Environmental Investigation

Carpenter Road Site
Lacey, Washington

for
City of Olympia

July 3, 2017

GeoEngineers
Earth Science + Technology

Environmental Investigation

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July 3, 2017

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1.0 INTRODUCTION

This report was prepared to present the results of an investigation of the City of Olympia's (City) Carpenter Road site in Lacy, Washington (Figure 1). The investigation was performed to support redevelopment of the property to provide facilities for the City's solid waste management fleet operations. Redevelopment of the property is identified to include demolition of the existing approximately 18,250-square foot building currently utilized as an indoor firing range and constructing waste management operations facilities.

The investigation presented in this report was specifically performed to evaluate the following:

- Potential impacts on soil from firing range operations at the site.
- Potential impacts from firing range operations on structures and materials comprising the existing building.
- Potential impacts on soil on the northern portion of the property resulting from historical aerial deposition from the former ASARCO Smelter located in Tacoma, Washington (i.e., ASARCO Smelter Plume)[1].
- The results of this investigation, as well as a separate geotechnical investigation, indicated groundwater is not likely impacted, therefore groundwater was not investigated.

Additionally, an order-of-magnitude cost estimate for was prepared for performing remedial actions to support demolition of the building and remediation of contaminated soil.

The report sections provided below present the following:

- Background for the property and investigation approach;
- Summary of the field investigation activities and procedures;
- Results of the investigation;
- A description of observed impacts;
- Recommendations for remedial actions; and
- Order-of-magnitude cost estimate for remedial actions.

2.0 BACKGROUND

The subject property is located north of Martin Way and east of Carpenter Road in Lacy, Washington (Figure 1). The address for the existing building on the property is 6530 Martin Way. The southern portion of the property is generally flat. The elevation slopes up from the southern to the northern portion of the property. The elevation ranges from approximately 145 feet in the southwest portion of the property to approximately 220 feet in the northeast portion of the property (Opsis Architecture 2017) (Figure 2).

[1] The whole site is within the ASARCO smelter plume. However, project plans only include soil excavation and potential off-site disposal from the northern portion of the site.

The northern portion of the property is undeveloped and covered by trees and shrubs. The central portion of the property is the current location of an indoor firing range that operates within an approximately 18,250-square foot metal building. The eastern portion of the property is currently used for storage of solid waste dumpsters.

Hummocky soil is observed to be present in two areas. One location of hummocky soil is north of the existing building and the second location is northeast of the building. The soil in these two areas was observed to have different gradational characteristics than soil observed in other areas of the property that is interpreted to be soil native to the property. Therefore, the soil present in these two areas is assumed to be soil piles that were imported to the property (i.e., fill).

The building in the central portion of the property is comprised of metal framing, metal roofing, and metal siding on the south side. Earthen walls are present on the west, north and east sides of the building and the soil comprising the earthen walls slopes up from the floor of the building to within between approximately 2 to 5 feet from the ceiling. An approximate 5-foot wall comprised of ecology blocks or wood is present at the base of the earthen walls at the floor of the building on the west, northwest and southeast sides. The floor of the building is comprised of concrete pavement on the west side, and asphalt pavement on the east side. Multiple wood frame structures with sheetrock walls and ceilings are present inside the building. The wood frame structures include a meeting room, bathrooms, storage, and training rooms. Several cinder block walls are also present within the building including a wall separating the two firing lanes in the building (i.e., Firing Lane A on the west side and Firing Lane B on the east side).

Bullet trap structures constructed of heavy gage galvanized metal are located on the north end of each firing lane (i.e., a total of two [2] bullet trap structures). Chunks of foam are contained in the bullet trap structure located at the north end of Firing Lane A. The metal bullet trap structures are located in front of the earthen/soil wall located on the north side of the building. The earthen/soil wall located on the north side of the building was identified to have been the historical bullet stop feature and therefore, projectiles (i.e., bullets) were previously fired into the soil wall on the north end of the building.

A ventilation system is present in the building. The ventilation system has a series of eight (8) intakes and blowers/fans on the southern end of the building and three (3) exhaust fans/vents in the ceiling on the northern end of the building. The ventilation system introduces outdoor air and blows the air from the south end of the building toward the north end of the building where air is exhausted from the building through the three (3) ceiling fans/vents.

Equipment (i.e., targets, target holders, tables, chairs, etc.), storage containers (i.e., lock boxes, lockers, buckets, tubs, shelving, etc.) and miscellaneous items (i.e., garbage cans, fuel cans, heaters, etc.) are present within the building and other rooms within the building. The equipment, storage containers, and miscellaneous items appear to be the property of the facility operators or other parties that utilize the firing range.

3.0 FIELD INVESTIGATION ACTIVITIES

This section presents an overview of field investigation activities performed at the site. Additional detail concerning the investigation approach and field activities performed in each specific area of the site are provided in Section 4.0.

Investigation activities were performed at the site on April 18, 19, and 24, 2017. A total of 16 hand auger borings were performed inside and outside the building on April 18 and 19. A total of four (4) test pits were excavated north and northeast of the building on April 18. A total of nine (9) direct push borings were performed outside the building on April 24. The investigation locations are presented on Figures 3 through 6. The samples that were collected and results of field screening and laboratory analysis of selected samples are presented in Tables 1 through 5.

Hand augers HA-1 through HA-6 were advanced outside the building near the ends of building downspouts near the north end of the building to assess the potential for soil contamination deposited from roof runoff water contaminated due to indoor firing range activities. As described above, the ventilation system moves air from inside the building to vents located on the northern end of the roof.

Hand augers HA-7 through HA-14 were advanced inside the building into the earthen/soil slopes on the west, north, and east sides of building to assess the potential for soil contamination from firing range activities. Hand augers HA-15 and HA-16 were advanced beneath the pavement floor of the building to assess whether firing range activities had been performed on the soil surface prior to paving of the floor. The hand augers were advanced after the asphalt pavement was removed by an asphalt cutting tool.

Hand augers were advanced to approximately 18 to 24 inches below ground surface (bgs). The sample screening and collection methodology generally included advancing the hand auger in approximate six (6) inch intervals, removing the hand auger, depositing soil collected in the auger on clean disposable plastic sheeting, and field screening the soil. Field screening included visual and X-ray fluorescence analyzer (XRF[2]) techniques. After a complete soil column was excavated, soil samples were collected from the depths of 0 to 6 inches, 6 to 12 inches, 12 to 18 inches or 18 to 24 inches (Tables 3 and 4).

The test pits were excavated to depths of 2 to 4 feet bgs into hummocky soil piles using a backhoe. Test pit field screening and sampling was performed to assess the potential for soil contamination in suspected imported soil. Sample screening and collection methodology included excavating the test pit to up to four feet bgs and then field screening the soil in the sidewall of the test pit. Samples for laboratory analysis were then collected from sidewalls that were representative of fill observed in the test pit (Table 2). Test pits were backfilled with the excavated soil after sampling.

Direct push borings were advanced to approximately 15 feet bgs using a limited access track-mounted direct push probe rig. Borings B-1 through B-3 were advanced in the northern portion of the site to assess potential soil contamination from aerial deposition from the historical Tacoma ASARCO Smelter. Borings B-4 through B-9 were advanced around the building to assess potential extent of soil contamination from firing range activities due to ventilation onto adjacent soil and/or ventilation onto the roof and runoff from the roof via stormwater through building down spouts. The sample collection and screening methodology included advancing the boring and collecting cores in 5-foot intervals, removing the disposable PVC sleeve from the core, cutting the PVC sleeve open, and examining the soil. Soil was field screened using visual and XRF techniques, and soil samples were collected from approximate depths of 0 to 6 inches, 6 to 12 inches,

[2] XRF consists of a hand-held field screening device that can provide estimates of metals concentrations in soil to assist in sample selection for laboratory analysis. Regulatory decisions are based on the laboratory results, not the XRF results.

24 to 30 inches, and 60 to 66 inches (Tables 1 and 4). All borings were backfilled by a licensed driller in accordance with Washington State law.

Selected samples were submitted to the laboratory for analysis of total Resource Conservation and Recovery Act (RCRA) 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) as well as antimony, copper and nickel using test methods United States Environmental Protection Agency (EPA) 6020A and EPA 7471A. Composite samples were also prepared from portions of discrete samples to preliminarily evaluate the soil for disposal purposes[3]. The composite samples were initially analyzed for total RCRA 8 metals and antimony, copper and nickel. Follow up analyses were performed on the composite samples using the toxicity characteristic leaching procedure (TCLP). TCLP analyses were performed for lead because total lead concentrations in the composite samples exceeded the "20 times rule" suggesting the possibility of leachable lead greater than the hazardous/dangerous waste toxicity characteristic criteria. TCLP analysis was not performed for other metals in the composite samples because the concentrations for other metals were less than the 20 times rule (Table 5).

The majority of the field equipment was disposable equipment which was disposed of after a single use. Non-disposable equipment included sampling spoons, the hand auger, and the direct push sampling equipment. Non-disposable equipment was decontaminated between holes in general accordance with the Sampling Plan, including wash with Alconox-based detergent and double rinsing with distilled water.

4.0 RESULTS AND RECOMMENDATIONS

The following sections present the conceptual site model, details concerning the investigation approach, results of the field investigation, and recommendations for remedial actions and disposal of contaminated soil and/or reuse of the soil for the following specific investigation areas:

- Northern portion of the property;
- Hummocky soil piles north and northeast of building;
- Soil within the building;
- Soil outside the building adjacent to ceiling vents; and
- Building components.

In the discussions below, the following lead threshold levels are used for comparison:

- Washington State (Puget Sound) background lead concentrations: 24 milligrams per kilogram (mg/kg)
- Model Toxics Control Act "Method A" cleanup level: 250 mg/kg
- Toxicity Characteristic criteria based on TCLP test: 5 milligrams per liter (mg/L)

[3] Additional sampling and analysis will be needed to dispose of soil when the project goes to construction.

4.1 Northern Portion of Property

The following summarizes the conceptual site model, investigation approach, results, and recommendations for soil on the northern portion of the property:

Conceptual Site Model

- Soil comprising the northern portion of the property is believed to be native soil.
- The potential exists for metals contamination in soil resulting from historical, aerial deposition from the Tacoma ASARCO Smelter Plume (https://fortress.wa.gov/ecy/smeltersearch/).
- Indicator metals of Tacoma ASARCO Smelter Plume contamination are arsenic and lead.
- Arsenic and lead contamination from aerial deposition is anticipated to be present at the surface of the native soil. However, contamination could be present at greater depths as a result of precipitation and infiltration of stormwater and subsequent transport to deeper soil. Contamination could also be present at greater depths if soil was historically disturbed.
- Historical disturbance is not known to have occurred. However, a detailed evaluation of property use was not performed as part of this investigation.

Investigation Approach

- Direct push soil borings were advanced at three (3) accessible locations in the northern portion of the property identified as B-1, B-2 and B-3 (Figure 3).
- Soil borings were advanced to 15 feet below bgs.
- Four (4) soil samples were collected from each boring at approximately 0-6, 6-12, 24-30 and 60-66 inches bgs (Table 1A).
- The four (4) samples were screened for arsenic, copper, lead and mercury using XRF to assess whether there were indications of Tacoma ASARCO Smelter Plume contamination and to support selection of samples for follow up laboratory confirmation analysis (Table 1A).
- Soil samples from the surface (i.e., 0-5 or 0-6 inches, Table 1B) at each location were selected for follow up, laboratory confirmation analysis for metals.
- Two additional samples from the depth interval below the surface soil (i.e., 6-8 or 6-12 inches, Table 1B) at borings B-1 and B-2 were selected for follow up laboratory analysis to evaluate lead measured by XRF and other metals concentrations below the surface at these locations.
- Metals analysis performed by the laboratory included total RCRA 8 metals and antimony, copper, and nickel.
- In an effort to expediently provide information to support the proposed redevelopment, the XRF screening and laboratory analyses were specifically performed to evaluate the following:
  - Whether soil has been impacted by Tacoma ASARCO Smelter Plume deposition on the northern portion of the property; and
  - If the material was impacted by Smelter Plume contaminants, the appropriate method for disposal of the material.

Results of the Field Investigation

- Tables 1A and 1B present the results from XRF screening and laboratory analysis, respectively, for soil present in the northern portion of the property.
- Soil present in northern portion of the property does not appear to be impacted by Tacoma ASARCO Smelter Plume contamination based on the following observations:
  - Arsenic and lead concentrations are less than soil background concentrations in Washington State (Table 1B).
- Soil present in northern portion of the property also does not appear to have elevated concentrations of other metals that would require disposal at a landfill if redevelopment necessitated removal from the property. This is based on the following observations:
  - Cadmium, chromium, copper, mercury, and nickel were not detected or were detected at concentrations less than soil background concentrations in Washington State (Table 1B).
  - Antimony, barium, selenium, and silver were not detected or were detected at concentrations two orders of magnitude less than MTCA cleanup levels (Table 1B). Note that background concentrations for these metals have not been identified for Washington State.

Conclusions and Recommendations

- Soil present in the northern portion of the property does not appear to be impacted by Tacoma ASARCO Smelter Plume contamination.
- It is believed, based on the results of the sampling and analysis performed as part of this investigation, that the soil on the northern portion of the property is suitable for beneficial reuse.

  Note that additional analyses may be required or warranted depending on the proposed reuse as characterization for contaminants, other than contaminants associated with the Tacoma ASARCO Smelter Plume deposition, was not performed as part of this investigation.
- It is recommended that the City require approval for any proposed beneficial reuse of the soil prior to removal of the soil from the northern portion of the property.

4.2 Hummocky Soil Piles Located North and Northeast of Building

The following summarizes the conceptual site model, investigation approach, results, and recommendations for the hummocky soil piles located north and northeast of the building:

Conceptual Site Model

- Hummocky soil is present in two separate areas on the property north and northeast of the building.
- The hummocky soil appears to be piles of soil deposited next to each other.
- The soil in these two areas was observed to have different gradational characteristics than soil observed in other areas of the property that is believed to be native soil.
- Therefore, the hummocky soil present in the two areas is believed to have been imported to the property.
- The source of the soil is not known. An evaluation of the potential source of the hummocky soil was not performed as part of this investigation.

Investigation Approach

- Two (2) test pits identified as ETP1 and ETP2 were excavated into the soil piles north of the building and two (2) test pits identified as ETP3 and ETP4 were excavated into the soil piles northeast of the building (Figure 4).
- The test pits were excavated through potential fill material to the inferred soil/native contact. Depths were 0-2 or 0-4 feet bgs.
- Soil from the full depth of the test pits was screened for arsenic, copper, lead and mercury using the XRF (Table 2A).
- One (1) sample was collected from each test pit at depths of 1-1.5 or 2-2.5 feet bgs for follow up, laboratory confirmation analysis for metals (Table 2B).
- Metals analysis performed by the laboratory included total RCRA 8 metals and antimony, copper, and nickel.
- In an effort to expediently provide information to support the proposed redevelopment, the XRF screening and laboratory analyses were specifically performed to evaluate the following:
  - Whether soil has been impacted by Tacoma ASARCO Smelter Plume deposition and/or firing ranging activities; and
  - If the material was impacted by Tacoma ASARCO Smelter Plume contaminants and/or firing range activities, the appropriate method for disposal of the material.

Results of the Field Investigation

- Tables 2A and 2B present the results from XRF screening and laboratory analysis, respectively, for the hummocky soil piles present north and northeast of the building.
- The soil present in piles north of the building is not believed to be impacted by firing range activities or Tacoma ASARCO Smelter Plume deposition based on the following observations for samples collected from test pits ETP1 and ETP2 (Table 2B):
  - Lead concentrations are generally low and below the MTCA cleanup level.
  - Antimony concentrations are generally low and below the MTCA cleanup level. Note that a background concentration for antimony has not been identified for Washington State.
  - Copper concentrations are less than soil background concentrations in Washington State.
  - Arsenic concentrations are less than soil background concentrations in Washington State.
- The soil present in piles northeast of the building is not believed to be impacted by firing range activities or Tacoma ASARCO Smelter Plume deposition based on the following observations for samples collected from test pits ETP3 and ETP4 (Table 2B):
  - Lead concentrations are low and less than soil background concentrations in Washington State.
  - Antimony concentrations are generally low and below the MTCA cleanup level. Note that a background concentration for antimony has not been identified for Washington State.
  - Copper concentrations are low and less than soil background concentrations in Washington State or below the MTCA cleanup level.
  - Arsenic concentrations are less than soil background concentrations in Washington State.

- Although soil metals concentrations were less than MTCA, selected metals (copper lead and mercury) were identified to be present at concentrations greater than Washington State background (see Table 2B).

  Note that mercury was measured at a concentration of 15 milligrams per kilogram (mg/kg) by XRF field screening in the sample from EPT3 and greater than the MTCA cleanup level (2 mg/kg) (Table 2A). However, the soil sample analyzed by the laboratory did not confirm the XRF results. The mercury concentration in the sample from EPT3 based on laboratory analysis was 0.080 mg/kg and is below the MTCA cleanup level (Table 2B).

Conclusions and Recommendations

- It is recommended that additional research be performed to identify the source of the soil piles located north and northeast of the building.
- Although the soil is not believed to be impacted by firing range activities or Tacoma ASARCO Smelter Plume deposition based on the results of this investigation, the soil contains metals at concentrations greater than background in Washington State.
- It is recommended, based on the data collected as part of this investigation, that the soil in piles present north and northeast of the building be utilized onsite as fill as part of redevelopment of the property.
- The source of the material is not known and characterization for contaminants other than contaminants known to be associated with firing range activities and Tacoma ASARCO Smelter Plume deposition was not performed.
- It is recommended that additional characterization be performed if the City wants to export the soil off site for disposal and/or off-site reuse.
- It is recommended that the City require approval for any proposed off-site reuse of the soil prior to removal of the soil from the property.

4.3 Components of the Building

The following summarizes the conceptual site model, investigation approach, results, and recommendations for the building components:

Conceptual Site Model

- The building components could include regulated building materials (i.e., asbestos, lead-based paint) or have been impacted by firing range activities that would require remediation or management prior to or during demolition.
- Impacts from the firing of guns/firearms could result from releases of metals into the environment by the following mechanisms:
  - Ejection/expulsion of gases and particulates from the gun/firearm as a result of the ignition of the primer which is a chemical reaction between several metals and the ignition of the gunpowder that propels the projectile.
  - Abrasion of the projectile, that is typically comprised of multiple metals, as it is shot out of the gun/firearm.
  - Abrasion of the projectile when the projectile encounters/penetrates the bullet trap mechanism that typically is a soil berm but can also be a metal structure or other materials.
  - Metal projectile components which frequently break apart on impact with the bullet trap mechanism.

- The metals most commonly associated with firing of guns/firearms include lead, antimony, barium, and copper.
- The particulates resulting from firing of guns/firearms are released into the air within the firing range building.
- The ventilation system at the firing range introduces outdoor air and blows the air from the south end of the building toward the north end of the building where air is exhausted from the building through three (3) ceiling fans/vents.
- The particulates settle out on the surface of soil, structures and other features in the firing range or are vented to the outside of the building through the ceiling vents.

Investigation Approach

- A regulated building survey was performed by Pacific Rim Environmental, Inc. on April 19, 2017 to evaluate the following:
  - Presence of asbestos containing materials;
  - Presence of lead in paint;
  - Assess lead concentrations on building components;
  - To support evaluation of remedial actions and disposal requirements for building materials; and
  - The report from the regulated building material survey is included in (Appendix A).
- Twenty-one (21) bulk samples were collected of suspect asbestos containing materials and analyzed at Pacific Rim's laboratory.
- Suspect asbestos-containing laminate mastic was identified on the bathroom walls (i.e., bonding the laminate to the walls) but was not tested because destructive sampling was required which may have caused significant damage to the bathroom walls. Therefore, sampling and testing of the mastic is warranted prior to demolition.
- XRF screening was performed on 15 interior painted surfaces to evaluate the presence of lead-based paint.
- Three (3) TCLP lead samples were collected from building components. Sample TCLP-1 was collected from Side A Floor material, TCLP-2 was collected from Side B Floor material, and TCLP-3 was collected as a composite sample of multiple building materials that would be removed as part of demolition. The samples were collected to assess disposal requirements for building materials.
- Three (3) wipe samples of dust were collected from the horizontal surface of components of the building that would be removed as part of demolition including the top of a ventilation system duct (WS-1), top of a training room (WS-2), and the top of an Ecology block (WS-3). The samples were analyzed for lead to assess the potential for lead contamination of surfaces due to gun range activities.

Results of the Field Investigation

- No samples contained asbestos at greater than 1 percent (%). Materials are positive for asbestos if they are found to contain greater than 1 percent.
- XRF screening did not identify lead based paint greater than 1.0 milligram per square meter (mg/m^2). A concentration of 1.0 mg/m^2 is the EPA/HUD standard.

- The results of TCLP analyses for lead on sample TCLP-1 of Side A floor pavement substantially exceeded the hazardous/dangerous waste criteria (75 mg/L compared to the criteria of 5 mg/L). The results of TCLP analyses for lead on sample TCLP-2 of Side B floor pavement was less than the criteria (0.4 mg/L compared to the criteria of 5 mg/L).
- The results of TCLP analysis for lead on the composite sample TCLP-3 of building materials exceeded the hazardous/dangerous waste criteria (21 mg/L in sample TCLP-3 compared to the criteria of 5 mg/L).
- The results of the three (3) wipe samples of dust identified elevated lead concentrations on the surface of components of the building that would be removed as part of demolition including the top of a ventilation system duct (WS-1 at 67,000 micrograms per square foot [µg/ft^2]), top of a training room (WS-2 at 21,000 µg/ft^2), and the top of an Ecology block (WS-3 at 14,000 µg/ft^2).

Conclusions and Recommendations

- Building materials were not identified to be positive for asbestos (i.e., building materials contained less than the threshold of 1 percent asbestos). However, suspect asbestos-containing laminate mastic was identified on the bathroom walls but was not tested. Therefore, sampling and testing of the mastic is warranted prior to demolition.
- Lead based paint greater than 1.0 mg/m^2 (the EPA/HUD standard) was not identified to be present.
- The results of TCLP analyses on building materials indicates that the building materials would designate as hazardous/dangerous waste and require treatment and disposal at a Subtitle C landfill.
- The results of wipe samples of dust identified that elevated concentrations of lead are present on the surface of components of the building that would be removed as part of demolition and remediation.
- The presence of elevated lead concentrations will require strict adherence to health and safety regulations specific to protection from and monitoring of lead throughout remediation and demolition activities.
- Building materials not being disposed of as hazardous/dangerous waste at a Subtitle C landfill will require some form of remediation (ex. washing, cleaning) to remove elevated lead concentrations prior to disposal, recycling or reuse.

4.4 Soil Inside the Building

The following summarizes the conceptual site model, investigation approach, results, and recommendations for soil inside the building:

Conceptual Site Model

- The conceptual site model for soil inside the building is the same as the conceptual site model for the building components described in Section 4.3.

Investigation Approach

- Ten (10) hand auger borings designated HA-7 through HA-16 were performed in the earthen/soil walls and floor within the building (Figure 5).
- Coring of the asphalt pavement floor was performed in HA-15 and HA-16 on the east side of the building (Firing Lane B) so that soil below the floor could be screened with the XRF and sampled for laboratory analysis. Coring was attempted on the west side of the building but the pavement on the west side, which was comprised of concrete over 8 inches thick in two layers, could not be penetrated by the available

equipment. This is not expected to affect the results of the investigation as the soil concentrations are expected to be similar under the building as long as the concrete floor was in place at the same time.

- The hand auger borings were advanced to between 18 and 24 inches bgs (Table 3A).
- Up to four (4) soil samples were collected from each boring at 0-6, 6-12, 12-18, and 18-24 inches bgs.
- The samples were initially screened for arsenic, copper, lead, and mercury using XRF (Table 3A).
- Additionally, the soil on the surface of the earthen/soil walls was screened using XRF at three (3) locations including HA-8, HA-11, and HA-13 and the soil at a depth of approximately 0.25 inches below the surface was screened using XRF at two (2) locations including HA-8 and HA-11 (Table 3A).
- Soil samples were selected from each hand auger boring for follow-up laboratory confirmation analysis for metals based on the XRF results (Table 3B).
- Composite samples (Comp C and Comp D) were also collected that comprised soil with lead concentrations greater than the MTCA cleanup level that requires remedial action under MTCA (Table 3B).
- Metals analysis performed by the laboratory included total RCRA 8 metals and antimony, copper, and nickel.
- Additionally, follow up TCLP analyses were performed on the composite samples Comp C and Comp D for lead because total lead concentrations in the composite samples exceeded the 20 times rule suggesting the possibility of leachable lead greater than the hazardous/dangerous waste toxicity characteristic criteria (Table 5). Note that TCLP analysis was not performed for other metals in the composite samples because the concentrations for other metals were less than the 20 times rule.
- In an effort to expediently provide information to support the proposed redevelopment, the XRF screening and laboratory analyses were specifically performed to evaluate the following:
  - Where soil has been impacted by firing range activities;
  - Preliminary extent of soil with concentrations greater than MTCA cleanup levels; and
  - The appropriate method of disposal for soil with concentrations greater than the MTCA cleanup levels.

Results of the Field Investigation

- Tables 3A and 3B present the results from XRF screening and laboratory analysis, respectively, for soil present inside the building.
- Soil present in the building has been impacted by firing range activities based on the following observations:
  - A thin, light to dark gray layer is visible on the surface of the earthen/soil walls in areas.
  - Lead is present in surface soil at concentrations greater than the MTCA Cleanup Level in borings HA-8, HA-9, HA-10, HA-11 and HA-12 based on results of XRF screening and laboratory analyses (Tables 3A and 3B).
  - Lead is present in subsurface soil at concentrations greater than the MTCA Cleanup Level in borings HA-9, HA-10, and HA-11 based on results of XRF screening and laboratory analyses (Tables 3A and 3B).
- Impacts from firing range activities are present in surface soil (i.e., upper several inches) throughout the northern portions of the west and east sidewalls based on the following observations:

- A thin, light to dark gray layer is visible on the surface of the earthen/soil walls on the west and east side.
- The measured lead concentration based on XRF screening at the surface at HA-8 is greater than the MTCA cleanup level on the surface of soil (1,379 mg/kg) (Table 3A).
- The lead concentration was measured by XRF to be an order of magnitude lower than the surface measurement, and also lower than the MTCA cleanup level at a depth of 0.25 inches (191 mg/kg) (Table 3A).

- In addition to surface area impacts, there are impacts from firing range activities that were detected in subsurface soil in several locations in the west sidewall. Furthermore, there may be additional deeper impacts present in subsurface soil in other areas of the west and east sidewalls based on the following observations:
  - The measured lead concentrations based on XRF screening and laboratory analysis at HA-9 is greater than the MTCA cleanup level at depths of 12 to 24 inches (Tables 3A and 3B).
  - Boring HA-9 is where soil was observed to have sloughed down to the bottom of the sloped wall.
  - Soil sloughing was observed at the base of the sidewalls at other locations on the west and east walls.
- Impacts from firing range activities were detected in subsurface soil in the north sidewall based on the following observations and information:
  - The measured lead concentrations based on XRF screening and laboratory analysis at HA-10 and HA-11 is greater than the MTCA cleanup level at depths of 6 to 18 inches (Tables 3A and 3B).
  - The north wall was previously the bullet trap for the firing range and therefore, projectiles were fired into the north wall and likely penetrated to depths of up to approximately 18 inches.
  - Additionally, soil was observed to be piled up and/or sloughed at the base of the slope.
- The TCLP lead concentrations of composite samples Comp C and Comp D were greater than the toxicity characteristic criteria for lead indicating that the soil will designate as hazardous/dangerous waste and will require treatment and disposal at a Subtitle C landfill (Table 5).
- The soil present beneath the floor does not appear have been significantly impacted by firing range activities based on the following observations:
  - Lead concentrations measured by XRF and laboratory analysis are less than the MTCA Cleanup Level.
  - The results of laboratory analyses indicate that arsenic, cadmium, chromium, copper, lead, mercury, and nickel are less than background concentrations in Washington state.
  - The results of laboratory analysis for antimony, barium, selenium, and silver were not detected or were detected at concentrations two orders of magnitude less than MTCA cleanup levels. Note that background concentrations for these metals have not been identified for Washington State.

Conclusions and Recommendations

- Soil comprising the west, north, and east earthen/soil walls in the building have been impacted by firing range activities and contain lead at concentrations greater than the MTCA CUL.
- The soil present beneath the floor does not appear have been significantly impacted by firing range activities.
- Remedial actions will be needed to remove soils with lead concentrations greater than the MTCA CUL.

- Soil that is removed will likely designate as hazardous/dangerous waste and require disposal in a Subtitle C landfill.

4.5 Soil Outside the Building

The following summarizes the conceptual site model, investigation approach, results, and recommendations for soil outside the building:

Conceptual Site Model

- The particulates resulting from firing of guns/firearms are released into the air within the firing range building.
- The ventilation system at the firing range introduces and blows air from the south end of the building toward the north end of the building where air is exhausted from the building through three (3) ceiling fans/vents.
- The particulates settle on the roof or soil adjacent to the building.
- Precipitation and stormwater transport metals to soil.

Investigation Approach

- Six (6) hand auger borings designated HA-1 through HA-6 were performed on the west and east sides of the building adjacent to the ceiling fans/vents and roof down spouts (Figure 6).
- Six (6) Direct push soil borings designated B-4 through B-9 were also advanced at locations on the west and east sides of the building adjacent to the ceiling fan/vents and roof down spouts (Figure 6).
- The hand auger borings were advanced to between 18 and 24 inches bgs (Table 4A).
- Direct push soil borings were advanced to 15 feet below bgs.
- Up to four (4) soil samples were collected from each hand auger boring at 0-6, 6-12, 12-18, and 18-24 inches bgs.
- Up to three (3) soil samples were collected from each boring at approximately 0-6, 24-30 and 60-66 inches bgs (Table 4A).
- The samples were initially screened for arsenic, copper, lead, and mercury using XRF (Table 4A).
- A soil sample was selected from hand auger boring HA-6 for follow up, laboratory confirmation analysis for metals based on the XRF results (Table 4B).
- Soil samples were selected from multiple depths from the surface from each direct push boring location for follow up, laboratory confirmation analysis for metals based on the XRF results (Table 4B).
- Composite samples were also collected from the hand auger borings that comprised soil with lead concentrations greater than the MTCA cleanup level that require remedial action under MTCA (Table 4B).
- Metals analysis performed by the laboratory included total RCRA 8 metals and antimony, copper, and nickel.
- Additionally, follow up TCLP analyses were performed on the composite samples Comp A and Comp B for lead because total lead concentrations in the composite samples exceeded the 20 times rule suggesting the possibility of leachable lead greater than the hazardous/dangerous waste toxicity characteristic criteria

(Table 5). Note that TCLP analysis was not performed for other metals in the composite samples because the concentrations for other metals were less than the 20 times rule.

- In an effort to expediently provide information to support the proposed redevelopment, the XRF screening and laboratory analyses were performed to evaluate the following:
  - Where soil has been impacted by firing range activities.
  - Preliminary extent of soil with concentrations greater than MTCA cleanup levels.
  - The appropriate method of disposal for soil with concentrations greater than the MTCA cleanup levels.

Results of the Field Investigation

- Tables 4A and 4B present the results from XRF screening and laboratory analysis, respectively, for soil present outside the building.
- Soil present outside the building has been impacted by firing range activities based on the following observations:
  - Lead is present in surface and subsurface soil at concentrations greater than the MTCA Cleanup Level in borings HA-1, HA-2, HA-3, HA-4 and HA-5 based on results of XRF screening and laboratory analyses (Tables 4A and 4B).
  - The lead concentrations greater than the MTCA Cleanup Level are present in soil in close proximity to the ceiling fans/vents that exhaust air from the firing range.
- The impacts to soil outside the building appear to be bounded based on the following observations:
  - The lead concentrations in HA-6, B-5 and B-6 on the west side of the building are less than the MTCA Cleanup Level (Table 4A and 4B).
  - The lead concentrations in B-8 and B-9 on the east side of the building are less than the MTCA Cleanup Level (Table 4A and 4B).
- The results of TCLP testing of the composite samples Comp A and Comp B had concentrations greater than the toxicity characteristic criteria for lead indicating that the soil will designate as hazardous/dangerous waste and will require treatment and disposal at a Subtitle C landfill (Table 5).

Conclusions and Recommendations

- Soil on the west and east sides of the building have been impacted by firing range activities.
- Remedial actions will be needed to remove soils with lead concentrations greater than the MTCA Cleanup Level.
- Soil that is removed will likely designate as hazardous/dangerous waste and require disposal in a Subtitle C landfill.

5.0 REMEDIAL ACTION APPROACH AND SCOPE

The following summarizes the currently identified approach and scope of remedial actions at the Carpenter Road property based on the results of the current investigation.

5.1 Overview

As identified in Section 4.0, remedial actions are required as part of demolition of the building and structures within the building as well as soil inside and outside the building that have been impacted by firing range activities. An overview of the key elements of the remedial action approach and scope include the following:

- Notification, coordination, and regulatory reporting to the Washington State Department of Ecology.
- Engineering design, preparation of remedial action construction plans and specifications, and completion of remedial action construction.
- The presence of elevated lead concentrations will require strict adherence to health and safety regulations specific to protection from and monitoring of lead throughout remediation and demolition activities.
- Remedial actions and demolition will need to be sequenced to minimize potential transport of lead contamination in the environment and cross contamination of materials and media.
- A preliminary sequence for remedial actions and demolition includes:
  - Demolition, remediation, and recycling of the ventilation system components.
  - Demolition and disposal of interior structures and ceiling insulation as hazardous/dangerous waste.
  - Demolition, remediation, and reuse of Ecology blocks.
  - Remediation of building components, as necessary, prior to demolition and recycling.
  - Excavation, stockpiling, disposal characterization, and landfill disposal of contaminated soil inside the building.
  - Excavation, stockpiling, disposal characterization, and landfill disposal of contaminated soil outside the building.
  - Demolition and disposal of the asphalt pavement as hazardous/dangerous waste.
  - Demolition, remediation, and recycling of concrete pavement and footings.
  - Demolition and recycling of the building.
- Remedial action construction management, monitoring and documentation.

Note that it is assumed that all existing equipment (i.e., targets, target holders, tables, chairs, etc.), storage containers (i.e., lock boxes, lockers, buckets, tubs, shelving, etc.) and miscellaneous items (i.e., garbage cans, fuel cans, heaters, etc.), and metal bullet stops (i.e., two heavy gage metal structures at end of each firing lane) and contents of the bullet stop(s) that are not part of the building structure or other structures within the building are the property of the facility operators or other parties and will be removed from the building prior to remediation and demolition. Also note that it is assumed that all materials and containers present outside the building that were not included in this investigation do not require remedial actions and will be removed or disposed of as part of other redevelopment activities.

An order of magnitude cost estimate for the identified remedial actions and demolition of the existing building based on the results of the investigation and sequencing described above is provided in Table 6. The total order of magnitude cost estimate for remedial actions and demolition is $1,867,000. The estimate includes a contingency of 30 percent (approximately $383,000) to account for currently unidentified site conditions and/or construction requirements. Examples of currently unidentified site conditions include a greater extent of contamination or other environmental conditions not identified as part of this investigation. Examples of

current unidentified construction requirements include additional management and/or monitoring required during construction to complete demolition, remediation, removal and disposal of site structures.

The following section and Table 6 provide additional information concerning the approach and scope of remedial actions as well as key assumptions for completing remedial actions at the site.

5.2 Additional Information and Assumptions for Remedial Actions

Additional information concerning the approach and scope of remedial actions as well as key assumptions for completing remedial action at the site include the following:

Regulatory Approach

- The release of contaminants as a result of firing range activities, requires notification, coordination, and reporting to Ecology and remediation in accordance with MTCA.
- There are three general approaches for addressing the investigation and remediation of the site under Ecology and MTCA requirements that include the following:
  - Independent Remedial Action
  - Formal Order (ex. Agreed Order)
  - Voluntary Cleanup Program (VCP)
- Each approach varies in the amount of coordination and reporting that is performed with Ecology during the investigation, remedial action selection and design, and remediation process which affects the duration needed to complete the process, the cleanup cost, and risk of Ecology acceptance of the cleanup. Additionally, only the formal order process provides protections from claims from a 3rd party.
- In general, a cleanup performed as an independent remedial action requires less coordination and reporting with Ecology; takes less time to perform the cleanup; has a higher risk of Ecology not accepting the cleanup because Ecology is minimally involved in the investigation, remedial action selection and design, and remediation process; and has a lower overall cost of cleanup.
- In general, a cleanup performed under a formal order includes the greatest amount of coordination and reporting with Ecology; takes the longest time to perform the cleanup; has the lowest risk of Ecology not accepting the cleanup because Ecology is involved throughout the investigation, remedial action selection and design; and has the highest overall cost of cleanup.
- In general, a cleanup performed under the VCP program lies between an independent remedial action and a cleanup under a formal order with respect to the extent of coordination with Ecology, time to get to cleanup, risk of Ecology not accepting the cleanup, and cost. Note however, that due to limits on funding of the VCP program, Ecology has instituted waiting lists for new projects entering the program which would significantly extend the schedule.
- Based on a preliminary evaluation and current understanding of the project schedule (i.e., the City is wanting to expedite the project) and understanding of contamination at the property based on the results of the current investigation, it is our opinion that the remedial action should be performed as an independent remedial action. Note that additional consideration by the City of the regulatory approach is warranted and should include consultation with legal counsel.

Ventilation System

- The ventilation system consists of a series of air intakes and blowers/fans on the southern end of the building and three (3) axial fans/vents in the ceiling on the northern end of the building.
- Assumptions for demolition, remediation and recycling of ventilation system components include the following:
  - Elevated lead concentrations are present on the surface of components of the ventilation system based on the results of wipe sample WS-1 (67,000 µg/ft^2) collected from the surface of a component of the system.
  - Remediation (ex. wet cleaning, vacuuming) is needed prior to transport off site for recycling to eliminate the potential for release of lead into the environment or human exposure.
  - The components of the ventilation system would be recycled as scrap metal.

Interior Structures and Ceiling Insulation

- Interior structures include the following:
  - Multiple wood frame structures with sheetrock walls and ceilings, doors, windows, lighting, etc. are present inside the building. The wood frame structures consist of a combination of rooms including a meeting room, bathrooms, storage, and training rooms.
  - A cinderblock wall separating the two firing lanes in the building (i.e., Firing Lane A on the west side and Firing Lane B on the east side).
  - Wood retaining wall on the west side of Firing Lane A.
- Ceiling insulation materials include the following:
  - Insulation batting on the ceiling of internal structures.
  - Insulation batting on the ceiling of the building.
- Assumptions for demolition and disposal of interior structures and ceiling insulation include the following:
  - The interior structures would currently designate as hazardous/dangerous waste based on TCLP results for the composite sample TCLP- 3 (21 mg/L) collected as part of the regulated building materials survey.
  - Remedial actions (ex. wet cleaning, vacuuming, scarification) are generally not applicable to this material and would likely not be very effective if applied to this material.
  - The cost of performing remedial actions on all or a part of the of the physical structures, testing prior to disposal to support a lower cost disposal (i.e., Subtitle D disposal), and segregation and management of material potentially requiring hazardous/dangerous waste (Subtitle C landfill) vs solid waste (i.e., Subtitle D landfill) disposal would essentially be similar to cost for disposing of the material as hazardous/dangerous waste.
  - Therefore, the material is assumed to be disposed of at a Subtitle C landfill as hazardous/dangerous waste.
  - The material would require treatment and macro encapsulation at the landfill prior to disposal.

Ecology Blocks

- Approximately sixty (60) Ecology blocks are present at the base of the earthen/soil walls on the west, east, and north sides of the building.
- Assumptions for remediation and reuse of the Ecology blocks include the following:

- Elevated lead concentrations are present on the surface of Ecology blocks based on the wipe sample WS-3 (14,000 µg/ft^2) collected from the surface of an Ecology block.
- Contaminated/potentially contaminated soil is present against the Ecology blocks where the earthen/soil walls have sloughed down onto the Ecology blocks.
- Remediation (ex. wet cleaning, vacuuming) is needed prior to transport for reuse to eliminate the potential for release of lead into the environment or human exposure.

Soil Inside the Building.

- Soil from the west, east, and north sidewalls requires remediation as described in Section 4.4. Figure 7 shows the area identified for remediation.
- Assumptions for remediation of contaminated soil inside the building include the following:
  - The remediation of soil on the west wall includes:
    - Removal of 6 inches of surface soil from across 110 feet of the sidewall.
    - Removal of sloughed soil at the base of the sidewall from 45 feet of the sidewall.
    - The estimated volume of in-place soil requiring remediation from the west sidewall is 60 cubic yards (cy).
  - The volume of soil requiring remediation on the east wall includes:
    - Removal of 6 inches of surface soil from 70 feet of the sidewall.
    - The estimated volume of in-place soil requiring remediation from the west sidewall is 30 cy.
  - The volume of soil requiring remediation on the north wall includes:
    - Removal of 18 inches of soil from 85 feet of the sidewall.
    - Removal of sloughed soil at the base of the sidewall from 45 feet of the sidewall.
    - The estimated volume of soil requiring remediation from the west sidewall is 150 cy.
  - The excavated soil from each sidewall will be stockpiled separately.
  - Sampling and analysis will be performed on each stockpile to further characterize the soil for disposal.
  - The soil on the earthen/soil walls inside the building requiring remediation currently designates as hazardous/dangerous waste based on TCLP results for the composite samples Comp C and Comp D.
  - Therefore, the material is assumed to be disposed of at a Subtitle C landfill as hazardous/dangerous waste.
  - The material would require treatment at the landfill prior to disposal.

Soil Outside the building

- Soil on the west and east sides of the building adjacent to the ceiling fans/vents and roof down spouts requires remediation as described in Section 4.5. Figure 8 shows the area identified for remediation.
- Assumptions for remediation of contaminated soil outside the building include the following:
  - The remediation of soil on the west side of the building includes:
    - Removal of soil from an area of 2,200 square feet (sf).
    - Removal of soil to an average depth of 18 inches.

        - The estimated volume of soil requiring remediation from the west side of the building is 125 cy.
    - The remediation of soil on the east side of the building includes:
        - Removal of soil from an area of 2,450 sf.
        - Removal of soil to an average depth of 18 inches.
        - The estimated volume of soil requiring remediation from the east side of the building is 135 cy.
    - The excavated soil from each side of the building will be stockpiled separately.
    - Sampling and analysis will be performed on each stockpile to further characterize the soil for disposal.
    - The soil on the west and east sides the building requiring remediation currently designates as hazardous/dangerous waste based on TCLP results for the composite samples Comp A and Comp B.
    - Therefore, the material is assumed to be disposed of at a Subtitle C landfill as hazardous/dangerous waste.
    - The material would require treatment at the landfill prior to disposal.

Asphalt Pavement Surfaces

- The floor on the east side of the building is comprised of asphalt pavement.
- Assumptions for demolition and disposal of asphalt pavement include the following:
    - Demolition and removal of asphalt pavement from an area of 700 sf.
    - The asphalt pavement is an average of 2 inches thick.
    - The estimated volume of asphalt pavement requiring demolition and disposal from the east side of the building is 30 cy.
    - It is assumed that this material currently designates as hazardous/dangerous waste based on TCLP results for the composite samples TCLP-3 collected as part of the building material survey.
    - Remedial actions (ex. wet cleaning, scarification) may not be effective if applied to this material.
    - The cost of performing remedial actions on the asphalt pavement, testing prior to disposal to support a lower cost disposal (i.e., Subtitle D disposal), and segregation and management of material potentially requiring hazardous/dangerous waste (Subtitle C landfill) vs solid waste (i.e., Subtitle D landfill) disposal would essentially be similar to or more than the cost for disposing of the material as hazardous/dangerous waste.
    - Therefore, the material is assumed to be disposed of at a Subtitle C landfill as hazardous/dangerous waste.
    - The material would require treatment and macro encapsulation at the landfill prior to disposal.

Concrete Surfaces

- The floor on the west and south sides of the building are comprised of concrete pavement. Other concrete footings and foundation structures are also present at the site.
- Assumptions for demolition and disposal of concrete pavement include the following:
    - Demolition and removal of concrete pavement from an area of 700 sf.
    - The concrete pavement is an average of 8 inches thick.
    - The estimated volume of concrete pavement requiring demolition and disposal from the west and south sides of the building is 190 cy.

- An estimated additional 100 cy of concrete is present as footings adjacent to the pavement floor.
- This material currently designates as hazardous/dangerous waste based on TCLP results for the composite TCLP-3 sample collected as part of the regulated building materials survey.
- Remedial actions (ex. wet cleaning) are applicable to this material and would be effective if applied to this material.
- The cost of performing remedial actions on the concrete pavement and footings, testing prior to disposal to support a lower cost disposal (i.e., recycling), and segregation and management of material potentially requiring hazardous/dangerous waste (Subtitle C landfill) vs recycling would be less than disposing of the material as hazardous/dangerous waste.
- Therefore, the material is assumed to be remediated and then recycled.

Building

- The building is comprised of metal structural supports and metal roofing and siding.
- Assumptions for remediation, demolition, and recycling of building components include the following:
  - Elevated lead concentrations are present on the surface of components of the building based on the results of wipe samples collected from other surfaces within the building.
  - Remediation (ex. wet cleaning, vacuuming) is needed prior to transport off site for recycling to eliminate the potential for release of lead into the environment or human exposure.
  - The components of the building would be recycled as scrap metal.

6.0 LIMITATIONS

We have prepared this report for the exclusive use of the City of Olympia for the Environmental Investigation of the Carpenter Road Site located in Lacey, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted environmental science practices for environmental investigations in this area at the time this report was prepared. The conclusions and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty, express or implied, applies to this report.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Table 1A

XRF Results - Northern Portion of Site

Carpenter Road Site

Lacey, Washington

Location	Depth (inches)	Arsenic		Copper		Lead		Mercury	
		Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)
B1	0 to 6	ND	<11	ND	<34	**16**	5	ND	<13
	6 to 8	ND	<10	ND	<35	ND	<13	ND	<10
	24 to 32	ND	<11	ND	<31	ND	<11	ND	<12
	60 to 66	ND	<9	ND	<33	ND	<13	ND	<12
B2	0 to 5	ND	<10	ND	<32	**24**	5	ND	<11
	6 to 12	ND	<9	ND	<32	ND	<12	ND	<10
	24 to 30	ND	<9	ND	<36	ND	<13	ND	<13
	60 to 66	ND	<10	ND	<34	ND	<11	ND	<15
B3	0 to 6	ND	<10	ND	<37	ND	<14	ND	<10
	6 to 12	ND	<10	ND	<34	ND	<14	ND	<12
	24 to 30	ND	<8	ND	<34	ND	<13	ND	<13
	60 to 66	ND	<9	ND	<32	ND	<13	ND	<12

Notes:

XRF = X-ray fluorescence

ppm = parts per million

ND = Not detected

Table 1B

Soil Analytical Results - Northern Portion of Site

Carpenter Road Site

Lacey, Washington

Location ID	Sample ID	Start Depth (Inches)	End Depth (Inches)	Analyte Units	Antimony mg/Kg	Arsenic mg/Kg	Barium mg/Kg	Cadmium mg/Kg	Chromium mg/Kg	Copper mg/Kg	Lead mg/Kg	Mercury mg/Kg	Nickel mg/Kg	Selenium mg/Kg	Silver mg/Kg
				MTCA CUL [1]	32	20	16,000	2	2,000	3,200	250	2	1,600	400	400
				Washington Background [2]	--	7	--	1	48	36	24	0.07	48	--	--
B-1	B-1-0-6-20170424	0	6		0.18 U	**2.6**	**40**	0.36 U	**19**	**12**	**4.0**	0.029 U	**25**	0.90 U	0.18 U
	B-1-6-8-20170424	6	8		0.17 U	**1.9**	**130**	0.33 U	**23**	**11**	**2.2**	0.031 U	**15**	0.84 U	0.17 U
B-2	B-2-0-5-20170424	0	5		**0.21**	**2.7**	**44**	0.42 U	**22**	**20**	**5.7**	0.033 U	**20**	1.0 U	0.21 U
	B-2-6-12-20170424	6	12		0.19 U	**4.4**	**61**	0.38 U	**34**	**30**	**3.3**	**0.031**	**33**	0.96 U	0.19 U
B-3	B-3-0-6-20170424	0	6		0.18 U	**2.7**	**65**	0.36 U	**16**	**13**	**5.1**	0.032 U	**19**	0.90 U	0.18 U

Notes:

[1] The lowest of the Model Toxics Control Act (MTCA) Method A or B Cleanup Levels (CULs). The chromium cleanup level of 2,000 mg/kg is the total chromium level.

[2] Washington State background metals concentration (Puget Sound Region) based on "Background Concentration of Metals in Washington State" (Ecology 1994)

Bold font indicates the analyte was detected

Table 2A

XRF Results - Hummocky Soil Areas

Carpenter Road Site

Lacey, Washington

Location	Depth (Feet)	Arsenic		Copper		Lead		Mercury	
		Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)
ETP1	0 to 4	ND	<16	**43**	13	**63**	7	ND	<15
ETP2	0 to 4	ND	<14	ND	<32	**47**	7	ND	<13
ETP3	0 to 2	ND	<10	ND	<33	ND	<13	**15**	5
ETP4	0 to 4	ND	<12	**53**	12	**31**	5	ND	<12

Notes:

XRF = X-ray fluorescence

ppm = parts per million

ND = Not detected

Table 2B

Soil Analytical Results - Hummocky Soil Areas

Carpenter Road Site

Lacey, Washington

Location ID	Sample ID	Start Depth (Feet)	End Depth (Feet)	Analyte / Units	Antimony mg/Kg	Arsenic mg/Kg	Barium mg/Kg	Cadmium mg/Kg	Chromium mg/Kg	Copper mg/Kg	Lead mg/Kg	Mercury mg/Kg	Nickel mg/Kg	Selenium mg/Kg	Silver mg/Kg
				MTCA CUL [1]	32	20	16,000	2	2,000	3,200	250	2	1,600	400	400
				Washington Background [2]	–	7	–	1	48	36	24	0.07	48	–	–
ETP1	E-TP1-2-2.5-20170418	2	2.5		**0.67**	**5.2**	**85**	**0.49**	**25**	**27**	**67**	**0.092**	**25**	1.1 U	0.22 U
ETP2	E-TP2-2-2.5-20170418	2	2.5		**0.30**	**3.5**	**57**	0.42 U	**18**	**18**	**28**	**0.034**	**16**	1.1 U	0.21 U
ETP3	E-TP3-1-1.5-20170418	1	1.5		**0.44**	**6.5**	**130**	0.48 U	**29**	**24**	**13**	**0.080**	**25**	1.2 U	0.24 U
ETP4	E-TP4-2-2.5-20170418	2	2.5		**0.95**	**2.8**	**88**	0.40 U	**20**	**38**	**24**	0.030 U	**19**	1.0 U	0.20 U

Notes:

[1] The lowest of the Model Toxics Control Act (MTCA) Method A or B Cleanup Levels (CULs). The chromium cleanup level of 2,000 mg/kg is the total chromium level.

[2] Washington State background metals concentration (Puget Sound Region) based on "Background Concentration of Metals in Washington State" (Ecology 1994)

Bold font indicates the analyte was detected

Gray shading indicates the concentration exceeds Washington State Background concentration

Table 3A

XRF Results - Inside Building

Carpenter Road Site

Lacey, Washington

Location ID	Depth (inches)	Arsenic		Copper		Lead		Mercury	
		Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)
HA-7	0 to 6	ND	<13	ND	<39	**23**	6	ND	<15
	6 to 12	ND	<14	ND	<35	**49**	6	ND	<14
	12 to 18	ND	<11	ND	<41	ND	<16	ND	<11
HA-8	Surface	--	--	--	--	**1,379**	--	--	--
	0.25	--	--	--	--	**191**	--	--	--
	0 to 6	ND	<10	ND	<38	ND	<14	ND	<14
	6 to 12	ND	<19	**97**	16	**30**	6	ND	<14
	12 to 18	**13**	4	**171**	18	ND	<15	ND	<14
HA-9	0 to 6	ND	<10	ND	<37	ND	<14	ND	<14
	6 to 12	ND	<13	**48**	13	**32**	6	ND	<16
	12 to 18	ND	<35	**112**	15	**413**	16	ND	<16
	18 to 24	ND	<15	**45**	13	**47**	7	ND	<13
HA-10	0 to 6	ND	<71	**138**	17	**1,988**	45	ND	<24
	6 to 12	ND	<49	ND	<40	**834**	25	ND	<18
	12 to 18	ND	<23	ND	<35	**188**	11	ND	<13
HA-11	Surface	--	--	--	--	**475**	--	--	--
	0.25	--	--	--	--	**191**	--	--	--
	0 to 6	ND	<23	ND	<37	**175**	11	ND	<15
	6 to 12	**37**	10	ND	<36	**328**	14	ND	<16
	12 to 18	ND	<13	ND	<34	**40**	6	ND	<13
HA-12	0 to 6	ND	<30	**51**	14	**293**	14	ND	<14
	6 to 12	ND	<10	ND	<33	ND	<13	ND	<13
	12 to 18	**21**	6	ND	<39	**85**	8	ND	<16
HA-13	Surface	--	--	--	--	**51**	--	--	--
	0 to 6	**18**	4	**36**	12	**24**	5	--	--
	6 to 12	ND	<16	ND	<44	**33**	7	ND	<16
	12 to 18	ND	<12	**40**	12	**33**	6	ND	<12
HA-14	0 to 6	ND	<17	**85**	14	**75**	7	ND	<15
	6 to 12	ND	<18	**49**	12	**88**	8	ND	<14
	12 to 18	ND	<22	**124**	16	**151**	10	ND	<17
HA-15	0 to 6	ND	<12	ND	<36	**19**	5	ND	<11
	6 to 12	ND	<10	**39**	13	**16**	5	ND	<15
	12 to 18	ND	<15	**169**	20	**33**	7	ND	<16
HA-16	0 to 6	**16**	4	ND	<39	ND	<15	ND	<14
	6 to 12	ND	<13	**71**	15	**23**	6	ND	<15
	12 to 18	ND	<14	**212**	18	**43**	6	ND	<14

Notes:

XRF = X-ray fluorescence

ppm = parts per million

ND = Not detected

Surface = An XRF reading performed on the surface of the soil

Table 3B

Soil Analytical Results - Inside Building

Carpenter Road Site

Lacey, Washington

Location ID	Sample ID	Start Depth (Feet)	End Depth (Feet)	Analyte Units	Antimony mg/Kg	Arsenic mg/Kg	Barium mg/Kg	Cadmium mg/Kg	Chromium mg/Kg	Copper mg/Kg	Lead mg/Kg	Mercury mg/Kg	Nickel mg/Kg	Selenium mg/Kg	Silver mg/Kg
				MTCA CUL [1]	32	20	16,000	2	2,000	3,200	250	2	16,000	400	400
				Washington Background [2]	--	7	--	1	48	36	24	0.07	48	--	--
HA7	HA7-0-6-20170419	0	6		**0.89**	**4.2**	**57**	0.37 U	**19**	**21**	**16**	**0.032**	**20**	0.92 U	0.18 U
HA8	HA8-0-6-20170419	0	6		**0.29**	**2.9**	**44**	0.40 U	**15**	**14**	**6.2**	0.030 U	**16**	1.0 U	0.20 U
HA9	HA9-18-24-20170419	18	24		**43**	**10**	**82**	0.36 U	**21**	**7,800**	**1,200**	0.029 U	**18**	0.89 U	**0.23**
HA10	HA10-0-6-20170419	0	6		**41**	**4.6**	**37**	0.36 U	**16**	**170**	**2,200**	0.029 U	**18**	0.91 U	0.18 U
HA10	HA10-12-18-20170419	12	18		**8.4**	**2.2**	**32**	0.36 U	**13**	**49**	**650**	0.027 U	**15**	0.90 U	0.18 U
HA11	HA11-12-18-20170419	12	18		**0.58**	**1.9**	**39**	0.40 U	**21**	**24**	**30**	0.031 U	**24**	1.0 U	0.20 U
HA12	HA12-0-6-20170419	0	6		**3.3**	**2.3**	**42**	0.39 U	**12**	**17**	**86**	0.029 U	**16**	0.96 U	0.19 U
HA13	HA13-0-6-20170419	0	6		**0.34**	**2.8**	**47**	0.38 U	**13**	**15**	**9.4**	0.030 U	**15**	0.94 U	0.19 U
HA14	HA14-12-18-20170419	12	18		**0.73**	**4.1**	**40**	0.41 U	**13**	**30**	**51**	**0.060**	**13**	1.0 U	0.20 U
HA15	HA15-0-6-20170419	0	6		**0.48**	**3.2**	**40**	0.39 U	**24**	**21**	**13**	0.027 U	**25**	0.97 U	0.19 U
HA16	HA16-12-18-20170419	12	18		**0.26**	**2.7**	**49**	0.40 U	**18**	**26**	**6.1**	**0.042**	**25**	0.99 U	0.20 U
COMP C	COMP C				**16**	**6.5**	**63**	0.39 U	**18**	**38**	**480**	0.029 U	**23**	0.98 U	0.20 U
COMP D	COMP D				**22**	**3.0**	**44**	0.39 U	**13**	**57**	**1,200**	0.027 U	**18**	0.97 U	0.19 U

Notes:

[1] The lowest of the Model Toxics Control Act (MTCA) Method A or B Cleanup Levels (CULs). The chromium cleanup level of 2,000 mg/kg is the total chromium level.

[2] Washington State background metals concentration (Puget Sound Region) based on "Background Concentration of Metals in Washington State" (Ecology 1994)

Bold font indicates the analyte was detected

Gray shading indicates the concentration exceeds Washington State Background concentration

Yellow shading indicates the concentration exceeds the MTCA CUL

Comp C was a composite of HA-9 0 to 6, 6 to 12, and 12 to 18 inches

Comp D was a composite of HA-10 0 to 6 inches and 6 to 12 inches and HA-11 0 to 6 inches and 6 to 12 inches.

Table 4A

XRF Results - Outside Building

Carpenter Road Site

Lacey, Washington

Location ID	Depth (inches)	Arsenic		Copper		Lead		Mercury	
		Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)	Reading (ppm)	Error (+/- ppm)
HA-1	0 to 6	**756**	44	**1,219**	38	**6,445**	108	**72**	14
	6 to 12	ND	<87	**370**	20	**4,080**	68	**32**	9
	12 to 18	**43**	14	ND	<43	**506**	20	ND	<17
HA-2	0 to 6	**128**	16	**90**	16	**2,919**	62	ND	<28
	6 to 12	**190**	28	**130**	16	**2,728**	55	ND	<28
	12 to 18	**152**	29	**92**	17	**2,377**	56	ND	<28
	18 to 24	**121**	28	**98**	17	**209**	51	ND	<26
HA-3	0 to 6	ND	<34	**477**	26	**380**	16	ND	<16
	6 to 12	ND	<18	**262**	20	**311**	14	ND	<11
	12 to 18	ND	<22	**69**	17	**94**	10	ND	<18
HA-4	0 to 6	**112**	31	**265**	24	**2,223**	58	ND	<29
	6 to 12	**298**	31	**458**	25	**3,139**	62	ND	<27
	12 to 18	**195**	26	**274**	24	**1,594**	44	ND	<28
HA-5	0 to 6	**66**	12	**95**	12	**676**	17	ND	<14
	6 to 12	ND	<33	**52**	13	**370**	15	ND	<16
	12 to 18	ND	<22	**51**	<12	**182**	<10	ND	<12
HA-6	0 to 6	**20**	6	ND	<33	**107**	8	ND	<12
	6 to 12	ND	<12	ND	<33	**42**	6	ND	<14
	12 to 18	ND	<15	ND	<37	**51**	7	ND	<13
B4	0 to 6	ND	<10	ND	<32	**14**	4	ND	<12
	24 to 30	ND	<9	ND	<32	ND	<13	ND	<13
B5	0 to 6	ND	<9	ND	<34	**32**	6	ND	<12
	24 to 30	ND	<11	ND	<32	**84**	9	ND	<10
	48 to 60	ND	<10	ND	<31	**14**	5	ND	<13
B6	0 to 6	ND	<10	ND	<32	**14**	5	ND	<13
	24 to 28	ND	<10	ND	<36	ND	<14	ND	<11
	60 to 66	ND	<10	ND	<35	ND	<12	ND	<13
B7	0 to 6	ND	<14	**50**	13	**51**	6	ND	<14
	24 to 30	ND	<11	ND	<36	**22**	5	ND	<14
	60 to 66	ND	<9	ND	<35	ND	<12	ND	<11
B8	0 to 6	ND	<9	ND	<31	ND	<12	ND	<12
	24 to 30	ND	<10	ND	<34	ND	<14	ND	<14
B9	0 to 6	ND	<17	ND	<49	**32**	8	ND	<19
	24 to 30	ND	<9	ND	<28	ND	<12	ND	<12
	60 to 66	ND	<9	ND	<26	ND	<11	ND	<15

Notes:

XRF = X-ray fluorescence
ppm = parts per million
ND = Not detected

Table 4B

Soil Analytical Results - Outside Building

Carpenter Road Site

Lacey, Washington

Location ID	Sample ID	Start Depth (Feet)	End Depth (Feet)	Analyte	Antimony	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver
				Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
				MTCA CUL [1]	32	20	16,000	2	2,000	3,200	250	2	16,000	400	400
				Washington Background [2]	--	7	--	1	48	36	24	0.07	48	--	--
B-4	B-4-0-6-20170424	0	6		0.19 U	**2.6**	**43**	0.37 U	**16**	**17**	**4.0**	**0.030**	**16**	0.94 U	0.19 U
B-5	B-5-0-6-20170424	0	6		**3.4**	**2.1**	**45**	0.37 U	**16**	**36**	**230**	0.033 U	**16**	0.94 U	0.19 U
B-5	B-5-24-30-20170424	24	30		**1.8**	**3.4**	**58**	0.38 U	**27**	**35**	**120**	0.030 U	**23**	0.95 U	0.19 U
B-6	B-6-0-6-20170424	0	6		**0.21**	**2.8**	**40**	0.35 U	**25**	**19**	**6.6**	0.028 U	**21**	0.87 U	0.17 U
B-7	B-7-0-6-20170424	0	6		**0.27**	**2.3**	**51**	0.33 U	**14**	**14**	**17**	0.030 U	**13**	0.83 U	0.17 U
B-7	B-7-24-30-20170424	24	30		**3.4**	**1.8**	**46**	0.34 U	**21**	**66**	**260**	0.035 U	**19**	0.85 U	0.17 U
B-8	B-8-0-6-20170424	0	6		**2.4**	**3.5**	**63**	0.30 U	**26**	**24**	**240**	0.032 U	**22**	0.75 U	0.15 U
B-9	B-9-0-6-20170424	0	6		**0.38**	**3.6**	**73**	0.37 U	**21**	**21**	**20**	0.032 U	**22**	0.91 U	0.18 U
HA6	HA6-0-6-20170418	0	6		**1.5**	**3.4**	**38**	0.43 U	**19**	**21**	**140**	**0.031**	**18**	1.1 U	0.21 U
Comp A	Comp A	0	6		**43**	**4.2**	**42**	0.44 U	**15**	**200**	**2,500**	0.036 U	**14**	1.1 U	0.22 U
Comp B	Comp B	0	6		**28**	**4.4**	**52**	0.47 U	**12**	**120**	**1,100**	**0.071**	**13**	1.2 U	0.24 U

Notes:

[1] The lowest of the Model Toxics Control Act (MTCA) Method A or B Cleanup Levels (CULs). The chromium cleanup level of 2,000 mg/kg is the total chromium level.

[2] Washington State background metals concentration (Puget Sound Region) based on "Background Concentration of Metals in Washington State" (Ecology 1994)

Bold font indicates the analyte was detected

Gray shading indicates the concentration exceeds Washington State Background concentration

Yellow shading indicates the concentration exceeds the MTCA CUL

Comp A was a composite of HA-1 0-6 inches, HA-2 0-6 inches, and HA-3 0-6 inches

Comp B was a composite of HA-4 0-6 inches and HA-5 0-6 inches

Table 5

Total and TCLP Lead Results - Composite Samples

Carpenter Road Site

Lacey, Washington

Location ID	Sample ID	Analyte Units	Lead mg/Kg	TCLP Lead mg/L
		MTCA CUL [1] /TCLP Criteria [2]	250	5
		Washington Background [3]	24	–
Comp A	Comp A		**2,500**	**20**
Comp B	Comp B		**1,100**	**32**
Comp C	Comp C		**480**	**7.7**
Comp D	Comp D		**1,200**	**77**

Notes:

[1] Model Toxics Control Act (MTCA) Cleanup Level (CUL) for lead (250 mg/kg)

[2] Hazardous/Dangerous Waste Toxicity Characteristic Criteria (5 mg/L)

[3] Washington State background metals concentration (Puget Sound Region) based on "Background Concentration of Metals in Washington State" (Ecology 1994)

Bold font indicates the analyte was detected

Yellow shading indicates the concentration exceeds the MTCA CUL

Orange shading indicates the concentration exceeds the Hazardous/Dangerous Waste Toxicity Characteristic Criteria

Comp A was a composite of HA-1 0-6 inches, HA-2 0-6 inches, and HA-3 0-6 inches

Comp B was a composite of HA-4 0-6 inches and HA-5 0-6 inches

Comp C was a composite of HA-9 0-6, 6-12, and 12-18 inches

Comp D was a composite of HA-10 0-6 inches and 6-12 inches, and HA-11 0-6 inches and 6-12 inches.

Table 6

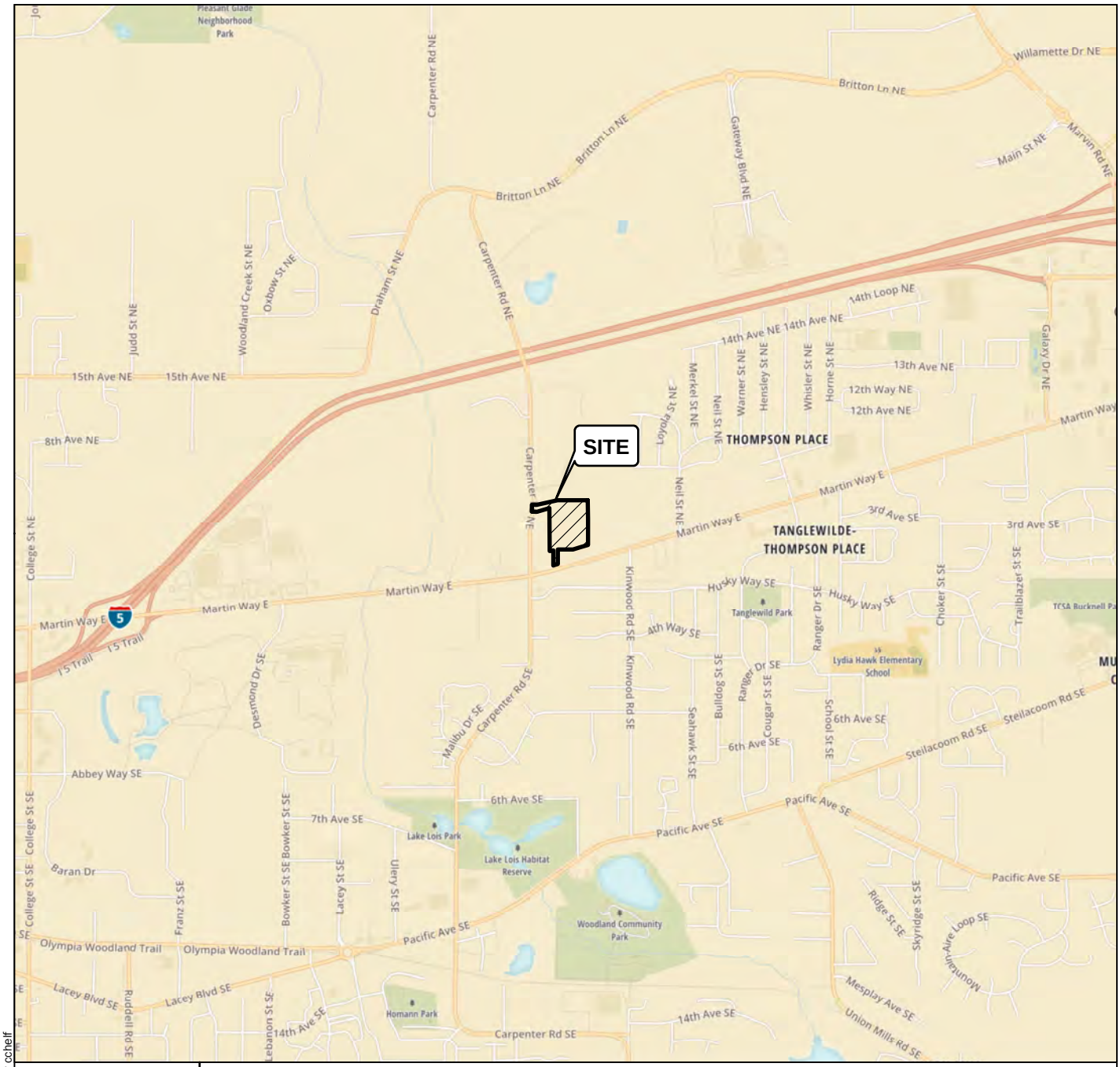
Order of Magnitude Remedial Action Cost Estimate

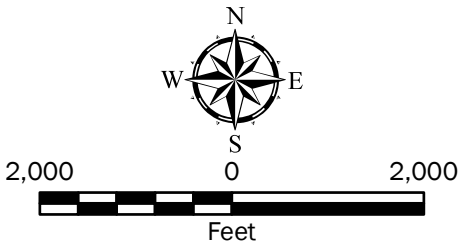
Carpenter Road Site

Lacey, Washington

Item No.	Description	Quantity	Unit	Unit Price	Amount	Notes and Assumptions
REMEDIAL ACTIONS						
Mobilization and Demobilization						
1	Mobilization/Demobilization	1	LS	$89,490	$89,490	Assumed cost for Contractor mobilization to and demobilization from property to perform remedial actions. Assumed to be 10 percent of construction cost.
Temporary Facilities and Site Controls						
2	Temporary Facilities	1	LS	$15,000	$15,000	Assumed cost for facilities and site controls to include a construction trailer, portable toilet, and necessary utilities (ex. power, water, etc.).
3	Site Security and Temporary Erosion and Sediment Control (TESC)	1	LS	$30,000	$30,000	Assumed cost to establish and maintain security fencing and TESC BMPs during remedial actions to protect the environment from lead present at the property.
Health and Safety						
4	Health and Safety	1	LS	$50,000	$50,000	Assumed cost to establish, monitor, and maintain health and safety measures including air monitoring to protect worker safety from exposure to lead present on structures and in media at the property during remedial actions. Assumes that this item will require a Certified Industrial Hygienist (CIH) to plan and perform air monitoring, preparation of health and safety plans, etc.
Demolition, Remediation, and Recycling of Ventilation System						
5	Remediation of Ventilation System Components	1	LS	$2,000	$2,000	Assumed cost for remediation (e.g. wet cleaning methods) of ventilation system surfaces to remove elevated concentrations of lead prior to transport and recycling.
6	Demolition, Transport and Recycling of Ventilation System Components	1	TON	$3,000	$3,000	Assumed cost for demolition, transport and recycling of ventilation system components. Assumes 2 truck loads will be required for transport of ventilation system components to a recycling facility.
Demolition and Disposal of Interior Structures and Insulation						
7	Demolition of Interior Structures and Ceiling Insulation	1	LS	$30,000	$30,000	Estimated cost for performing demolition of interior structures and removing insulation on ceiling of buildings. Assumes removal of insulation from ceiling of metal building and disposal of insulation with interior structures.
8	Transport and Disposal of Interior Structures/Ceiling Insulation to Hazardous Waste Landfill	8	Container	$6,200	$49,600	Estimated cost for transportation and diposal of demolished interior structures and ceiling insulation at a hazardous waste landfill. Assumes macro-encapsulation performed by landfill to treat and contain lead prior to landfill disposal.
Remediation and Reuse of Ecology Blocks						
10	Remediation of Ecology Blocks	1	LS	$7,000	$7,000	Assumed cost for remediation of ecology blocks to remove elevated concentrations of lead from the surfaces of the ecology blocks prior to transport for reuse. Lump sum cost based on an assumption of $2/SF for concrete surface cleaning.
11	Transport of Ecology Blocks for Reuse	1	LS	$2,000	$2,000	Assumed cost for transport of ecology blocks for reuse. Assumed 4 truck loads will be required for transport of ecology blocks.
Remedial Excavation and Disposal of Soil Inside Building						
12	Remedial Excavation and Stockpiling of Soil inside building	240	CY	$25	$6,000	Estimated cost for excavation of earthen/soil walls inside building to remove soil with lead concentrations greater than MTCA Cleanup Level. Assumes excavation of soil to depths of between 0.5 and 5 feet from earthen/soil walls. Assumes stockpiling of soil in up to three stockpiles established on existing pavement to allow stockpile sampling and analysis to characterize soil for disposal.
13	Stockpile Sampling and Analysis	1	LS	$5,000	$5,000	Estimated cost for performing stockpile sampling and analysis to characterize soil prior to disposal. Assumes sample analysis for RCRA 8 metals and copper and nickel. Assumes follow up TCLP analysis for lead.
14	Transport and Disposal of Soil	384	TON	$370	$142,080	Assumed cost for loading, transport, and disposal of soil (based on quote received from a landfill). Assumes that soil designated as Hazardous/Dangerous Waste will require disposal at Subtitle C landfill. Assumes 1.6 tons/cubic yard conversion factor for soil volume to weight.
Remedial Excavation and Disposal of Soil Outside Building						
15	Remedial Excavation and Stockpiling of Soil[3]	260	CY	$10	$2,600	Estimated cost for excavation of soil outside building to remove soil with lead concentrations greater than MTCA Cleanup Level. Assumes excavation of soil to depths on average to 2 feet. Assumes stockpiling of soil in two stockpiles to allow stockpile sampling and analysis to characterize soil for disposal.
16	Stockpile Sampling and Analysis	1	LS	$5,000	$5,000	Estimated cost for performing stockpile sampling and analysis to characterize soil prior to disposal. Assumes sample analysis for RCRA 8 metals and copper and nickel. Assumes follow up TCLP analysis for lead.
17	Transport and Disposal of Soil	416	TON	$370	$153,920	Assumed cost for loading, transport, and disposal of soil (based on quote received from a landfill). Assumes that soil designates as Hazardous/Dangerous Waste requiring disposal at Subtitle C landfill. Assumes 1.6 tons/cubic yard conversion factor for soil volume to weight.
Demolition and Disposal of Asphalt Pavement						
18	Asphalt Demolition	460	SY	$20	$9,200	Assumed cost for controlled demolition of asphalt pavement within the building to minimize cross-contamination (based on RS Means)
19	Transport and Disposal of Asphalt as Hazardous/Dangerous Waste	54	TON	$370	$19,980	Assumed cost for loading, transport, and disposal of demolished asphalt (based on quote received from a landfill). Assumes that asphalt designates as Hazardous/Dangerous Waste requiring disposal at Subtitle C landfill. Asphalt assumed to be 2 inches thick. Assumed 1.8 tons/cubic yard conversion factor for asphalt volume to weight. Assumes a quantity of 30 CY.
Demolition and Disposal of Concrete Pavement and Footings						
20	Remediation of Concrete Surfaces Prior to Demolition and Recycliing	9,634	SF	$2	$19,268	Assumed cost for cleaning concrete surfaces to remove elevated concentrations of lead from the surface of the concrete prior to demolition. Unit cost from PacRim.
21	Concrete Demolition	9,634	SF	$5	$48,170	Assumed cost for demolition of concrete pavement and footings adjacent to pavement (based on RS Means).

Item No.	Description	Quantity	Unit	Unit Price	Amount	Notes and Assumptions
22	Transport and Recycling of Concrete	522	TON	$15	$7,830	Assumed cost for transport and off-site recycling of demolished concrete (based on a quote received from a recycling facility for a recent project). Assumes variable thicknesses of concrete structures. Assumed 1.8 tons/cubic yard conversion factor for concrete volume to weight. Assumes a quantity of 290 CY.
23	Utilities Decommissioning and Demolition	1	LS	$10,000	$10,000	Assumed cost for decommissioning, demolition and disposal of utilities in remedial action areas. Assumed to include removing utilities within remedial action excavations and plugging the ends of stormwater and sewer pipes that are trunkaded at the limits of the excavations and disposal of utilities that are removed.
Demolition, Remediation and Recycling of Building Structure						
24	Remediation of Metal Building Components	1,824	SF	$2	$3,648	Assumed cost for remediation of components of the metal building to remove elevated concentrations of lead from the surface of the metal buiding components prior to demolition, transport, and recycling. Assumes 10% of the buding area needs remediation. Unit cost based on quote received from PacRim.
25	Demolition, Transport and Recycling of Building Components	18,240	SF	$15	$273,600	Assumed cost for demolition, transport and recycling of building components including metal roof, walls and structural components. Building is assumed to be 152 feet long by 120 feet wide. Unit cost based on quote received from PacRim.
	Construction Subtotal				**$984,386**	
Contractor Overhead and Taxes						
26	Contractor Overhead	10%	%		$98,438.56	Assumed to be 10 percent of construction subtotal.
27	Sales Tax	8.7%	%		$94,205.70	Assumed to be 8.7 percent of construction subtotal including contractor overhead.
CONSTRUCTION SUBTOTAL (INCLUDING CONTRACTOR OVERHEAD AND TAX)					**$1,177,030**	
28	Construction Management and Monitoring	10%	%		$98,438.56	Assumed cost for construction management tasks as well as monitoring and documentation of field activities and compliance with environmental requirements and remedial action construction reporting. Assumed to be 10 percent of construction subtotal.
CONSTRUCTION TOTAL					**$1,275,468**	
29	Contingency	30%	%		$382,640.53	The estimate includes a contingency of 30 percent (%) to account for currently unidentified or unanticipated site conditions and/or construction requirements such as discovery of additional contamination that was not identified as part of recent investigation, additional management and/or monitoring required during construction to complete demolition, remediation, removal and disposal of site structures, etc.
CONSTRUCTION TOTAL WITH CONTINGENCY					**$1,658,000**	
Indirect Costs						
30	Compliance with Washington State Department of Ecology and Model Toxics Cleanup Act (MTCA) Requirements	1	LS		$80,000	Assumed cost for preparing Remedial Investigation/Feasibility Study Report, Cleanup Action Plan and coodinating with Ecology in achieving No Futher Action (NFA) for the property.
31	Engineering Design, Permitting and Agency Authorizations	6 to 12%	%		$129,480	Assumed cost for preparing Engineering Design Report (EDR), construction plans and specifications, contractor solicitation bid package, Compliance Monitoring Plan, submittals for agency authorizations and approvals and coordination and communication with regulatory agencies. Assumes 12% of the project cost for first $500,000 and 6% of the project cost thereafter.
	Subtotal				**$209,480**	
TOTAL PROJECT COST					**$1,867,000**	





Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 1

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Notes:
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Data Source: Base map provided by Opsis Architecture

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Site Plan

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 2

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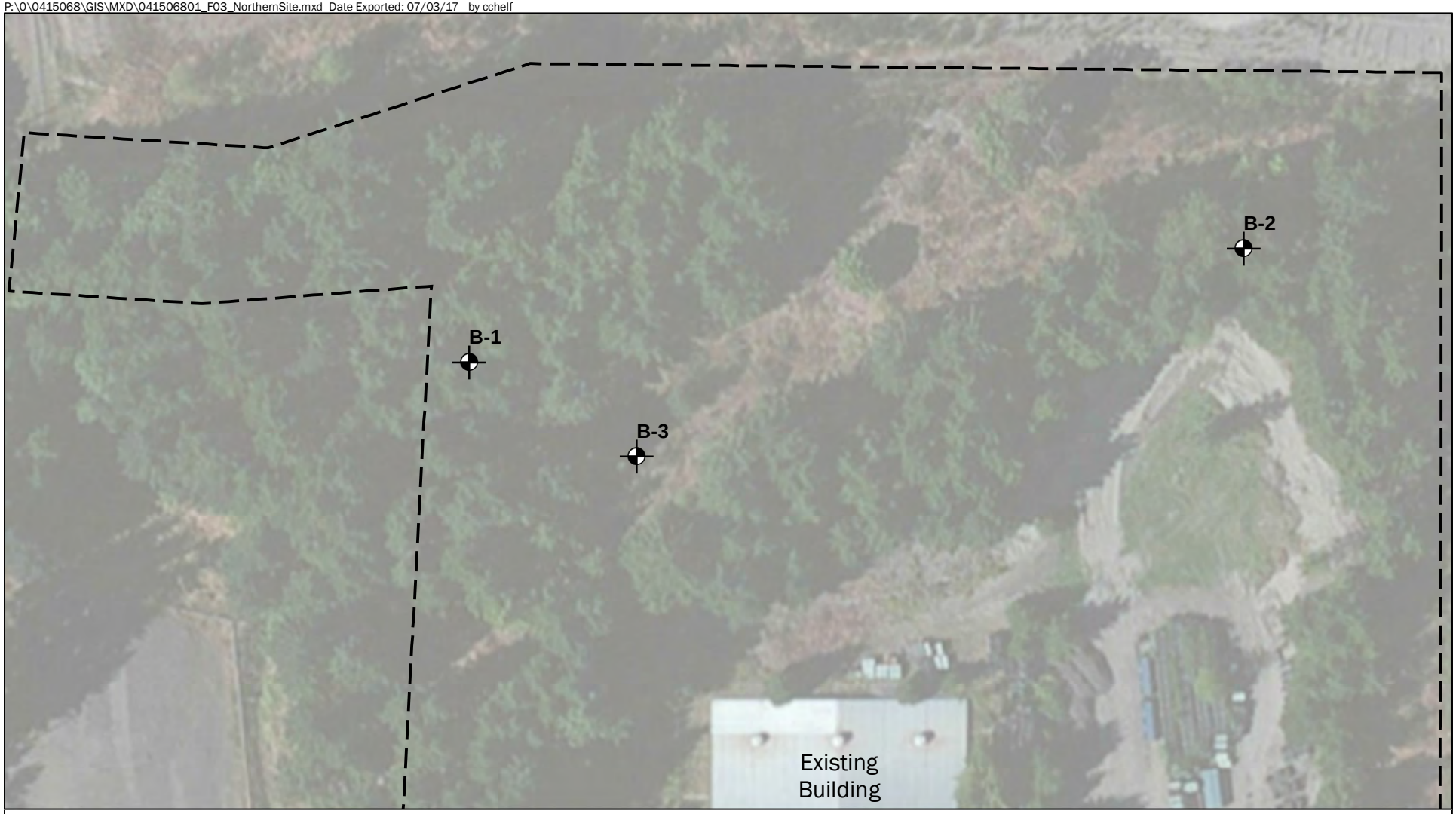

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Data Source: Aerial Image from ArcGIS Data Online

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Legend

B-1 Approximate Location of Direct Push Boring

N W E S

100 0 100

Feet

Sampling Locations – Northern Portion of Site

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 3

P:\0\0415068\GIS\MXD\041506801_F04_HummockySoil.mxd Date Exported: 07/03/17 by cchelf

Notes:

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Data Source: Aerial Image from ArcGIS Data Online

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Legend

EPT1 Approximate Location of Test Pit

N W E S

70 0 70

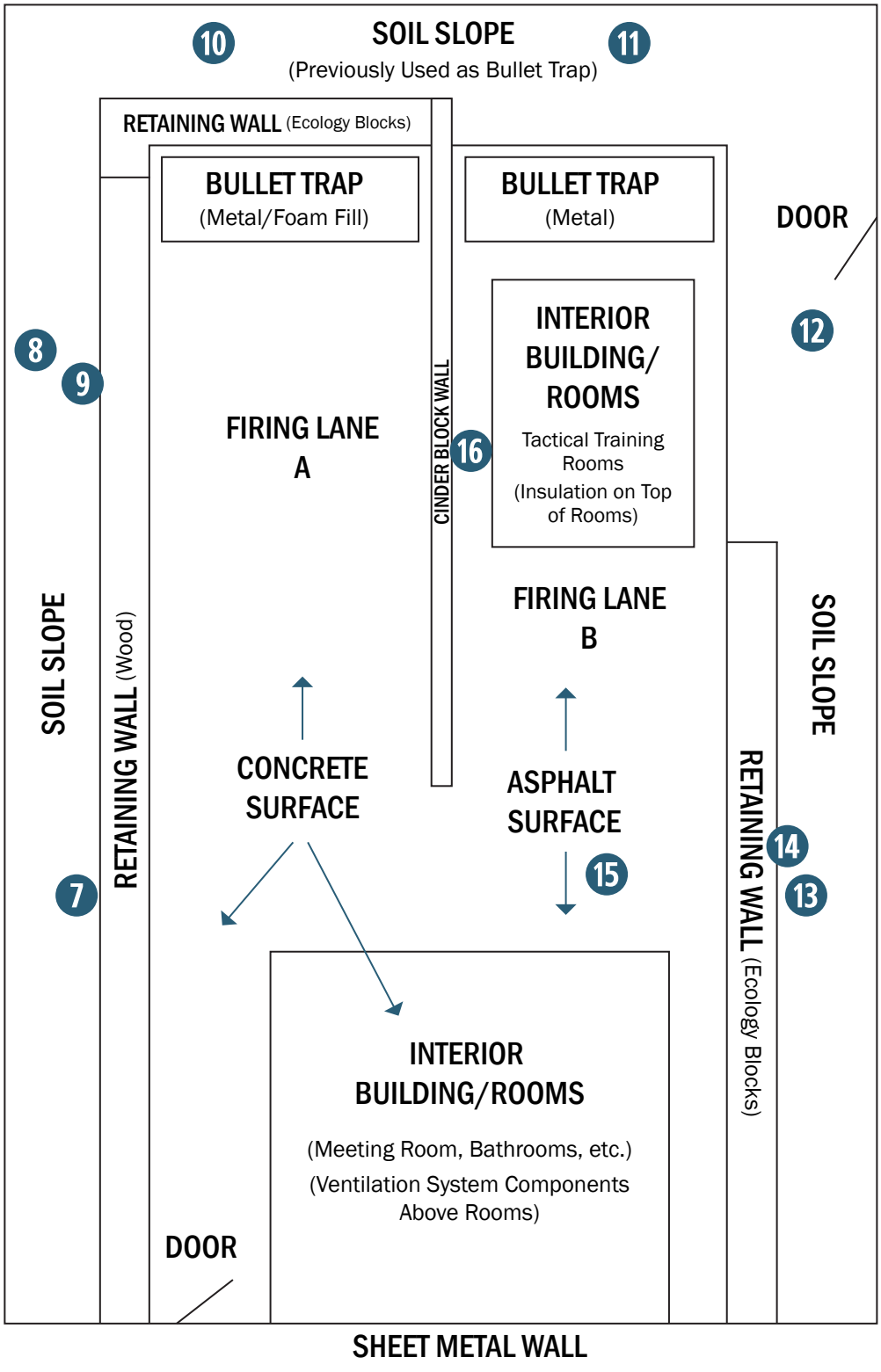
Feet

Sampling Locations – Hummocky Soil Piles

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 4



N
W E
S

Not to Scale

Legend

8 = Approximate location of Hand Auger Boring HA-8

Notes:

1. The location of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source:

Sampling Locations - Inside Building

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 5

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Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base map provided by the City of Olympia.

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Legend

B-1 — Approximate Location of Direct Push Boring

HA-1 — Approximate Location of Hand Auger

N
W E
S

40 0 40
Feet

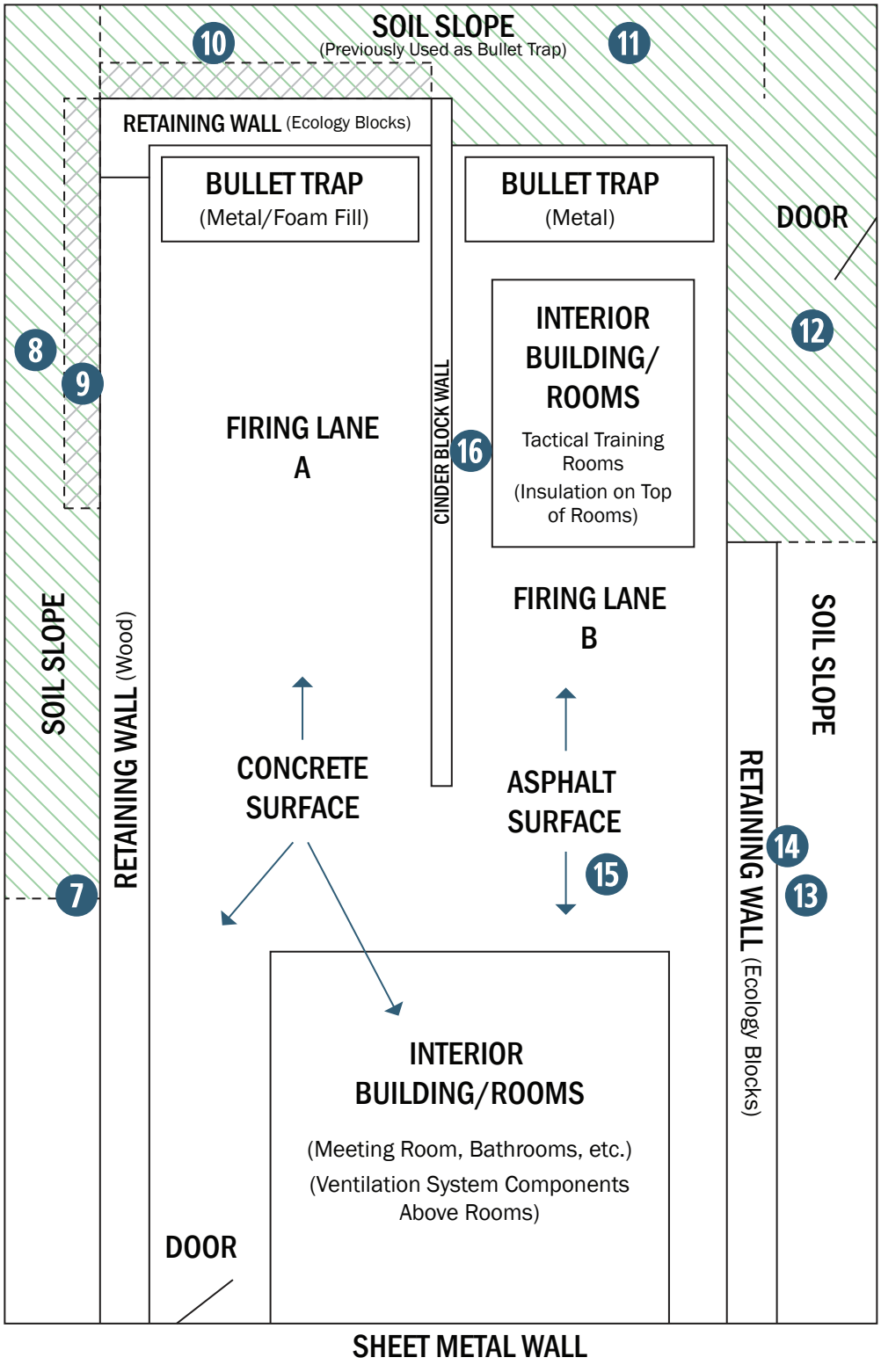
Sampling Locations – Outside Building

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 6

P:\0\04150683\GIS\MXD\04150683_F06_OutsideBuilding.mxd Date Exported: 07/03/17 by cchelf



N
W E
S

Not to Scale

Legend

8 Approximate location of Hand Auger Boring HA-8

Surface Soil Removal/ Remediation Area

Slough Soil Removal/ Remediation Area

Notes:

1. The location of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source:

Soil Remediation - Inside Building

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 7

P:\0\0415068\Graphics_Misc\041506801_F07_SoilRemediation_InsideBuilding.ai Exported 05/25/2017 by spride

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Base map provided by the City of Olympia.

Projection: WGS 1984 Web Mercator Auxiliary Sphere

Legend

Soil Removal/Remediation Area

B-1 Approximate Location of Direct Push Boring

HA-1 Approximate Location of Hand Auger

N
W E
S

40 0 40
Feet

Soil Remediation – Outside Building

Carpenter Road Site
Lacey, Washington

GeoEngineers

Figure 8

P:\0\04150683\GIS\MXD\04150683_F08_SoilRemediationOutsideBuilding.mxd Date Exported: 07/03/17 by cchelf

APPENDIX A
Regulated Building Materials Survey

PACIFIC RIM ENVIRONMENTAL, INC.

Regulated Building Materials Survey

OPD Firing Range

6530 Martin Way
Lacey, WA

Performed for:

GeoEngineers, Inc.
8410 154th Avenue Northeast
Redmond, WA 98052

Prepared By:

Todd Carter, AHERA Inspector
DOC Lead Risk Assessor

Date Prepared: 05/04/2017 PacRim #: 16057

6510 Southcenter Blvd., Ste. #40
Seattle, WA 98188

pacrimenv.com

Phone: (206) 244-8965
Toll Free 800-245-8965

Table of Contents
OPD Firing Range | 6530 Martin Way | Lacey, WA

Section 1.0 Scope of Work
OPD Firing Range | 6530 Martin Way | Lacey, WA

On April 19, 2017, Todd Carter, an AHERA Building Inspector and DOC Certified Lead Inspector, of Pacific Rim Environmental, Inc. (PacRim) performed a regulated building material survey at the subject property located at 6530 Martin Way in Lacey, WA.

Site: The subject property is occupied by an approximately 18,270 square foot firing range and storage shed.

Limitations: No inspection or report limitations noted.

Field inspection, data collection, and report generation were performed according to the following **Scope of Work**:

> Provide AHERA Certified Building Inspector to perform a building inspection in accordance with Washington Administrative Code (WAC) 296-62-07721 and current PSCAA regulations. Provide a State of Washington Department of Commerce Lead Risk Assessor to perform a building inspection in accordance with WAC code 365-230-200.
>
> ***Asbestos-Containing Materials (ACM)***
> 1. Bulk sampling and analysis of suspect asbestos-containing materials (ACM).
> 2. Analysis of suspect ACM by a NVLAP accredited laboratory.
> 3. Quantity estimates of ACM.
> 4. Written report including recommendations based on the technician's observations, abatement (removal) cost estimates, sample descriptions, and sample location.
> 5. Statement of Compliance with W.A.C. 296-62-07721 Sign-off form.
>
> ***Lead-Based Paints (LBP)***
> 6. Perform survey for suspect lead-based paints utilizing a Niton XRF portable sampling device.
> 7. Prepare final report including: Sample descriptions, locations, analytical results, and recommendations.

This survey is intended to identify possible asbestos-containing materials (ACM) on the interior and exterior of the building. This inspection covered only those areas, which were exposed and/or physically accessible to the inspector. Materials uncovered during the course of demolition, renovation, or maintenance activities that are not identified in this inspection report must be presumed to contain asbestos until PLM analysis proves that the material is not asbestos-containing.

This survey is not intended for, nor should be used as a design specification. The Asbestos in Schools Hazard Amendment and Reauthorization Act (ASHARA), effective November 20, 1990, expanded accreditation requirements to apply to persons who work with asbestos in public and commercial buildings as well as schools. Specifically, ASHARA expanded the Toxic Substances Control Act (TSCA) Section 206 (a) (1) and (3) to require accreditation for any person who designs or conducts a response action with respect to friable ACM in a building. TSCA Section 207 provides for civil penalties of $5,000 for each day of a violation for not employing accredited individuals to design and conduct response actions. Sampling of suspect asbestos-containing materials was conducted as prescribed in 40 CFR 763.86.

Suspect asbestos-containing materials within the structure were identified and classified as a surfacing material, thermal system insulation, or miscellaneous materials. Surfacing materials are those, which are either spray applied or troweled-on for acoustical, decorative, or fireproofing purposes. Thermal system insulation (TSI) is insulation used to inhibit heat transfer or to prevent condensation on pipes, boilers, tanks, ducts and various other components. Miscellaneous materials include all other materials not included in the above categories such as floor tile, ceiling tile, roofing felt, cementitious materials, wallboard systems and products such as caulking, mastic and putty.

Bulk samples collected were submitted for sample analysis in accordance with method EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk Building Materials". Analyses were performed in Pacific Rim Environmental Inc.'s NVLAP Accredited Laboratory (Lab Code 101631-0). Materials are positive for asbestos if they are found to contain greater than 1% or 1% asbestos.

A total of twenty-one (21) bulk samples were collected and submitted for PLM laboratory analysis. None (0) of the samples were found to contain greater than 1% asbestos. One visual assessment was made and the material is PACM (presumed asbestos containing material).

Thermal Systems Insulation (TSI)

Suspect asbestos-containing **fiberglass insulation** was identified in walls and ceiling. The material was sampled and ***no asbestos was detected.*** (Sample # 11)

Suspect asbestos-containing **ceiling insulation** was identified in training room. The material was sampled and ***no asbestos was detected.*** (Sample # 13)

If during the course of work in the crawl space or wall, ceiling or floor demolition, any TSI materials that are not listed in this report are uncovered, sampling ***must*** be performed prior to disturbing these materials.

Surfacing Materials

Suspect asbestos-containing **texture on GWB** was identified in in the office, Amory room, training room wall, training room bathroom, and training room hallway. The material was sampled several times and ***no asbestos was detected.*** (Samples # 2, 6, 8, 9, 14)

Suspect asbestos-containing **acoustical ceiling texture** was identified in the Amory room. The material was sampled several times and ***no asbestos was detected.*** (Samples # 3, 4, 5)

If during the course of wall, ceiling or floor demolition, any surfacing materials not identified in this report are uncovered, sampling ***must*** be performed prior to disturbing these materials.

Miscellaneous Materials

Suspect asbestos-containing **cove base mastic** was identified in the office. The material was sampled and ***no asbestos was detected***. (Sample # 1)

Suspect asbestos-containing **carpet mastic** was identified on the training room floor. The material was sampled and ***no asbestos was detected.*** (Sample # 7)

Suspect asbestos-containing **sheet vinyl flooring** was identified in the bathroom. The material was sampled and ***no asbestos was detected.*** (Sample # 10)

Suspect asbestos-containing **particle board panels** were identified on the training room roof. The material was sampled and ***no asbestos was detected***. (Sample # 12)

Suspect asbestos-containing **putty or caulk** was identified in the on a roof panel at the ventilator, roof patch locations above range, and exterior training room windows. The material was sampled several times and ***no asbestos was detected***. (Samples # 15, 18, 19)

Suspect asbestos-containing **roofing mastic** was identified on roof patch locations above range side A. The material was sampled and ***no asbestos was detected***. (Sample # 16)

Miscellaneous materials continued

Suspect asbestos-containing **roofing tar** was identified on roof patch locations above range side A. The material was sampled and ***no asbestos was detected.*** (Sample # 17)

Suspect asbestos-containing **expansion joint** was identified in the range floor side A. The material was sampled and ***no asbestos was detected.*** (Sample # 20)

Suspect asbestos-containing **3-tab roofing, roof shingles** was identified on the storage shed roof. The material was sampled and ***no asbestos was detected.*** (Sample # 21)

Suspect asbestos-containing **laminate mastic on walls** was identified in the bathrooms. The material was visually inspected and **presumed *asbestos containing material.*** (Visual # V-01)

If during the course of wall, ceiling or floor demolition, any miscellaneous materials that are not listed in this report are uncovered, sampling ***must*** be performed prior to disturbing these materials.

Section 3.0 Asbestos Abatement Cost Estimate
OPD Firing Range | 6530 Martin Way | Lacey, WA

The following abatement costs are "best-effort" estimates and are based on current industry averages. The following estimates are subject to many variables beyond the control of PacRim. Such variables include, but are not limited to: project duration, contractor work schedule, hours of work allowed by the owner, contractor performance, regulatory agency interpretation of changing regulations, logistics of removal of material and miscellaneous delays. The estimate is meant only as a guideline to assist in the selection of an abatement contractor and may not reflect the actual final costs of asbestos removal. They do not include owner costs such as abatement project oversight and monitoring for compliance to law, and compliance to project plans and/or specifications. These estimates assume that adequate, professional plans and specifications are prepared. Generally, abatement costs are minimized by professional project management as well as utilizing the same asbestos abatement contractor to remove all asbestos containing materials during a single project. It is in no way intended to serve as, or replace, a comprehensive abatement specification. Estimates include permitting, removal and disposal.

Material (Location)	Approximate Quantity	@	Price per Sq. Ft. Ln. Ft. or Each	Total
Laminate mastic Storage shed bathroom walls	150 sq. ft.	@	NA*	NA*
			TOTAL	**NA***

***Contractors will typically have a minimum call-out fee. Unit pricing may not be applicable to small-scale, shore-duration projects such as this.**

Section 4.0 Statement of Compliance
OPD Firing Range | 6530 Martin Way | Lacey, WA

In accordance with W.A.C. 296-62-07721 and PSCAA Regulation III, Article 4, Pacific Rim Environmental, Inc. performed a survey for asbestos at the subject Property located at 6530 Martin Way in Lacey, WA. Should employees or contract personnel encounter any suspect asbestos-containing materials (ACM) it is their responsibility to:

1. Contact a representative of the owner.
2. Consult the inspection report to determine whether or not the suspect material contains asbestos.
3. If the suspect material does not appear in the inspection report, then that material was not sampled and must be presumed to contain asbestos until proven otherwise by sampling and PLM analysis.
4. Ensure that all employees and contractors are informed and advised of the location and type of materials that contain asbestos.

The following asbestos-containing materials were identified at the subject property:

- **PACM Laminate mastic (bathroom walls)**

I Hereby Attest:

The inspection report has been made available to me. I will inform all subcontractors of the location and types of materials containing asbestos. I am authorized to sign on behalf of my company.

Contractor:	_____	Owner's Rep:	_____
Signature:	_____	Signature:	_____
Print Name:	_____	Print Name:	_____
Title:	_____	Title:	_____
Date:	_____	Date:	_____

The inspection and testing performed on the interior painted surfaces of the subject Property **did not identify** lead-based paint above the EPA/HUD standard of 1.0 mg/m^2 on the following tested components.

All XRF sample results are provided in Appendix D.

If the building is to be renovated or remodeled there are procedures regarding the disturbance or removal of the lead-based paints that **can** be followed (i.e. initial air monitoring, clearance sampling, etc.). These procedures can be found in *HUD-0006700 Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. It is not required that these regulations/procedures be utilized on this project, however because these are the only available guidelines for the removal of lead-based paints PacRim feels it necessary to inform you of these guidelines.

The only state rules or regulations that currently apply to lead-based paints are WAC 296-155-17603 Scope* and WAC 296-155-17607 Permissible Exposure Limit**. The WAC code states that if lead is detectable in the workplace in any quantity, initial air monitoring must be performed on employees doing demolition, renovation or remodeling work in areas found to have materials containing lead. Also, workers performing lead removal must be trained in accordance with WAC 296-155-17625.

The EPA/HUD standard uses a criterion of 5,000 parts per million (PPM) dry weight or 1.0 milligrams per square centimeter (1.0 mg/cm2) for lead-based paint. However, if lead is detected in any concentration, Federal OSHA and Washington State Department of Labor and Industries regulations will still apply, since neither agency has established a concentration of lead in paint below which the lead in construction standards do not apply.

LEAD TCLP SAMPLING

The samples were collected and placed in a sealable sample container and given a unique identification number and submitted to the laboratory for analysis under chain-of-custody procedures.

The regulatory limit for lead leachate for waste stream characterization and disposal is 5.0 mg/L or 5 PPM (Parts Per Million) The TCLP samples were submitted for waste stream characterization using the Toxicity Characteristic Leaching Procedure SW 846 6010B.

The sample results are summarized below in Table B. Refer to Appendix for laboratory analysis report.

TABLE B

Sample I.D.	Sample Location	Analyte	Result	Regulatory Limit
TCLP-1	Side A Floor	TCLP Lead	75 mg/L	5.0 mg/L
TCLP-2	Side B Floor	TCLP Lead	<0.4 mg/L	5.0 mg/L
TCLP-3	Building	TCLP Lead	21 mg/L	5.0 mg/L

DUST SAMPLING AND ANALYSIS

A total of three (3) wipe samples were collected from selected horizontal surfaces and submitted for lead analysis. The samples were collected and analyzed in accordance Method SW 846 3050B/7000B.

Dust samples were collected using a Ghost wipe. The Ghost wipe is a 15cm x 15cm sturdy wiping media moistened with DI water. The wipe meets ASTM E1792 specifications as required by the US EPA and AIHA policy on sampling for lead in surface dust. The wipe samples were collected in accordance with HUD/EPA protocol using single-surface sampling. No composite samples were collected.

The samples were collected from a 12" x 12" area for a same surface area of one square foot for each sample.

A fresh pair of disposable gloves was donned for each sample. Samples were placed into a sealed container and given a unique identification number. Samples were submitted to the analytical laboratory using chain-of custody procedures.

Comparison of the lead dust wipe samples results to the most stringent residential cleanup objectives is provided for informational purposes only to demonstrate that the surfaces tested are contaminated with lead dust.

The MTCA Cleanup Regulations 173-340-900 - Method A Soil Cleanup Levels for Unrestricted Land Uses for Lead is 250 mg/kg or PPM (parts per million)

Range users should be advised to use appropriate work practices and engineering controls during any activity that may generate or disturb dust. This can be accomplished through awareness training in accordance with **WAC 296-155-17625 *Employee Information and Training*** and training on the selection, use and maintenance of respirators in accordance with **WAC 296-155-17613 *Respiratory Protection.***

TABLE A

Date	Sample #	Sample Location	Sample Type	Result µg/ft²
4-19-17	WS-1	Top of HVAC Duct	Wipe	67,000
4-19-17	WS-2	Top of Training Room	Wipe	21,000
4-19-17	WS-3	Top of Eco Block	Wipe	14,000

Appendix A: Asbestos Sample Summary

Asbestos Sample Summary

PacRim

Client: **GeoEngineers, Inc.**
8410 154th Ave. NE
Redmond, WA 98052

Job Number: **16057**
Print Date: **May 11, 2017**

Project: **OPD Firing Range**
6530 Martin Way
Lacey, WA

Sample #	Sample Date	Sample Location	AHERA Category	Sample Description	Asbestos Type / %	Approximate Quant.
1	4/19/2017	Office	Miscellaneous	Cove Base Mastic	None Detected (Both Layers)	N/A
2	4/19/2017	Office	Surfacing	Texture on GWB	None Detected (Both Layers)	N/A
3	4/19/2017	Armory room	Surfacing	Acoustical Ceiling Texture	None Detected	N/A
4	4/19/2017	Armory room	Surfacing	Acoustical Ceiling Texture	None Detected	N/A
5	4/19/2017	Armory room	Surfacing	Acoustical Ceiling Texture	None Detected	N/A
6	4/19/2017	Armory room, wall	Surfacing	Texture on GWB	None Detected (Both Layers)	N/A
7	4/19/2017	Training room, floor	Miscellaneous	Carpet Mastic	None Detected	N/A
8	4/19/2017	Training room, wall	Surfacing	Texture on GWB	None Detected	N/A
9	4/19/2017	Training room, bathroom	Surfacing	Texture on GWB	None Detected (Both Layers)	N/A
10	4/19/2017	Bathroom	Miscellaneous	Sheet vinyl flooring	None Detected (Both Layers)	N/A
11	4/19/2017	Wall	TSI	Fiberglass Wall and ceiling insulation	None Detected (Both Layers)	N/A
12	4/19/2017	Training room, roof	Miscellaneous	Particle board panels	None Detected	N/A
13	4/19/2017	Training room	TSI	Ceiling Insulation	None Detected	N/A
14	4/19/2017	Training room, hallway	Surfacing	Texture on GWB	None Detected (Both Layers)	N/A
15	4/19/2017	Roof panel at ventilator	Miscellaneous	Putty or caulk	None Detected (Both Layers)	N/A
16	4/19/2017	Roof patch locations above range Side A	Miscellaneous	Roofing mastic	None Detected	N/A
17	4/19/2017	Roof patch locations above range Side A	Miscellaneous	Roofing tar	None Detected	N/A

Asbestos Sample Summary

PacRim

Client: **GeoEngineers, Inc.**
8410 154th Ave. NE
Redmond, WA 98052

Job Number: **16057**
Print Date: **May 11, 2017**

Project: **OPD Firing Range**
6530 Martin Way
Lacey, WA

Sample #	Sample Date	Sample Location	AHERA Category	Sample Description	Asbestos Type / %	Approximate Quant.
18	4/19/2017	Roof patch locations above range	Miscellaneous	Putty or caulk	None Detected (Both Layers)	N/A
19	4/19/2017	Exterior training Room windows	Miscellaneous	Putty or caulk	None Detected	N/A
20	4/19/2017	Range Floor Side A	Miscellaneous	Expansion Joint	None Detected (Both Layers)	N/A
21	4/19/2017	Storage shed, roof	Miscellaneous	3 tab roofing Roof shingles	None Detected (Both Layers)	N/A
V-01	4/19/2017	Storage shed, bathroom	Miscellaneous	Visual Laminate mastic on walls	PACM	150 Sq.Ft.

Appendix B: **Bulk Sample Analysis Report**

PACIFIC RIM ENVIRONMENTAL, INC.

BULK SAMPLE ANALYSIS REPORT

CLIENT:	**GeoEngineers, Inc.** 8410 154th Ave. NE Redmond, WA 98052	**PACRIM # :** **REPORT # :** **DATE RECEIVED :** **ANALYST :**	16057 2017-04-0162 04/20/2017 William F. Golloway
PROJECT:	**OPD Firing Range** 6530 Martin Way Lacey, WA	**DATE ANALYZED :** **REPORT BY :** **REPORT DATE :** **TURNAROUND:**	04/24 & 04/26/2017 Olivia Neira 04/27/2017 5 days
SAMPLE DATE:	04/19/2017	**PAGE :**	1 of 5

Attached are the results of analysis of 21 bulk samples submitted for asbestos identification: Lab ID #2017-04-0162 through 2017-04-0182.

The samples were analyzed in accordance with method EPA-600/R-93/116: "Method for the Determination of Asbestos in Bulk Building Materials".

Unless otherwise noted, the samples were inhomogeneous; subsamples of components were analyzed to achieve representative analysis. Separate layers of layered samples are analyzed and reported separately. Unless otherwise stated, asbestos content was quantified by calibrated visual estimation (CVES). CVES concentrations are reported in 2 to 3 percent ranges for fiber concentrations ranging from 1-10%, and 5 percent ranges for concentrations greater than 10%. Samples in which asbestos was not observed are reported as "none detected".

Limitations and Uncertainty:

Factors such as sample quality, sample size, interfering matrix material, fiber size, and fiber concentration contribute to the uncertainty of asbestos concentration measurements in bulk materials. Relative errors exceeding 100% may occur in samples containing <1-10% asbestos. Relative errors are typically below 30% in samples with greater than 10% asbestos, and approach zero as the asbestos concentration approaches 100%.

Asbestos fibers with diameters below approximately 0.25 micrometers are not detectable by PLM. These extremely fine fibers may occur in such products as floor tile, adhesives, and cement products. This limitation can be overcome, however, by the use of alternate analytical methods, such as Transmission Electron Microscopy (TEM).

This report cannot be represented by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full without written permission from the laboratory.

NVLAP Accredited LAB #: 101631-0
Samples submitted by: PacRim

Reports Reviewed By: _____
Approved Signatory

Pacific Rim Environmental, Inc.
BULK SAMPLE ANALYSIS REPORT

CLIENT:	**GeoEngineers, Inc.** 8410 154th Ave. NE Redmond, WA 98052	PACRIM # :	16057
		REPORT # :	2017-04-0162
		DATE RECEIVED :	04/20/2017
		ANALYST :	William F. Golloway
PROJECT:	**OPD Firing Range** 6530 Martin Way Lacey, WA	DATE ANALYZED :	04/24 & 04/26/2017
		REPORT BY :	Olivia Neira
		REPORT DATE :	04/27/2017
		TURNAROUND:	5 days
SAMPLE DATE:	04/19/2017	PAGE :	2 of 5

Client/Lab ID Number	Sample Location and Description	Asbestos Type(s) / %	Other Material(s)	Date Analyzed
1 2017-04-0162	**Office (Cove Base Mastic).** Blue, flexible cove base (layer 1) with light brown mastic (layer 2).	**Layer 1** (Cove base): None Detected. **Layer 2** (Mastic): None Detected.	**Layer 1:** Vinyl, Mineral Aggregate. **Layer 2:** Cellulose (<1%), Adhesive.	4/24/17
2 2017-04-0163	**Office (Texture on GWB).** White-painted, white, chalky texture (layer 1) on light gray, chalky drywall with brown paper (layer 2).	**Layer 1** (Texture): None Detected. **Layer 2** (Drywall): None Detected.	**Layer 1:** Cellulose (<1%), Binder, Mineral Aggregate, Paint. **Layer 2:** Cellulose (20-25%), Gypsum, Mineral Aggregate, Binder.	4/24/17
3 2017-04-0164	**Armory room (Acoustical Ceiling Texture).** White-painted, white, crumbled, popcorn texture.	None Detected.	Cellulose (<1%), Foam, Binder, Mineral Aggregate, Paint.	4/24/17
4 2017-04-0165	**Armory room (Acoustical Ceiling Texture).** White-painted, white, crumbled, popcorn texture.	None Detected.	Cellulose (<1%), Foam, Binder, Mineral Aggregate, Paint.	4/24/17
5 2017-04-0166	**Armory room (Acoustical Ceiling Texture).** White-painted, white, crumbled, popcorn texture.	None Detected.	Cellulose (<1%), Foam, Binder, Mineral Aggregate, Paint.	4/24/17
6 2017-04-0167	**Armory room, wall (Texture on GWB).** White-painted, white, chalky texture (layer 1) on light gray, chalky drywall with brown paper (layer 2).	**Layer 1** (Texture): None Detected. **Layer 2** (Drywall): None Detected.	**Layer 1:** Cellulose (<1%), Binder, Mineral Aggregate, Paint. **Layer 2:** Cellulose (10-15%), Fiberglass (1-3%), Gypsum, Mineral Aggregate, Binder.	4/24/17

Pacific Rim Environmental, Inc.
BULK SAMPLE ANALYSIS REPORT

CLIENT:	**GeoEngineers, Inc.**	PACRIM # :	16057
	8410 154th Ave. NE	REPORT # :	2017-04-0162
	Redmond, WA 98052	DATE RECEIVED :	04/20/2017
		ANALYST :	William F. Golloway
PROJECT:	**OPD Firing Range**	DATE ANALYZED :	04/24 & 04/26/2017
	6530 Martin Way	REPORT BY :	Olivia Neira
	Lacey, WA	REPORT DATE :	04/27/2017
		TURNAROUND:	5 days
SAMPLE DATE:	04/19/2017	PAGE :	3 of 5

Client/Lab ID Number	Sample Location and Description	Asbestos Type(s) / %	Other Material(s)	Date Analyzed
7 2017-04-0168	**Training room, floor (Carpet Mastic).** Light yellow mastic with adhering, white-painted, mud-like residue and carpet.	None Detected.	Cellulose (<1%), Synthetics (15-20%), Adhesive, Binder, Mineral Aggregate, Paint.	4/24/17
8 2017-04-0169	**Training room, wall (Texture on GWB).** White-painted, white, somewhat chalky texture.	None Detected.	Cellulose (<1%), Binder, Mineral Aggregate, Paint.	4/24/17
9 2017-04-0170	**Training room, bathroom (Texture on GWB).** White-painted, white, powdery-chalky mud (layer 1) on light pink, chalky drywall with light gray and brown paper (layer 2).	**Layer 1** (Mud): None Detected. **Layer 2** (Drywall): None Detected.	**Layer 1:** Cellulose (<1%), Binder, Mineral Aggregate, Paint. **Layer 2:** Cellulose (10-15%), Fiberglass (1-3%), Gypsum, Mineral Aggregate, Binder, Paint.	4/24/17
10 2017-04-0171	**Bathroom (Sheet vinyl flooring).** Gray sheet flooring with embedded, woven backing (layer 1) and white mastic (layer 2).	**Layer 1** (Flooring): None Detected. **Layer 2** (Mastic): None Detected.	**Layer 1:** Cellulose (40-45%), Binder. **Layer 2:** Cellulose (<1%), Adhesive, Mineral Aggregate.	4/24/17
11 2017-04-0172	**Wall (Fiberglass Wall and ceiling insulation).** White, vinyl wrap (layer 1) on light yellow, fibrous insulation (layer 2).	**Layer 1** (Wrap): None Detected. **Layer 2** (Insulation): None Detected.	**Layer 1:** Vinyl, Mineral Aggregate. **Layer 2:** Cellulose (<1%), Fibrous Glass (85-90%), Binder, Metal.	4/24/17

Pacific Rim Environmental, Inc.
BULK SAMPLE ANALYSIS REPORT

CLIENT:	**GeoEngineers, Inc.** 8410 154th Ave. NE Redmond, WA 98052	PACRIM # :	16057
		REPORT # :	2017-04-0162
		DATE RECEIVED :	04/20/2017
		ANALYST :	William F. Golloway
PROJECT:	**OPD Firing Range** 6530 Martin Way Lacey, WA	DATE ANALYZED :	04/24 & 04/26/2017
		REPORT BY :	Olivia Neira
		REPORT DATE :	04/27/2017
		TURNAROUND:	5 days
SAMPLE DATE:	04/19/2017	PAGE :	4 of 5

Client/Lab ID Number	Sample Location and Description	Asbestos Type(s) / %	Other Material(s)	Date Analyzed
12 2017-04-0173	**Training room, roof (Particle board panels).** Brown, fiberboard-like material. **Note:** Sample appears to be homogeneous.	None Detected.	Cellulose (90-95%), Animal Hair (<1%), Spider silk (<1%), Wood, Binder.	4/24/17
13 2017-04-0174	**Training room (Ceiling Insulation).** White, fibrous insulation material with adhering fibers.	None Detected.	Cellulose (<1%), Hair (<1%), Fibrous Glass (95-98%), Wood, Binder.	4/24/17
14 2017-04-0175	**Training room, hallway (Texture on GWB).** Light brown-painted, white, chalky texture (layer 1) on white-painted, brown paper with light gray, leveling compound (layer 2).	**Layer 1** (Texture): None Detected. **Layer 2** (Paper with drywall): None Detected.	**Layer 1:** Cellulose (<1%), Binder, Mineral Aggregate, Paint. **Layer 2:** Cellulose (40-45%), Gypsum, Mineral Aggregate, Binder.	4/24/17
15 2017-04-0176	**Roof panel at ventilator (Putty or caulk).** Clear to white, flexible caulking-like material (layer 1) on white, flexible caulking-like material (layer 2).	**Layer 1** (Caulking): None Detected. **Layer 2** (Caulking): None Detected.	**Layer 1:** Binder, Mineral Aggregate. **Layer 2:** Cellulose (<1%), Binder.	4/26/17
16 2017-04-0177	**Roof patch locations above range Side A (Roofing mastic).** Dark gray-brown to black putty-like material.	None Detected.	Cellulose (3-5%), Binder, Mineral Aggregate.	4/26/17

Pacific Rim Environmental, Inc.
BULK SAMPLE ANALYSIS REPORT

CLIENT:	**GeoEngineers, Inc.** 8410 154th Ave. NE Redmond, WA 98052	PACRIM # :	16057
		REPORT # :	2017-04-0162
		DATE RECEIVED :	04/20/2017
		ANALYST :	William F. Golloway
PROJECT:	**OPD Firing Range** 6530 Martin Way Lacey, WA	DATE ANALYZED :	04/24 & 04/26/2017
		REPORT BY :	Olivia Neira
		REPORT DATE :	04/27/2017
		TURNAROUND:	5 days
SAMPLE DATE:	04/19/2017	PAGE :	5 of 5

Client/Lab ID Number	Sample Location and Description	Asbestos Type(s) / %	Other Material(s)	Date Analyzed
17 2017-04-0178	**Roof patch locations above range Side A (Roofing tar).** Dark gray to black, flexible caulking-like material with gray surface hue.	None Detected.	Cellulose (<1%), Binder, Mineral Aggregate.	4/26/17
18 2017-04-0179	**Roof patch locations above range (Putty or caulk).** White, soft caulking-like material (layer 1) with light gray, soft caulking-like material (layer 2).	**Layer 1** (Caulking): None Detected. **Layer 2** (Caulking): None Detected.	**Layer 1:** Cellulose (<1%), Binder. **Layer 2:** Cellulose (<1%), Binder.	4/26/17
19 2017-04-0180	**Exterior training Room windows (Putty or caulk).** Gray, soft, tacky putty material. **Note:** Sample appears to be homogeneous.	None Detected.	Cellulose (<1%), Binder.	4/26/17
20 2017-04-0181	**Range Floor Side A (Expansion Joint).** White, flexible, caulking-like material with black surface residue (layer 1) on light gray caulking-like material (layer 2).	**Layer 1** (Caulking): None Detected. **Layer 2** (Caulking): None Detected.	**Layer 1:** Binder, Mineral Aggregate. **Layer 2:** Binder, Mineral Aggregate.	4/26/17
21 2017-04-0182	**Storage shed, roof (3-tab roofing Roof shingles).** Black, tar, 3-tab-like roofing with white gray gravel (layer 1) and black, tar, 3-tab-like roofing with black and light brown gravel and gray paint (layer 2).	**Layer 1** (Roofing): None Detected. **Layer 2** (Roofing): None Detected.	**Layer 1:** Cellulose (<1%), Fiberglass (10-15%), Mineral Aggregate, Tar. **Layer 2:** Cellulose (<1%), Fiberglass (10-15%), Mineral Aggregate, Tar, Paint.	4/26/17

Appendix C: **Site Photographs**

SITE PHOTOGRAPHS

Photo #1 – Range Area Side A

Photo #2 – Range Area Side B

SITE PHOTOGRAPHS

Photo #3 – Settled dust above training room

Photo #4 – Settled dust on fiberglass insulation

SITE PHOTOGRAPHS

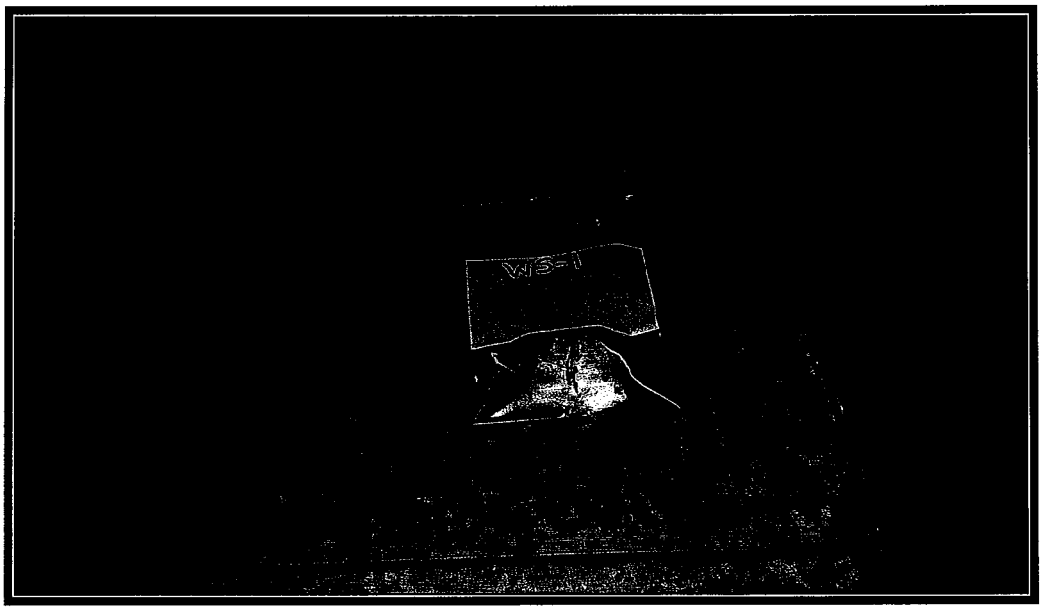


Photo #5 – Dust Sample on Ductwork

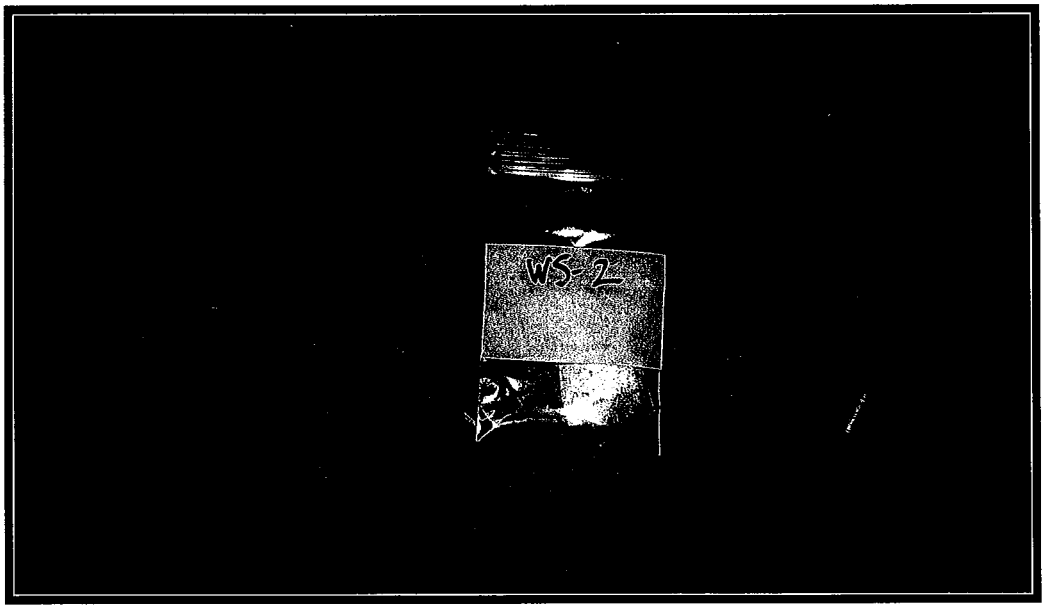


Photo #6 – Dust Sample above Training Room

SITE PHOTOGRAPHS

Photo #7 – Dust Sample on Eco Block

Appendix D: **XRF Data Sheets**

Lead-Based Paint (XRF) Data Sheet

PacRim

Client: **GeoEngineers, Inc.**
8410 154th Ave. NE
Redmond, WA 98052

Project: **OPD Firing Range**
6530 Martin Way
Lacey, WA

XRF Serial #: **XLP300-80662**
Inspection Date: **19-Apr-2017**
Inspection By: **Todd Carter**
PacRim Job#: **16057**

PacRim#	Test #	Substrate	Component / Side	Description / Location	Color	Result	Pbc mg/cm2
1	138	*First calibration check*				Positive	1.1
2	139	*First calibration check*				Null	1
3	140	*First calibration check*				Null	1
4	141	Metal	Exterior siding	Front of building	tan	Negative	0
5	142	Metal	Door frame	Front door	gray	Negative	0
6	143	Wood	Door jamb	Training room vestibule	blue	Negative	0.01
7	144	Metal	Door	Training room vestibule	white	Negative	0
8	145	Wood	Interior siding	Range office	tan	Negative	0
9	146	Concrete	Floor	Vestibule	gray	Negative	0.1
10	147	Metal	Column	Range area	red	Negative	0.03
11	148	Concrete	CMU wall	Divider wall, side A	tan	Negative	0
12	149	Metal	I-beam	Tactical side B	gray	Negative	0.01
13	150	Metal	Deflector	Small arms bullet trap	red	Negative	0.15
14	151	Metal	Wall beams	Range side B	red	Negative	0.01
15	152	Metal	Back stop	Side B, bullet trap	gray	Negative	0.6
16	153	Wood	Interior walls	Tactical side B	white	Negative	0.04
17	154	Concrete	Footing	Side A range	white	Negative	0.01
18	155	Metal	Back stop	Side A bullet trap	gray	Negative	0
19	156	*Last calibration check*				Positive	1.2
20	157	*Last calibration check*				Null	1
21	158	*Last calibration check*				Null	1

Report by: Olivia Neira
Date : April 20, 2017
Review by: Dale

Appendix E: **XRF Performance Characteristic Sheet**

Performance Characteristic Sheet

EFFECTIVE DATE: **September 24, 2004** **EDITION NO.: 1**

MANUFACTURER AND MODEL:

Make: *Niton LLC*
Tested Model: *XLp 300*
Source: ^{109}Cd
Note: This PCS is also applicable to the equivalent model variations indicated below, for the Lead-in-Paint K+L variable reading time mode, in the XLi and XLp series:

XLi 300A, XLi 301A, XLi 302A and XLi 303A.
XLp 300A, XLp 301A, XLp 302A and XLp 303A.
XLi 700A, XLi 701A, XLi 702A and XLi 703A.
XLp 700A, XLp 701A, XLp 702A, and XLp 703A.

Note: The XLi and XLp versions refer to the shape of the handle part of the instrument. The differences in the model numbers reflect other modes available, in addition to Lead-in-Paint modes. The manufacturer states that specifications for these instruments are identical for the source, detector, and detector electronics relative to the Lead-in-Paint mode.

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Lead-in-Paint K+L variable reading time mode.

XRF CALIBRATION CHECK LIMITS:

0.8 to 1.2 mg/cm^2 (inclusive)

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm^2 in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm^2 film).

If readings are outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instruments into control before XRF testing proceeds.

SUBSTRATE CORRECTION:

For XRF results using Lead-in-Paint K+L variable reading time mode, substrate correction is not needed for:

Brick, Concrete, Drywall, Metal, Plaster, and Wood

INCONCLUSIVE RANGE OR THRESHOLD:

K+L MODE READING DESCRIPTION	SUBSTRATE	THRESHOLD (mg/cm^2)
Results not corrected for substrate bias on any substrate	Brick	1.0
	Concrete	1.0
	Drywall	1.0
	Metal	1.0
	Plaster	1.0
	Wood	1.0

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted in August 2004 on 133 testing combinations. The instruments that were used to perform the testing had new sources; one instrument's was installed in November 2003 with 40 mCi initial strength, and the other's was installed June 2004 with 40 mCi initial strength.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Substrate correction is not needed for brick, concrete, drywall, metal, plaster or wood when using Lead-in-Paint K+L variable reading time mode, the normal operating mode for these instruments. If substrate correction is desired, refer to Chapter 7 of the HUD Guidelines for guidance on correcting XRF results for substrate bias.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing. Use the K+L variable time mode readings.

Conduct XRF retesting at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family housing a result is defined as the average of three readings. In multifamily housing, a result is a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF results.

Compute the average of all ten re-test XRF results.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

TESTING TIMES:

For the Lead-in-Paint K+L variable reading time mode, the instrument continues to read until it is moved away from the testing surface, terminated by the user, or the instrument software indicates the reading is complete. The following table provides testing time information for this testing mode. The times have been adjusted for source decay, normalized to the initial source strengths as noted above. Source strength and type of substrate will affect actual testing times. At the time of testing, the instruments had source strengths of 26.6 and 36.6 mCi.

Testing Times Using K+L Reading Mode (Seconds)

	All Data			Median for laboratory-measured lead levels (mg/cm^2)		
Substrate	25^{th} Percentile	Median	75^{th} Percentile	Pb < 0.25	0.25 ≤ Pb<1.0	1.0 ≤ Pb
Wood Drywall	4	11	19	11	15	11
Metal	4	12	18	9	12	14
Brick Concrete Plaster	8	16	22	15	18	16

CLASSIFICATION RESULTS:

XRF results are classified as positive if they are greater than or equal to the threshold, and negative if they are less than the threshold.

DOCUMENTATION:

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing.*

Appendix F: **Lead Dust and TCLP Reports**

EMSL Analytical, Inc.
3317 3rd Ave S, Suite D 2nd floor, Seattle, WA 98134
Phone/Fax: 2062696310 / (206) 900-8789
http://www.emsl.com seattlelab@emsl.com

EMSL Order:	511701093
CustomerID:	PACR50
CustomerPO:	
ProjectID:	

Attn: **Todd Carter**
Pacific Rim Environmental, Inc.
6510 Southcenter Blvd., Suite 40
Tukwila, WA 98188

Phone:	(206) 244-8965
Fax:	(206) 244-9096
Received:	04/20/17 11:14 AM
Collected:	4/19/2017

Project: **16057**

Test Report: Lead in Dust by Flame AAS (SW 846 3050B/7000B)*

Client SampleDescription	*Collected*	*Analyzed*	*Area Sampled*	*RDL*	*Lead Concentration*
WS-1	4/19/2017	4/27/2017	144 in²	2500 µg/ft²	67000 µg/ft²
511701093-0001	Site: Range Area Top of Duct				
WS-2	4/19/2017	4/27/2017	144 in²	2500 µg/ft²	21000 µg/ft²
511701093-0002	Site: Range Area Top of Trianing				
WS-3	4/19/2017	4/27/2017	144 in²	1000 µg/ft²	14000 µg/ft²
511701093-0003	Site: Range Area Top of Eco Block				

Lauren Kerber, Laboratory Manager
or other approved signatory

*Analysis following Lead in Dust by EMSL SOP/ Determination of Environmental Lead by FLAA. Reporting limit is 10 ug/wipe. ug/wipe = ug/ft2 x area sampled in ft2. Unless noted, results in this report are not blank corrected. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities (such as volume sampled) or analytical method limitations. Samples received in good condition unless otherwise noted. The lab is not responsible for data reported in µg/ft² which is dependent on the area provided by non-lab personnel. The test results contained within this report meet the requirements of NELAC unless otherwise noted. "<" (less than) results signifies that the analyte was not detected at or above the reporting limit. Measurement of uncertainty is available upon request. The QC data associated with the sample results included in this report meet the recovery and precision requirements unless specifically indicated otherwise. Definitions of modifications are available upon request.

Samples analyzed by EMSL Analytical, Inc. Seattle, WA

Initial report from 04/27/2017 09:39:38

LA Testing
5431 Industrial Drive, Huntington Beach, CA 92649
Phone/Fax: (714) 828-4999 / (714) 828-4944
http://www.LATesting.com gardengrovelab@latesting.com

LA Testing Order: 331708444
CustomerID: PACR50
CustomerPO:
ProjectID:

Attn: **Todd Carter**
Pacific Rim Environmental, Inc.
6510 Southcenter Blvd., Suite 40
Tukwila, WA 98188

Phone: (206) 244-8965
Fax: (206) 244-9096
Received: 04/21/17 10:10 AM
Collected: 4/19/2017

Project: **16057**

Test Report: Toxicity Characteristic Leaching Procedure (SW846, 1311/7420)

Client SampleDescription	*Collected*	*Analyzed*	*RDL*	*Lead Concentration*
TCLP-1	4/19/2017		4 mg/L	75 mg/L
331708444-0001	Site: Side A floor			
TCLP-2	4/19/2017		0.4 mg/L	<0.4 mg/L
331708444-0002	Site: Side B floor			
TCLP-3	4/19/2017		0.8 mg/L	21 mg/L
331708444-0003	Site: Building			

Michael Chapman

Michael Chapman, Laboratory Manager
or other approved signatory

This report relates only to those items tested. Sample received in acceptable condition unless otherwise noted.
Samples analyzed by LA Testing Huntington Beach, CA

Initial report from 04/25/2017 16:58:37

Appendix G: Inspector / Laboratory Certifications

Certificate of Completion

This is to certify that

Todd P. Carter

has satisfactorily completed
4 hours of refresher training as an

Asbestos Building Inspector

to comply with the training requirements of
TSCA Title II / 40 CFR 763 (AHERA)

Certificate #
157685

Instructor
EPA Provider Certificate #1085

ARGUS PACIFIC
TRAINING • CONSULTING
A Terracon COMPANY

Jun 15, 2016
Date(s) of Training
Exam Score: NA
Expiration Date: Jun 15, 2017

ARGUS PACIFIC, INC. • 1900 W NICKERSON ST, SUITE 315 • SEATTLE, WASHINGTON • 98119 • 206.285.3373 • WWW.ARGUSPACIFIC.COM

STATE OF WASHINGTON

Department of Commerce

Lead-Based Paint Program

Todd Carter

Has fulfilled the certification requirements of Washington Administrative code (WAC) 365-230 and has been certified to conduct lead-based paint activities pursuant to WAC 365-230-200 as a:

Risk Assessor

Certification #	Issuance Date	Expiration Date
0340	4/10/2015	4/10/2018

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101631-0

Pacific Rim Environmental, Inc.

Tukwila, WA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2017-04-01 through 2018-03-31

Effective Dates

For the National Voluntary Laboratory Accreditation Program

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Pacific Rim Environmental, Inc.
6510 Southcenter Boulevard
Suite #40
Tukwila, WA 98188
Mr. William F. Golloway
Phone: 206-244-8965 Fax: 206-244-9096
Email: fgolloway@pacrimenv.com
http://www.pacrimenv.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 101631-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA 600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

For the National Voluntary Laboratory Accreditation Program