JOSH GREEN, M.D.
GOVERNOR OF HAWAI'I
KE KIA'ĀINA O KA MOKU'ĀINA 'O HAWAI'I

KENNETH S. FINK, MD, MGA, MPH
DIRECTOR OF HEALTH
KA LUNA HO'OKELE

STATE OF HAWAII
DEPARTMENT OF HEALTH
KA 'OIHANA OLAKINO
P. O. BOX 3378
HONOLULU, HI 96801-3378

In reply, please refer to:
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Mr. Bryan Li
Iwilei Center, LLC
c/o BlackSand Capital, LLC
2270 Kalakaua Avenue, Suite 1788
Honolulu, Hawaii 96815

Facility/Site: Iwilei Center, Voluntary Response Program (VRP) Site VRP-34, located at 866 Iwilei Road, 414 Kuwili Street, 418 Iwilei Road, and 860 Iwilei Road, Honolulu, Hawaii

Subject: Comments on Revised VRP TASK 5 – REMEDIAL ALTERNATIVES ANALYSIS, Iwilei Center, dated January 29, 2023

Dear Mr. Li:

The Hawaii Department of Health (HDOH), Hazard Evaluation and Emergency Response (HEER) Office has reviewed the revised Remedial Alternatives Analysis (RAA) report for the Iwilei Center site referenced above and has the following comments:

General Comments

1. The intent of Hawaii Revised Statute 128D (HRS 128D) Part II, which describes the Voluntary Response Program (VRP), is to encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties to enhance the environment, stimulate socioeconomic improvements, and allow appropriate development to proceed[1]. To that end, a response action under the VRP is generally expected to identify and remediate ***at least*** the most contaminated areas of the site, even where some residual contamination will remain and require long-term management under an Environmental Hazard Management Plan (EHMP). Since prospective purchasers generally enter into the VRP agreement with the intention of redeveloping a property, the site characterization and remediation are usually conducted in coordination with the redevelopment to allow for maximum access to investigate and remediate the site. At this site, both the initial site

[1] https://health.hawaii.gov/heer/about-heer/organization/sdar-programs/voluntary-response-program/

characterization and the consideration of remedial alternatives were hampered by the presence of an occupied building at the site and the presumption that current and future use of the site would remain the same. As a result, HDOH accepted the use of limited sampling data to make conservative assumptions about the nature and extent of contamination for the evaluation of environmental hazards at the site. HDOH did not require further investigation of several areas of concern that would otherwise have been warranted, since such investigation would have been costly and destructive to the existing infrastructure, and under current conditions these hazards are adequately mitigated. However, since HDOH is now aware that future redevelopment plans may allow for additional focused characterization and remediation of those areas of concern, please revise the RAA to address the following:

a. Unfortunately, due to the buildings and other infrastructure present at the site, the initial site characterization was not as thorough as HDOH would have preferred. As a result, contaminant concentrations presented in the Task 4 *Site Characterization* and Task 6 *Environmental Hazard Evaluation* (EHE) are generally conservative estimates and do not necessarily tell the whole story of the extent of soil and groundwater contamination at the site. There appears to be generally widespread heterogeneously distributed contamination at the site in the form of Total Petroleum Hydrocarbon Residual Range Organics (TPH-RRO) and some metals, primarily arsenic. These contaminants are mostly present in the surface and shallow subsurface soil layers from 0 to approximately 6 feet below ground surface (bgs), with TPH-RRO mostly concentrated in the upper 1.5-feet bgs. However, soil samples were not evaluated for bioaccessible arsenic, so potential risk of direct exposure to the arsenic-contaminated soil at most of the site is uncertain. Groundwater samples from around the site had copper and nickel concentrations that could potentially threaten aquatic habitats but otherwise do not pose a hazard to the site.

   In addition to the above general sitewide conditions, there are three localized areas of concern that appear to have significantly higher concentrations of contamination and/or specific contaminants not found at other areas of the site.

   The first of these three areas is Decision Unit 11 (DU-11) with the associated monitoring well 9 (MW-9) at the north end of the property in the vicinity of a former Auto Repair and Welding facility and Railroad Equipment Storage Yard. In this area, high concentrations of TPH diesel range organics (TPH-DRO) as well as TPH-RRO were encountered, along with free product on the ground water indicating a historic petroleum release and possibly the presence of an unknown underground storage tank on or adjacent to the property. Similar contamination was discovered at the adjoining Hawaiian Electric Company substation property in August 2021.

   The next area is DU-1, near the location of a former "Steam Termite Eradication Kiln" where very high concentrations of arsenic were encountered in both the subsurface soil and the groundwater.

The final area is DU-2, in the vicinity of a former sheet metal shop and former roofing construction facility, where concentrations of the chlorinated solvent tetrachloroethylene (PCE) were detected in the subsurface soil at concentrations exceeding unrestricted Tier 1 Environmental Action Level (EAL) for potential vapor intrusion.

Unfortunately, due to the limiting conditions of the Site Characterization investigation, the exact nature and extent of the contamination in these three areas was not further evaluated. In all three areas, the potential exposure risk associated with the specific contaminants was determined in the EHE to be mitigated by the existing building slab and pavement and/or lack of residential receptors or structures (in the case of DU-2).

While risks associated with the contaminants described in the three areas of concern above are mitigated under current conditions and may be mitigated effectively with institutional controls (ICs) during and after redevelopment, HDOH would prefer that additional characterization be conducted in these areas to delineate these specific contaminants and, if appropriate, to conducted targeted remediation of these areas during redevelopment. Clearing the contaminants in these areas could significantly reduce the overall potential hazards at the site and potentially reduce the cost of implementing any required long-term management.

Once the true nature and extent of the contamination in each of these areas is determined, targeted *in situ* or *ex situ* treatment and detoxification as an alternative to landfill disposal should also be considered, to better meet the objectives of a Response Action as described in Hawaii Administrative Rules (HAR) 11-451-8(c).

Please revise the *Future Redevelopment Scenario* sections of the RAA to evaluate potential remedies for the following four areas of concern (AOCs) and hazards independently:

(1) General site wide shallow and subsurface lead, arsenic and TPH-O direct exposure and gross contamination

(2) DU-11/MW-9 TPH-O and TPH-D direct exposure, leaching and gross contamination in soil and groundwater

(3) DU-1 arsenic and cadmium direct exposure

(4) DU-2 PCE vapor intrusion

When evaluating targeted specific alternatives for each of these areas, please discuss any appropriate additional limited characterization, evaluation of bioaccessibility, and/or confirmation sampling that should be used to help refine the remedy or define the extent of the hazard.

b. With the exception of the subsurface soil sample in DU-1, arsenic concentrations were generally within an order of magnitude or less of the Tier 1 EAL and/or the site-specific Commercial/Industrial (C/I) land use EAL. HDOH recommends that a bioaccessibility assessment of arsenic in soil be conducted prior to or during the

redevelopment of the site. If the arsenic contamination in DU-1 is remediated as discussed in Comment #1(a) and it is determined that bioaccessible arsenic concentrations across the rest of the site do not exceed 23 mg/kg, then arsenic could be removed as a potential hazard at the site (note, bioaccessible arsenic concentrations less than 95 mg/kg apply to C/I land use[2]). Please include evaluation of bioaccessible arsenic as part of the remedial alternatives considered for the sitewide contamination AOC (metals and TPH-RRO) in the *Future Redevelopment Scenario* sections of the RAA.

If the remaining three areas discussed in Comment #1(a) are remediated and arsenic is eliminated as a potential hazards at the site, then the only remaining significant hazard across the site would be TPH-RRO which could be treated in situ or left to attenuate naturally, potentially resulting eventually in a clean site. [Note, there are also some DUs with lead concentrations that exceed the unrestricted use Tier 1 EAL for direct exposure, but these may eliminated following confirmation sampling discussed in Comment 1(c) below, or addressed with C/I land use restrictions or other ICs as discussed in Comment 4(a)].

c. Since proper site characterization was limited during Task 4 due to the presence of the building and parking areas, and since presumably significant soil removal may occur during redevelopment, HDOH recommends conducting "confirmation sampling" of the soil that is left at the site following building demolition, soil excavation, and grading to better characterize site conditions prior to construction. This will allow for better evaluation of any remaining hazards at the site to be incorporated in a revised EHE and post-construction EHMP to manage any remaining institutional and engineering controls at the site. Confirmation DU Multi-Increment Sampling (DU-MIS) should be conducted at the recommended frequency for unrestricted use in the HDOH 2017 *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material* and in the HEER Office Technical Guidance Manual (TGM) but may be modified with approval from the HEER Office. Please incorporate confirmation sampling into the remedial alternatives being considered for the *Future Redevelopment Scenario* sections of the RAA.

Please consider including the above recommended action items in the selected preferred remedial alternative to be addressed in the event of and at the time of redevelopment. While simply capping any remaining contamination at the site without further characterization or targeted remediation will address most of the risk of exposure, addressing these concerns when the soil is accessible during redevelopment could significantly reduce long-term management requirements and costs and will also better achieve the preferred Response Action goals spelled out in HAR 11-451-8(c).

2. It is known that methane is a byproduct of anaerobic degradation of petroleum and high concentrations of methane vapor can pose an explosive hazard. This hazard may increase

[2] HDOH 2011, *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)*, https://health.hawaii.gov/heer/files/2019/11/hdoharsenicsoilactionlevelsnov2011revsept2012-1.pdf

in subsurface electrical vaults and conduits. Anaerobic conditions can occur in the vadose zone beneath a structure when the oxygen is depleted and there are no fresh air pathways to replenish it. Anaerobic conditions often occur in the soil below the vadose zone (below the groundwater table). With sea level rise, the depth to groundwater at this site is likely to decrease which could result in increased anaerobic degradation of TPH-RRO in the shallower subsurface soil at this site as it becomes inundated with groundwater and/or impacted by tidal fluctuations. Methane is not a contaminant of concern that was included in the VRP agreement for this site, however, it should be given some consideration during potential future redevelopment if TPH contamination will be left in place. Please include mention of this concern in sections that discuss leaving petroleum in place and in the future revised Remedial Action Memorandum.

Specific Comments

3. Section 4 and Table 4-1:

    a. Please discuss depth to which TPH-RRO hazards were identified in areas outside DU-11.

    b. Please also discuss the fact that the bioaccessibility of arsenic in soil at the site was not determined and such an evaluation could reduce the areas of the site where arsenic is considered a hazard, and discuss the localized area of high arsenic contamination in both soil and groundwater in DU-1 and MW-2.

    c. Please include a discussion of areas where lead and cadmium concentrations exceeded Tier 1 EALs. Although these concentrations of lead and cadmium do not pose a hazard to site workers under current conditions (i.e., C/I land use and *de facto* soil cap), proper soil management will be required in the event of redevelopment to ensure this contaminated soil is not re-used off-site without proper approval from HDOH[3].

4. Section 7.1.6:

    a. The third sentence discusses the challenge to *in situ* remediation due to "various COCs present (i.e., both organic and inorganic)," but in fact there are primarily only two contaminants found across most of the site, arsenic and TPH-RRO. Additional soil contaminants identified during Task 4, other than those in the areas of concern discussed in Comment #1(a) are benzo (a) pyrene, chlordane, dieldrin, lead, and cadmium. Of those, only lead and cadmium were identified as potential hazards for direct exposure under unrestricted use scenarios (HEER Office Tier 1 EALs). Concentrations of lead and cadmium do not exceed EALs for C/I land use. The slight cadmium exceedance of the Tier 1 EAL appears to be limited to the subsurface layer of DU-1, whereas lead Tier 1 exceedances appear to be present in surface soil of DU-5 and DU-13 and in the subsurface of DU-1, DU-2 and DU-5. In groundwater, other than the exceedances in the areas of

[3] HDOH 2017, *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*, https://health.hawaii.gov/heer/files/2019/12/Clean-Fill-Guidance-HDOH-Oct-2017-1.pdf

concern referenced in Comment #1(a) (anthracene and TPH in DU-11/MW-9 and arsenic in DU-1/MW-2), only copper and nickel were found to be sitewide contaminants and those only pose a potential hazard if de-watering occurs into an aquatic environment; there is no groundwater hazard for the site.

Therefore, if, following a bioaccessibility evaluation, arsenic is removed as a hazard (except possibly in DU-1) as discussed in Comment #1(b), then only the sitewide TPH-RRO contamination remains to be considered for remediation. Sitewide TPH-RRO appears to be mostly limited to the surface soil (0 to 1.5-feet bgs). Lead contamination could be reevaluated following remediation of DUs 1 and 2 and confirmation sampling discussed in Comment #1(c) or mitigated with C/I land use restrictions. Please revise this section to discuss specific *in situ* remedial alternatives for the specific areas of concern described in Comment #1(a) as well as sitewide *in situ* remediation alternatives for surface and (where applicable) shallow subsurface TPH-RRO. Reevaluation of the extent of potential TPH-RRO hazards following confirmation sampling discussed in Comment #1(c) may significantly reduce the volume of soil that may require *in situ* treatment.

b. Last sentence, first paragraph discusses the length of time to complete *in situ* remediation and the requirement for the site to remain vacant as a further challenge to implementation. However, this is not the case for all *in situ* remediation. For example, simple bioventing to increase natural attenuation (aerobic degradation) of TPH in soil could be incorporated into the new structure at the property and provide the additional function of reducing the potential buildup of hazardous methane gas discussed in Comment #2.

5. Section 7.1.9: Please revise this statement regarding delays to redevelopment based on Comment #4(b) above and reevaluate cost for *in situ* treatment during future redevelopment.

6. Table 7-1, (and scoring tables presented throughout the document): Please revise scoring to indicate significant increases in technical and administrative feasibility under the "Possible Redevelopment Scenario" based on above comments and the separation and targeted treatment of sitewide hazards into manageable AOCs. For simplicity, please create separate tables for each AOC to evaluate appropriate alternatives.

   Also, HDOH acknowledges that the scoring for these tables is highly subjective but please ensure that the ranking for each criterion, alternative and scenario are directly comparable. For example, for effectiveness, a score of 1 should be "not effective at all" and 4 should be "completely effective," or 1 should be" least effective" and 4 should be "most effective" when comparing **all** combinations of alternatives and scenarios. By this type of standard, it is not likely that a treatment that effectively eliminates a contaminant hazard through destruction, detoxification, or disposal will rank the same level of effectiveness as a remedy that leaves the hazard in place to be managed indefinitely through ICs. HDOH acknowledges that the ICs alternative may still ultimately rank higher due to other factors.

7. Section 7.2.4:

    a. First paragraph: Please re-evaluate *ex-situ* treatment alternatives based on Comments #1(a) through #1(c) above. Also, in addition to excavation and disposal, please evaluate off-site treatment alternatives that may reduce or destroy contaminant toxicity, mobility, or volume in accordance to the preferences listed in HAR 11-451-8(c). HDOH acknowledges that it may be difficult to find an off-site location to conduct *ex situ* treatment on Oahu, nonetheless, the alternative should be explored.

    b. Second paragraph: Where contaminated soil may be left in place, you may also consider consolidating contaminated media in one area of the site as a way to minimize potential future exposure to receptors and IC requirements.

8. Section 7.2.6: Please revise cost discussion based on previous comments.

9. Table 7-2:

    a. Please revise as discussed in Comment #6.

    b. Also, please separately evaluate Effectiveness for *ex situ* treatment that reduces toxicity or destroys contaminants compared to off-site disposal and/or re-use on-site with no reduction in toxicity.

    c. Additionally, long-term effectiveness where contamination is left in place should rank lower for "Ex Situ" alone versus "Ex Situ & I/E Controls," please revise as appropriate.

10. Section 7.3:

    a. Please include in this section a discussion of how and whether long-term monitoring (LTM) of groundwater and free product recovery could potentially be incorporated into redevelopment plans such that the implementation of LTM would not limit or delay redevelopment significantly.

    b. Please also discuss whether a combination of source removal and LTM is feasible and beneficial, e.g., excavation and treatment or disposal of contaminated soil in DU-11, (along with any identified source, possibly including an impermeable barrier if the source is on the adjoining property), together with LTM and natural attenuation.

    c. Failure to treat the significant TPH contamination in DU-11 may contribute to an increased methane hazard as described in Comment #2, please include a brief discussion of this potential hazard in this section as well.

11. Table 7-3: Please revise as discussed in Comment #6.

12. Section 7.4: While ICs can effectively manage the risk of exposure to contaminant hazards under current conditions and following redevelopment, ***during*** redevelopment ICs will be more difficult to implement and workers will be exposed to contaminated media. Please discuss this in the evaluation of the "Future Redevelopment Scenario."

13. Table 7.4:

    a. Please revise this table based on Comment #6.

    b. Please also include separate scoring for the "Future Redevelopment Scenario" if the scoring for that scenario differs based on Comment #11 changes (e.g., scores for short-term impacts and implementability may change).

    c. As discussed in Comment #6, please reevaluate whether ICs alone should rank the same as treatment ***plus*** ICs in categories such as "Minimizes residual risk" and "Long-term effectiveness."

14. Based on the preceding comments, please revise the preferred alternative to also include additional remedial activities in specific AOCs during redevelopment, as determined appropriate and feasible, as well as pre-construction confirmation sampling to reevaluate the residual risk following remedial activities and site grading activities.

    It is also recommended that if contaminated soil will be left in place, consider consolidating the contaminated media in one area of the site for easier long-term management, see Comment #7(b).

15. Table 8-2: Please revise this summary table based on any changes to the preceding tables.

Should there be any questions, please do not hesitate to contact me at 808-586-5815 or via e-mail at sven.lindstrom@doh.hawaii.gov.

Sincerely,

Sven Lindstrom
Voluntary Cleanup Program Specialist
Site Discovery, Assessment, and Remediation
Hazard Evaluation and Emergency Response Office
Hawaii Department of Health

cc: Lisa Bail
Robert Chong, ESI (via e-mail)
Tracy Sylva, ESI (via e-mail)