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environmental · engineering · water resources

June 26, 2024

Mr. Jared Chang, AICP
Bowers + Kubota Consulting
94-408 Akoki Street # 201A
Waipahu, HI 96797

Subject: **Preliminary Site Investigation Letter Report**
Varona Village Parcels
Ewa, Oahu, Hawaii
Tax Map Key (1) 9-1-182: Parcels 007 and 010

Dear Mr. Chang:

Element Environmental, LLC (E2) has completed a Preliminary Site Investigation (PSI) in support of the proposed land transfer and development of two parcels (Tax Map Key [1] 9-1-182: parcels 007 and 010) of former agricultural land referenced above (*hereinafter referred to as the subject property*). The City and County of Honolulu (CCH) acquired Ewa Villages, including the subject property, after the plantation's land lease expired in the early 1980s. The State of Hawaii Department of Hawaiian Home Lands (DHHL) and CCH are currently negotiating a transfer of ownership for the two parcels of land.

The subject property has a combined land area of approximately 50 acres (less the approximately 3.7 acres previously developed as part of the Ka Makana Alii development currently held under license by the DHHL and CCH. Parcel 007 is approximately 19 acres in size and can be found on the north side of Kapolei Parkway. Parcel 010 covers an area of around 31 acres and is situated between Kapolei Parkway to the north and Renton Road to the south. Varona Village community is located to the west of Parcel 010.

The DHHL is in the process of evaluating potential ownership of the subject property for residential and commercial/industrial development. The purpose of the PSI was to evaluate the presence/absence, nature, and magnitude of potential contamination in surface soil to a maximum depth of 0.5 feet (ft) below ground surface (bgs) prior to the land transfer.

This letter summarizes the findings of the historical and regulatory records review, the sampling rationale and methodology, fieldwork, sample results, potential environmental hazards, findings, conclusions, and recommendations.

RECORDS REVIEW

E2 examined readily available documents, including site plans, site surveys/reports, topographic maps, and aerial photographs, along with supplemental documents obtained from public resources and E2 archives. We requested but did not receive title report(s) for the subject property, nor did we conduct interviews. E2 also reviewed readily available government records and environmental-related databases regarding

environmental conditions at the subject property and neighboring properties. The following paragraphs briefly describe our findings.

Historical Maps and Aerial Photographs

Parcel 007, located north of the Kapolei Parkway, was used for sugar cultivation from the late 1800s to 1982 when Oahu Sugar Plantation closed. It appears that this parcel lay fallow; however, illegal dumping occurred. In 1993¹, the entire parcel was graded, and construction of the Kapolei Parkway was underway.

Parcel 010, located adjacent to the Ka Makana Alii development, south of the Kapolei Parkway, and north of Renton Road (the former Oahu Railway and Land Co. [OR&L] right-of-way), was historically used for sugar cultivation from the late 1800s to 1982, when Oahu Sugar Plantation closed.

- 1902 Hawaii Territory Survey Map²: A portion of the subject property adjacent to the north side was used for sisal crops; the remainder to the north was part of the Ewa Plantation Co. sugar lands.
- 1922 United States Geological Survey (USGS) Fire Control Map³: Shows the Varona Village plantation housing development.
- 1928 Aerial Photo⁴: Shows an unidentified development/use of the southwest corner of Parcel 010 (approximately six acres) surrounded by cane fields (see photograph on the following page). This development was adjacent to the OR&L right-of-way. The Ewa Mooring Mast Field was located across the railroad tracks to the south.



¹ NOAA Aerial Photograph_Ref. 19-2072. 1993.

² Hawaii Territory Survey Map. Prepared by: Walter E. Wall. Surveyor. 1902.

³ Fire Control Map of Oahu. Prepared by: USGS. 1922.

⁴ Ewa Mooring Mast

- 1938 USGS map⁵: Shows a cane haul road and cane fields surrounding the unidentified development on the southwest corner of Parcel 010.
- A 1941 aerial photo⁶: Shows Plantation Camp B, now located on the east side of Varona Village.
- 1944 Barbers Point – Ewa Hawaiian Islands Photo Map⁷: Shows the unidentified development on the southwest corner of Parcel 010.
- A 1951 USGS Aerial Photo⁸: Shows the cane haul road on the west side of the unidentified development. Canfields surround the development on the east, west, and north sides.
- 1962 U.S. Department of Agriculture (USDA) Aerial Photo⁹: The cane field on the east side of the unidentified development and a portion of Camp B were cleared, and later, aerials appear to show the cleared area as a park. Canfields surround the development on the east, west, and north sides.
- 1993 National Oceanic and Atmospheric Administration (NOAA) Aerial Photo¹⁰: Shows the Kapolei Parkway construction is underway. The west side of Parcel 010 has been graded and was likely used as a construction base yard.
- 2000 NOAA Aerial Photo¹¹: Shows both the Kapolei Parkway and Ka Makana Alii construction. The west side of Parcel 010 was likely used as a construction base yard.



⁵ USGS Topographic Map of the Island of Oahu and the City and County of Honolulu, Hawaii, Surveyed 1927-1930. 1938 edition.

⁶ 1941 Annotated Aerial Photograph of the Japanese Ewa Airfield Attack Route. Prepared by: Mr. John Bond.

⁷ Barbers Point – Ewa Hawaiian Islands Photo Map. Prepared by: 64th Engineer Top. BN, USAFCPBC. Photography from Army Sorties flown November and December 1944.

⁸ USGS Aerial Photograph Ref. 22_2304. 1951.

⁹ USDA Aerial Photograph_Ref. 47-4403. 1962.

¹⁰ NOAA Aerial Photograph_Ref. 19-2072. 1993.

¹¹ NOAA Aerial Photograph_Ref. 19-2072. 1993.

Phase I ESA (Kimura International, 2014) ¹²

Kimura International identified the following recognized environmental conditions associated with the subject and/or adjoining properties:

- Parcels 007 and 010: Former use of both parcels for sugar cane cultivation.
- Parcel 007: The illegally dumped construction debris and the empty 5-gallon gasoline can.
- Parcel 010: Various piles of construction debris and household waste are scattered throughout, including concrete and asphalt construction debris, wire jackets, tires, empty container motor oil, refrigerator, television, and plastic and geotextile fiber. Additionally, a rubbish fire along the southern border of the parcel appears to have included at least one tire.
- The historic use of both parcels of the target property as former sugar cane land is a historic recognized environmental concern (HREC). Kimura International did not believe this HREC posed an immediate threat to human health or the environment; however, they stated it should be assumed that as a result of this use, the soils on both properties had been impacted by organochlorine pesticide and heavy metal pesticide use.

PRELIMINARY SITE INVESTIGATION

METHODOLOGY

The property was divided into 53 decision units (DUs), each approximately 1-acre in size. The DUs were labeled as DUs-1N to -20N and were located on the northern parcel, Parcel 007, while DUs-1S to -33S were located on the southern parcel, Parcel 010. The DU layout is presented in Figure 1, attached. Three of the 33 DUs within Parcel 010 (DUs-7S, -18S, and -27S) are occupied by paved parking as part of the Ka Makana Alii development and were not sampled (refer to the DUs highlighted in blue in Figure 1).

To establish the boundaries of DU, GIS technology was utilized, and survey tape was then placed to provide a point of reference in the future. Additionally, E2 observed and documented noteworthy areas of concern (AOCs) found during the sampling process, such as stained soil, ash, stockpiles, and debris piles, along with accompanying notes and photographs. Each of these AOCs was subsequently mapped using the GIS.

Soil sampling activities were conducted from February 13 through 22, 2024. A total of 56 *MULTI INCREMENT*® samples were collected from surface soil (0 to 0.5 ft bgs); 50 primary samples (one from each of the DUs) and six replicate samples (DU-8SB and -8SC, DU-19SB, and -19Sc, and DU-30SB and -30SC).

Each surface soil sample was composed of (100) 15-gram increments, for a total sample mass of 1.5 kilograms. Increments for each sample were placed in a resealable plastic bag and labeled with the project name, DU number, date, and time. Samples were temporarily stored in a cooler with wet ice in the field, logged on chain-of-custody forms, packed for shipping with blue ice, and shipped via FedEx to Eurofins Laboratory in Tacoma, Washington, for analysis.

¹² Phase I Environmental Site Assessment, Varona Villages, TMKS (1) 9-1-17-101, Lot 18278 and (1) 9-1-17-102, Lot 18280-A. Prepared for: City and County of Honolulu Department of Transportation Services. Prepared by: Kimura International. May 2014.

Soil samples were analyzed for one or more of the following:

- Polynuclear aromatic hydrocarbons (PAHs) using Environmental Protection Agency (EPA) Method SW-846 8270E-SIM,
- Organochlorine pesticides (OCPs) using EPA Method SW-846 8081B,
- Resource Conservation and Recovery Act (RCRA) 8 metals using EPA Method SW-846 6020B/7471A,
- Bioaccessible arsenic using EPA Method SW-846 1340/6010D was tested for four samples (DU-21S, -22S, -29S, and -32S), where total arsenic exceeds the State of Hawaii Department of Health (HDOH) Tier 1 Environmental Action Level (EAL) of 24 milligrams per kilogram (mg/kg) for total arsenic, and
- Toxicity Characteristic Leaching Procedure (TCLP) was tested for samples where total chromium (DU-20N, DU-3S, DU-6S, DU-10S, DU-19S, DU-21S, and DU-22S) and/or total lead (DU-22S, DU-28S, DU-29S, DU-30S, DU-31S, DU-32S, and DU-33S) exceeded the EPA's x 20 Rule.

SOIL SAMPLE RESULTS

Sample results were compared to HDOH EALs for sites where groundwater is a potential source of drinking water and the nearest surface water body is less than 150 meters away.¹³ Sample results for bioaccessible arsenic were compared to *Arsenic Soil Management Categories* (ASMCs) in accordance with current HDOH guidance.¹⁴

Table 1 summarizes the sample results exceeding the HDOH Tier 1 and Commercial/Industrial (C/I) EALs¹⁵ and ASMCs. The complete data summary table (Table A) and the laboratory reports are attached.

None of the contaminants of potential concern (COPCs) were detected in Parcel 007 surface soils at concentrations exceeding HDOH EALs. Only two COPCs, arsenic and lead, were identified Parcel 010 soils at concentrations exceeding HDOH EALs. Bioaccessible arsenic was identified in the soil at concentrations within ASCM Category C. All of the above detections were in DUs located within the southwest portion of Parcel 010 (see Figure 1 attached).

¹³ HDOH, 2024, *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Spring 2024)*: Hawaii'i Department of Health, Hazard Evaluation and Emergency Response, <https://health.hawaii.gov/heer/guidance/ehe-and-eals/>

¹⁴ *Update to Soil Action Levels for Inorganic Arsenic and Recommended Soil Management Practices (updates default, background arsenic soil action level presented in 2010 guidance to 24 mg/kg; arsenic exposure units in Section 3.0 table corrected to ug/day September 2012)*

¹⁵ HDOH, 2024, *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Spring 2024)*: Hawaii'i Department of Health, Hazard Evaluation and Emergency Response, <https://health.hawaii.gov/heer/guidance/ehe-and-eals/>

Table 1: Soil Sample Exceedances of HDOH EALs

Sample Number	Analytes (mg/kg)			ASMC
	Lead	Arsenic	Bioaccessible Arsenic	
DU-21S	11	55	60	Category C
DU-22S	110	28	7.9	Category A
DU-28S	440	15	NA	Category A
DU-29S	180	49	16 ^B	Category A
DU-30S	383	21	ND<0.0027	Category A
DU-31S	1100	21	NA	Category A
DU-32S	460	50	16 ^B	Category A
HDOH Tier 1 EALs	200	24		---
HDOH C/I EALs	800	95		---
ASCM Category A		<24		Not Impacted
ASCM Category B		>24	<23	Unrestricted Land Use
ASCM Category C			Between 23 and 95	Commercial/Industrial Use Only
Construction/Trench Worker Direct Exposure	800	110		

Notes: Blue font indicates the HDOH Tier 1 Tier 1 EAL is exceeded. Red font indicates the HDOH C/I land use EAL is exceeded.
ASMC = HDOH Arsenic Soil Management Categories. --- = Not applicable; NA = Not Analyzed
mg/kg = milligrams per kilogram B = compound found in the blank and sample

One DU sample had a lead concentration that exceeded the HDOH C/I EAL; three additional DUs had lead concentrations exceeding HDOH Tier 1 EALs. The four DU samples with the highest lead concentrations were additionally analyzed for TCLP, none of which had concentrations exceeding hazardous waste characteristics levels.

Four DU samples had arsenic concentrations exceeding HDOH Tier 1 EALs and were additionally analyzed for bioaccessible arsenic. One of the four DUs is impacted by arsenic concentrations within ASCM Category C, which limits land use to C/I uses only. Category C soils are exemplified by contamination at former pesticide storage and mixing areas and wood treatment facilities. Category C soils have also been identified in community gardens associated with former sugarcane plantations (with elevated arsenic also identified in the adjacent field areas), at the site of a former canec manufacturing site, and in some industrial areas believed to have been historically treated with arsenic herbicides for weed control.¹⁶

OBSERVATIONS IN THE FIELD

Illegal dumping and the potential presence of an old dump site were documented on Parcel 010 during the February 2024 sampling activities, as demonstrated in the attached Photo Plates.

¹⁶ HDOH, 2024, *Evaluation of Environmental Hazards at Sites with Contaminated Soil and Groundwater (Spring 2024)*: Hawaii'i Department of Health, Hazard Evaluation and Emergency Response, <https://health.hawaii.gov/heer/guidance/ehe-and-eals/>

CONCLUSIONS

Parcel 007: None of the tested analytes were detected in surface soil samples collected from Parcel 007 at concentrations exceeding the HDOH Tier 1 EALs; however, this parcel was completely graded at least once during construction of the Kapolei Parkway; therefore, it is possible that residual pesticides associated with sugar cane cultivation were mixed with deeper soils.

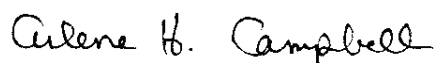
Parcel 010:

- Lead and/or arsenic were detected in seven DUs located in the southwest corner of the parcel and adjacent to the north side of Varona Village at concentrations exceeding HDOH Tier 1 EALs for unrestricted (residential) land use.
- Lead was detected in one DU (DU-31S) located in the southwest corner of the site at a concentration of 1,100 mg/kg, exceeding the HDOH C/I EAL. The lead may be associated with a potential dumping ground that was observed in this DU. Lead concentrations in excess of 800 mg/kg pose a direct exposure risk to construction and trench workers.
- Bioaccessible arsenic was detected in one DU at a concentration placing the soil in ASCM Category C, which limits the use of this DU to commercial/industrial use.

The HDOH Hazardous Evaluation and Emergency Response (HEER) Office typically requires complete characterization of soil at construction sites where the potential presence of contamination is suspected prior to development.

We appreciate this opportunity to provide you with our services for this project.

Sincerely,



Arlene H. Campbell, L.G.

Senior Geologist

Attachments

Figure 1 – Soil Sample Concentrations Exceeding HDOH EALs
Table A – Soil Sample Analytical Summary Data Table
Laboratory Reports
Photo Plates

