

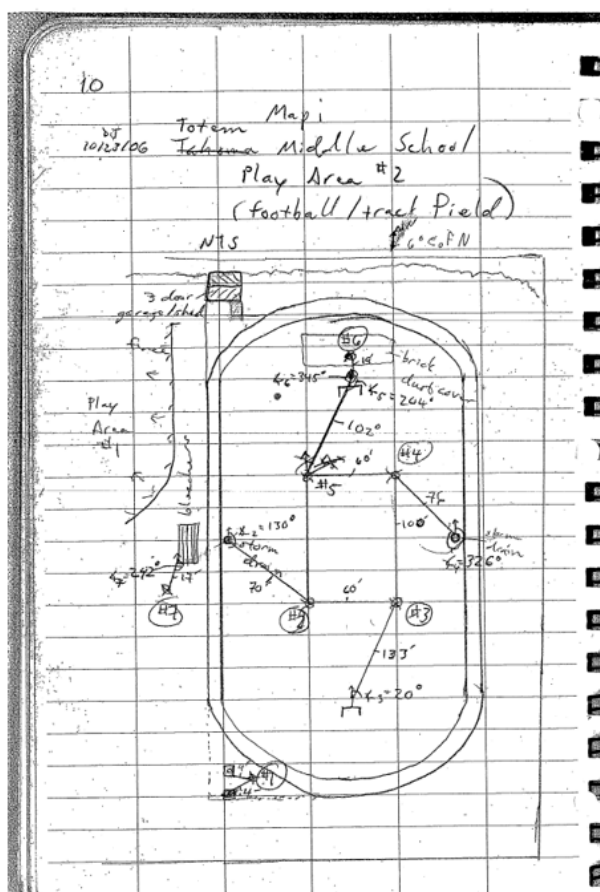
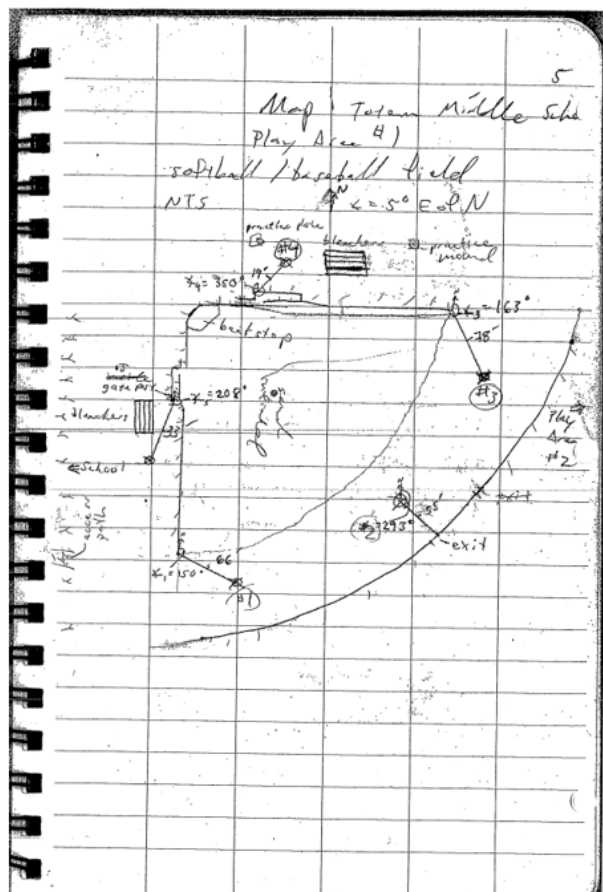


Friday, June 29, 2007

Page 1 of 1

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Soil Safety Program Soil Characterization Sampling for Totem Middle School



Federal Way School District

Totem Middle School

Arsenic Results

Boring	Play Area		
	1	2	3
1	11.00	8.00	
2	5.60	4.70	
3	6.30	3.10	
4	10.00	4.20	
5	4.60	3.00	
6		7.60	
7		3.10	
Average	7.50	4.81	
Max	11.00	8.00	

Lead Results

Boring	Play Area		
	1	2	3
1	17.00	20.00	
2	10.00	8.80	
3	10.00	5.40	
4	17.00	6.50	
5	7.50	5.70	
6		9.20	
7		4.50	
Average	12.30	8.59	
Max	17.00	20.00	