

4 ENVIRONMENTAL HAZARDS EVALUATION

A summary of chemicals of potential concern at the site and the chemicals of potential concern are provided in this section.

4.1 *Chemicals of Potential Concern*

The chemicals of concern on the Pali Highway site are lead and TPH oil. During site investigations at the site, both lead and oil were found to be present above commercial/industrial EAL's. Batch leaching test were run on soil samples collected with the highest Lead levels, and results confirmed that lead poses a potential threat of leaching to ground water. Soil with leachable lead above the regulatory level of 5 mg/L for the metal lead were handled and disposed of as Hazardous Waste. Lead impacted soil remains on the Pali Highway.

4.2 *Conceptual Site Model*

To address human health and environmental receptor concerns, a conceptual site model is used to identify how people, or the environment could be exposed to chemicals present at the site. Lead migration pathways, exposure routes, and sensitive receptors identified at the site are described below.

4.2.1 *Lead Migration Pathways*

The following general migration pathways for lead were evaluated and determined to be the priority pathways of concern.

- **Stormwater Runoff:** Stormwater runoff from the site travels as sheet flow from the highway lanes toward the median where it infiltrates, or to the guardrails where it infiltrates or travels as sheet flow to areas of lower elevation where it evaporates. The site is surrounded by the densely populated neighborhood of Nu'uuanu, and by forest and preservation lands. Storm water in contact with impacted soils is not of high concern as it is either densely vegetated or covered with concrete. If soils on the Pali highway are exposed in the future, this pathway becomes a viable method of transport for lead impacted soil and stormwater best management practices (BMP's) should be implemented to minimize contaminant transport during all soil disturbing activities.
- **Dust:** Future project related activities such as excavation and transport may stir up unwanted dust. The site soil is wet to moist, and current site activities do not generate dust.

4.2.2 Sensitive Receptors and Exposure Routes

The site is a highway where human exposure is limited. The most plausible current or future receptor population that may contact lead in the soil include the following:

- Workers at the site
- Patrons of disabled vehicles

For these sensitive populations, the most plausible pathway for human exposure include the following:

- Incidental ingestion or inhalation or, or dermal contact with exposed soil or debris from the site
- Incidental ingestion or inhalation or, or dermal contact with dust generated from soil stockpiled or allowed to dry and generate dust

4.3 Potential Environmental Hazard Evaluation

An evaluation of the potential environmental hazard is provided below.

4.3.1 Hazard Description

Residual soil is the medium of concern at the site. The presence of soil with total lead concentrations above applicable EAL's, and total leachable lead exceeding the maximum concentration of contaminants for the toxicity characteristic, constitutes the environmental hazard addressed by this evaluation. See Figure 3, Impacted Area Map, for a depiction of the affected area. All soil disturbing work within this area will require control under the institutional controls described below.

4.3.2 Hazard Mitigation

Site soil encountered, within the scope of this project, containing lead at concentrations above EAL's were excavated and hauled off-site for disposal on-island. Site soil encountered, within the scope of this project, containing lead exceeding the maximum concentration of contaminants for the toxicity characteristic was handled as hazardous waste and disposed of off island. Total lead concentrations above EAL's range from 210 mg/kg to 11,000 mg/kg, with total leachable lead ranging from 9.1 mg/L to 19 mg/L. Laboratory TCLP results were plotted to establish a correlation of total lead in soil to the mobility of leachable lead in the soil. The curve was used to establish a threshold above which mobility of lead may be a hazard. Soil samples with total lead levels of 1,500 mg/kg or greater resulted in TCLP detections. However, this number is a conservative one, as 4,500 mg/kg total lead was the first detection in a soil sample resulting in a TCLP detection above 5.0 mg/L the maximum concentration of contaminants for toxicity characteristic.

Lead impacted soil remains in median and guardrail soil, as well as laterally two feet outside Pali Highway guard rails, as well as vertically up to three (3) feet below ground surface between cross streets Kamehameha Hwy and Vineyard Blvd. The source contributing lead contamination has not been removed, as it is believed to be deposited from accumulation over decades following the use of lead paint gasoline.

4.3.3 Sampling and Disposal Requirements

Any earth disturbing activity, such as grading, or excavating, will incur soil sampling requirements within the impacted area, see Figure 3. Sampling shall be performed in accordance with TGM guidance. MIS samples are encouraged to increase Decision Unit representativeness. Decision Units shall be thoughtfully placed to properly characterize an area to be sampled. A minimum of 30 to 75 increments with systematic random distribution throughout the Decision Unit is recommended. Replicate samples are recommended to increase the characterization of the DU. See Hawaii DOH HEER branch TGM for more information on recommended sampling techniques.

Upon receipt of sample results, disposal (on-island) of soil containing lead levels greater than 200 mg/kg, the Tier 1 unrestricted use EAL, will be required. TCLP testing of samples with results exceeding 1,000 mg/kg total will be required for disposal on-island based upon the 20:1 rule. This rule states that if a chemical concentration is 20 times higher than the regulatory level for a chemical it meets the minimum concentration requiring TCLP test data prior to disposal of soil in a municipal construction/demolition waste landfill.

4.3.4 Institutional Controls

The following institutional controls will be required moving forward, governing all earth disturbing activities at the site.

- The implementation of this EHMP shall govern over the site for the entirety of construction, earth disturbing, or related actions (such as soil grading or excavation) that may encounter potentially lead impacted soil and introduce environmental hazards of direct exposure to humans or the environment and or cause migration of contaminated soil by wind or surface water runoff;
- All described activities shall be conducted under an environmental plan approved by HDOH;
- Any soil disturbance (such as excavation, grading, etc.) shall require proper testing (in accordance with the Hawaii State Contingency Plan TGM), handling, characterization, and proper disposal, as described in this plan;
- Contractors shall determine proper Health & Safety protocols according to OSHA 1926.62, lead in construction requirements, for all soil disturbing work performed

within the limits of the Pali Highway, see Figure 3 for affected area. Health and safety parameters to be observed include, but are not limited to the following;

- a. Personal Protective Equipment requirements, such as gloves, long sleeve shirts, boots, safety glasses, etc. shall be observed in accordance with OSHA personal protective equipment general requirements.
 - b. An importance shall be placed on proper hygiene for workers who will contact lead impacted soil, safety and health plan shall include washing hands thoroughly and often.
 - c. Proper boot wash stations should be provided for workers to limit track out to belongings (such residences or vehicles).
- Storm Water Pollution Prevention Plan (SWPPP) shall be developed and properly implemented to prevent and minimize the contact of lead with storm water, according to Hawaii Administrative Rules (HAR), Chapter 11 Title 55 during any earth disturbance greater than 1 acre in area or requiring coverage by a National Pollution Discharge Elimination System (NPDES) General Permit;
 - The landowner or operator must provide HDOH NFA Controls letter and accompanying EHMP to construction companies, or other significant users of the site, and all those tasked with intrusive soil activities within the project site boundaries prior to the commencement of soil disturbing activities;
 - Providing HDOH NFA with Controls letter and accompanying EHMP to prospective buyers of the property during any sale disclosure process, potential lessees, and other significant users of the site.

4.3.5 Post-remediation Exposure Assessment

Institutional controls governing the site will prevent pathways identified in Section 4.2.1 from becoming complete. As a result of implementing these controls properly the direct exposure pathway will be eliminated and therefore no complete human or ecological direct exposure pathway will be present at the site, and health and environmental risks will remain.