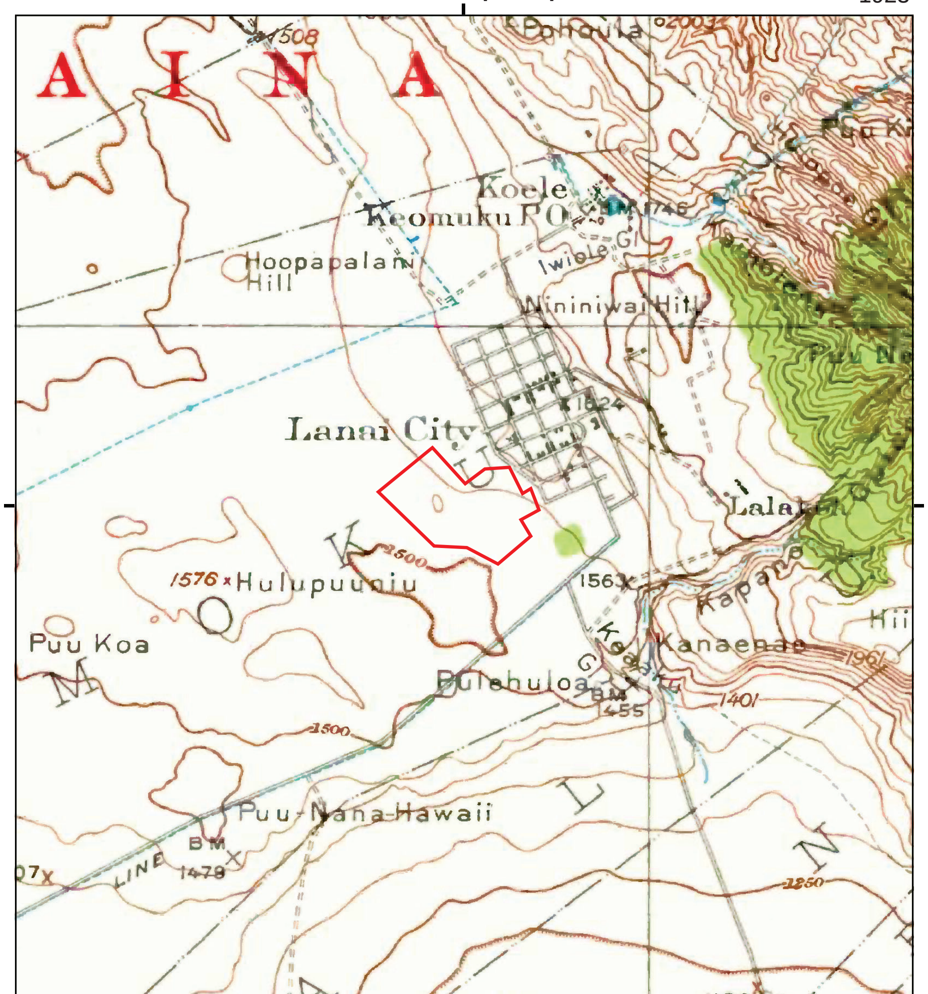
Historical Topo Map

1923



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE W E SW S SE

TP, Island of Lanai, 1923, 15-minute

SITE NAME: Lanai City Expansion - 200 Housing Units
ADDRESS: Awalua Avenue
Lanai City, HI 96763
CLIENT: TRC

N

Lanai City Expansion - 200 Housing Units
Awalua Avenue
Lanai City, HI 96763

Inquiry Number: 4620578.3
May 16, 2016

Certified Sanborn® Map Report

EDR®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

05/16/16

Site Name:	Client Name:
Lanai City Expansion - 200 Hou	TRC
Awalua Avenue	7600 N. 16th Street
Lanai City, HI 96763	Phoenix, AZ 85020
EDR Inquiry # 4620578.3	Contact: Kacey Swindle

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by TRC were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 7F79-4427-B880

PO #

Project 258407

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 7F79-4427-B880

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

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Lanai City Expansion - 200 Housing Units
Awalua Avenue
Lanai City, HI 96763

Inquiry Number: 4620578.5
May 17, 2016

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	*Target Street*	*Cross Street*	*Source*
2013	☐	☑	Cole Information Services
2008	☐	☑	Cole Information Services
2003	☐	☑	Cole Information Services
1999	☐	☑	Cole Information Services
1995	☐	☑	Cole Information Services
1992	☐	☑	Cole Information Services

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FINDINGS

TARGET PROPERTY STREET

Awalua Avenue
Lanai City, HI 96763

Year	*CD Image*	*Source*	
AWALUA AVE			
2013	-	Cole Information Services	Street not listed in Source
2008	-	Cole Information Services	Street not listed in Source
2003	-	Cole Information Services	Street not listed in Source
1999	-	Cole Information Services	Street not listed in Source
1995	-	Cole Information Services	Street not listed in Source
1992	-	Cole Information Services	Street not listed in Source

FINDINGS

CROSS STREETS

Year	*CD Image*	*Source*	
9 ST			
2013	pg. A1	Cole Information Services	
2008	-	Cole Information Services	Target and Adjoining not listed in Source
2003	-	Cole Information Services	Target and Adjoining not listed in Source
1999	-	Cole Information Services	Target and Adjoining not listed in Source
1995	-	Cole Information Services	Target and Adjoining not listed in Source
1992	-	Cole Information Services	Target and Adjoining not listed in Source
9TH			
2013	pg. A2	Cole Information Services	
2008	-	Cole Information Services	Target and Adjoining not listed in Source
2003	-	Cole Information Services	Target and Adjoining not listed in Source
1999	pg. A9	Cole Information Services	
1995	pg. A11	Cole Information Services	
1992	pg. A12	Cole Information Services	
9TH ST			
2013	pg. A3	Cole Information Services	
2008	pg. A4	Cole Information Services	
2003	-	Cole Information Services	Target and Adjoining not listed in Source
1999	-	Cole Information Services	Target and Adjoining not listed in Source
1995	-	Cole Information Services	Target and Adjoining not listed in Source
1992	-	Cole Information Services	Target and Adjoining not listed in Source
NINTH			
2013	-	Cole Information Services	Target and Adjoining not listed in Source
2008	pg. A5	Cole Information Services	
2003	pg. A7	Cole Information Services	
1999	pg. A10	Cole Information Services	
1995	-	Cole Information Services	Target and Adjoining not listed in Source
1992	-	Cole Information Services	Target and Adjoining not listed in Source

FINDINGS

Year	*CD Image*	*Source*	
NINTH ST			
2013	-	Cole Information Services	Target and Adjoining not listed in Source
2008	pg. A6	Cole Information Services	
2003	pg. A8	Cole Information Services	
1999	-	Cole Information Services	Target and Adjoining not listed in Source
1995	-	Cole Information Services	Target and Adjoining not listed in Source
1992	-	Cole Information Services	Target and Adjoining not listed in Source

City Directory Images

Target Street	Cross Street	Source
-	✓	Cole Information Services

9 ST 2013

335	LANAI GUNS & AMMO LLC
	NO KA OI GRINDZ LANAI LLC
628	LANAI SEVENTHDAY ADVENTIST CHURCH

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH 2013

328	IWAO KURASHIGE

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH ST 2013

338	SERIGO AGUILA
789	PATRICIA FISHER

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH ST 2008

338	SERIGO AGUILA

Target Street	Cross Street	Source
-	✓	Cole Information Services

NINTH 2008

328	IWAO KURASHIGE
335	MARIANITO ATOK

Target Street	Cross Street	Source
-	✓	Cole Information Services

NINTH ST 2008

439	CAMILO BALISACAN

Target Street	Cross Street	Source
-	✓	Cole Information Services

NINTH 2003

335	MARIANITO ATOK
439	SERGIO AGUILA
575	SHAHRIAR RAJAEI

Target Street	Cross Street	Source
-	✓	Cole Information Services

NINTH ST 2003

439	CAMILO BALISACAN

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH 1999

428	GTE HAWAIIAN TEL GENERAL INFORMATION OFFICES
628	LANAI SEVENTH DAY ADVENTIST CHURCH

Target Street	Cross Street	Source
-	✓	Cole Information Services

NINTH 1999

328	IWAO KURASHIGE
439	SERGIO AGUILA
737	THOMAS SELBY
757	ROBERT DONOVAN

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH 1995

328	KURASHIGE, IWAO
335	TAAL, EDWIN
737	SOWERS, EDWARD
757	DONOVAN, ROBERT F
766	HARA, FAY
789	SNOW, STEVE

Target Street	Cross Street	Source
-	✓	Cole Information Services

9TH 1992

328	KURASHIGE, IWAO
335	BOLO, ALFREDO JR
	ESPANTO, F
439	BACALSO, ISIDRO A
	BAKING, R
628	MCNAMARA, BOB
737	SOWERS, EDWARD
757	DONOVAN, ROBERT F
766	FUNADA, FRANK S
789	SNOW, STEVE

APPENDIX E:
PHOTOGRAPH LOG

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
1	06/01/2016

Description:
North corner of the power plant

Photo No.	Date
2	06/01/2016

Description:
North corner of the power plant looking east; overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
3	06/01/2016

Description:
South corner of the power plant looking east; overgrown vegetation

Photo No.	Date
4	06/01/2016

Description:
Drain inlet for Site runoff located at the south side of the power plant

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
5	06/01/2016

Description:
Equipment located at the south side of the power plant

Photo No.	Date
6	06/01/2016

Description:
Former AST secondary containment located adjacent to the south corner of the power plant

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
7	06/01/2016

Description:
Items stored inside the power plant building (as viewed through a hole in the side of the building)

Photo No.	Date
8	06/01/2016

Description:
East of the power plant looking east across the Site; overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
9	06/01/2016

Description:
Debris pile located southeast of the power plant (Typical throughout the Site)

Photo No.	Date
10	06/01/2016

Description:
Northeast corner of the Site looking southeast to the adjoining site – Church leased from Pulama Lanai

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
11	06/01/2016

Description:
Northeast corner of the Site looking north to the adjoining site – Police Station

Photo No.	Date
12	06/01/2016

Description:
Northeast corner of the Site looking west down 9th Street to the adjoining property – Baseball field

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
13	06/01/2016

Description:
Sewer manhole located on 9th Street (one of two sewer lines that run from the north portion of the Site to the southeast corner of the Site)

Photo No.	Date
14	06/01/2016

Description:
Former school house located north of the power plant – collapsed with overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
15	06/01/2016

Description:
MECO substation located north of the power plant – currently operational

Photo No.	Date
16	06/01/2016

Description:
Former Boy Scout Hall located north of the power plant – View of the structure from 9th Street looking south across the Site; overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
17	06/01/2016

Description:
Hawaii Gas ASTs located in the northwest portion of the Site – Reportedly a temporary location for Hawaii Gas and will be moved to a new location off of the Site

Photo No.	Date
18	06/01/2016

Description:
Hawaii Gas upright, residential propane tanks located in the northwest portion of the Site

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
19	06/01/2016

Description:
Hawaii Gas oblong, residential propane tanks with storage container beyond located in the northwest portion of the Site

Photo No.	Date
20	06/01/2016

Description:
5 gallon bucket of hydraulic oil and 1 gallon bucket of paint in poor condition located in the northwest portion of the Site currently occupied by Hawaii Gas

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
21	06/01/2016

Description:
5 gallon bucket of hydraulic fluid located in the northwest portion of the Site currently occupied by Hawaii Gas

Photo No.	Date
22	06/01/2016

Description:
5 gallon bucket of unknown substance and aboveground PVC pipe over foam (reportedly used as a boundary marker) located in the northwest portion of the Site currently occupied by Hawaii Gas

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
23	06/01/2016

Description:
Tires dumped on the Site (typical throughout the Site)

Photo No.	Date
24	06/01/2016

Description:
Broken down grader located in the northwest portion of the Site currently occupied by Hawaii Gas

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
25	06/01/2016

Description:
Broken down pineapple harvester located in the northwest portion of the Site

Photo No.	Date
26	06/01/2016

Description:
Reported former location of a water standpipe used to fill water trucks to water the pineapple fields

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
27	06/01/2016

Description:
North Site boundary looking north across gated, County owned property

Photo No.	Date
28	06/01/2016

Description:
North Site boundary looking south across the Site and the electrical easement and pole mounted transformers

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
29	06/21/2016

Description:
Northwest Site boundary looking south across the site; overgrown vegetation

Photo No.	Date
30	06/21/2016

Description:
Northwest Site boundary looking west to adjoining property – Undeveloped, agricultural land (The roadway in the photo is reportedly going to be 9th Street once it is extended.)

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
31	06/01/2016

Description:
West Site boundary looking east across the Nursery

Photo No.	Date
32	06/01/2016

Description:
Leafshine aerosol located in the Nursery portion of the Site

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
33	06/01/2016

Description:
Three (3) empty totes of Roundup located along the southeast boundary of the Nursery

Photo No.	Date
34	06/01/2016

Description:
Pallets of fertilizer located in the east portion of Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
35	06/01/2016

Description:
Flammable cabinet located on the east portion of the Nursery

Photo No.	Date
36	06/01/2016

Description:
55-gallon drum of diesel with staining on the gravel below located in the east portion of the Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
37	06/01/2016

Description:
Nursery office located in the northeast portion of the Nursery

Photo No.	Date
38	06/01/2016

Description:
Pesticide and chemical storage shed located in the northeast corner of the Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
39	06/01/2016

Description:
Gravel floor of the pesticide and chemical storage shed located in the northeast corner of the Nursery

Photo No.	Date
40	06/01/2016

Description:
Liberate® Penetrant (Drift Control Agent) in the pesticide and chemical storage shed located in the northeast corner of the Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
41	06/01/2016

Description:
Water pipes located behind the Nursery office in the northeast portion of the Nursery

Photo No.	Date
42	06/01/2016

Description:
Porta Potties servicing the Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
43	06/01/2016

Description:
Fertilizer on pallets and a 15-gallon container of Pendulum Aquacap Herbicide located near the entrance of the Nursery

Photo No.	Date
44	06/01/2016

Description:
Green waste pile with compost piles beyond located to the northwest of the Nursery

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
45	06/01/2016

Description:
Water hose located just north of the green waste pile

Photo No.	Date
46	06/01/2016

Description:
North end of the community gardens looking southeast across the Site

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
47	06/01/2016

Description:
Community garden plot with chickens

Photo No.	Date
48	06/01/2016

Description:
Community garden plot with a garden

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
49	06/01/2016

Description:
Community garden plot with containers of unknown contents

Photo No.	Date
50	06/01/2016

Description:
Community garden plot with chickens

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
51	06/01/2016

Description:
Community garden plot with goats

Photo No.	Date
52	06/01/2016

Description:
Marked sewer manhole located in the southeast portion of the Site; overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
53	06/01/2016

Description:
County Highway Department located southwest of the Site

Photo No.	Date
54	06/21/2016

Description:
Waste Water Treatment Plant located southwest of the Site

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
55	06/01/2016

Description:
South Site boundary (12th Street) looking south to the light industrial adjoining the Site

Photo No.	Date
56	06/01/2016

Description:
Southeast Site boundary (12th Street and Awalua intersection) looking southeast to the warehouse adjoining the Site

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
57	06/01/2016

Description:
Southeast Site boundary (12th Street and Awalua intersection) looking northeast to the parking lot and storage containers adjoining the Site (Former Emulsion Plant Site)

Photo No.	Date
58	06/21/2016

Description:
Former Emulsion Plant Site – fenced off

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
59	06/01/2016

Description:
East Site boundary (from Fraser Avenue) looking east across the Site; overgrown vegetation

Photo No.	Date
60	06/01/2016

Description:
Former Oshiro gas station located to the north-northeast of the Site (LUST listing with NFA)

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
61	06/21/2016

Description:
Quonset Shed

Photo No.	Date
62	06/01/2016

Description:
Quonset shed, interior overview

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
63	06/21/2016

Description:
Quonset shed, storage containers located west of the shed. Locked and reportedly storing equipment

Photo No.	Date
64	06/21/2016

Description:
Quonset shed, contents of flammable cabinet in good condition

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
65	06/21/2016

Description:
West Site boundary looking west-northwest across Waste Water Treatment Plant northmost ponds (ponds are lined)

Photo No.	Date
66	06/21/2016

Description:
West Site boundary looking North across the Site, overgrown vegetation

Photographic Log

Client Name:	Site Location:	Project No.:
Pulama Lanai	Lanai City Expansion – 200 Housing Units	258407

Photo No.	Date
67	06/21/2016

Description:
Upper elevation beyond the Site overlooking the Waste Water Treatment Plant with the Site beyond.

APPENDIX F:
TRC STAFF AND ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS/RESUMES

TRC

ROSS SURRENCY, PG

EDUCATION
B.S., Geology, Georgia Southern University, 1990

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS
Professional Geologist, Arizona, (#50914), 2010
Professional Geologist, California, (#8005), 2005
Professional Geologist, Georgia, (#1294), 1996

AREAS OF EXPERTISE
Mr. Ross Surrency, PG, has expertise in the following areas:

- Project Management
- Phase I and II Environmental Site Assessments
- Soil and Groundwater Remediation
- Underground Storage Tank Removal/Management
- Regulatory Negotiation/Liaison
- CERCLA/RCRA

REPRESENTATIVE EXPERIENCE
Mr. Surrency has over 22 years of experience in the environmental industry serving private- and public-sector and government clients. This experience encompasses over 180 environmental investigations in 14 states involving a variety of project types, including fuel service stations, bulk fuel terminals, refineries, petroleum pipelines, manufacturing/industrial facilities, construction sites, landfills and United States military installations. These projects have involved a wide variety of contaminants including petroleum hydrocarbons, fuel oxygenates, industrial solvents, pesticides, PCBs, and metals. Mr. Surrency's responsibilities have included acquisition of environmental permits; preparation of work plans, health and safety plans, corrective action plans, and technical reports; planning, direction, and supervision of field, laboratory, and office studies to establish geologic and hydrogeologic site characteristics; implementation of corrective action activities; and regulatory compliance and liaison with regulatory agencies. His experience includes extensive hands-on planning, field investigation and remediation management, permitting, cost estimating, and project management.

Circle K Stores Inc., Site Management – Various Retail Sites, Southern CA (Project Manager: 2012-present)
Mr. Surrency serves as Project Manager managing site assessment, remediation, and operation and maintenance (O&M) activities for 10 retail gasoline stations located throughout Los Angeles and Orange Counties. He is responsible for scheduling all aspects of site work including frequent correspondence with various regulatory agencies.

Confidential Client, Remedial Excavation, Riverside, California (Senior Project Geologist: July 2013 – March 2014)
Mr. Surrency served as Senior Project Geologist during targeted soil removal on a 62-acre private property being developed for residential use. Approximately 165,227 tons of PCB-impacted soil was removed to achieve a residential cleanup goal of 0.22 mg/kg for PCBs. Approximately 995 confirmation soil samples were collected for laboratory analysis. Mr. Surrency prepared the removal documentation report for California Department of Toxic Substances Control (DTSC) submittal. Following report submittal, DTSC quickly responded with a certificate of completion for the project.

Holly Energy Partners, Remedial Excavation, Tucson, Arizona (Project Manager: 2011)
Mr. Surrency served as Project Manager for the removal of petroleum hydrocarbon impacted soil resulting from a gasoline release from an aboveground storage tank at a bulk fuel terminal. Approximately 234 tons of soil were excavated and transported offsite for disposal. Confirmation soil samples were collected to verify that the affected material had been successfully removed according to the state regulatory agency cleanup goals. Specialized equipment was utilized and safety was emphasized due to space limitations within the excavation area.

Burlington Northern and Santa Fe Railroad, Southern California International Gateway Properties Phase 2 Investigation, Wilmington, CA (Senior Project Geologist: June 2011)
Mr. Surrency served as Senior Project Geologist conducting a Phase II site assessment of the approximately 100-acre property. Assessment activities included identifying several active petroleum pipelines that traverse the property, drilling 95 soil borings to a maximum depth of 25 feet, and collecting soil and groundwater samples for laboratory analysis. A total of 268 soil samples and 39 groundwater samples were collected.

Carroll Shelby Enterprises, Inc., Gardena, CA (Senior Project Geologist: July 2010-Present)
Mr. Surrency serves as Senior Project Geologist coordinating site assessment and remediation activities at this facility. Activities have included additional onsite and offsite assessment, a tidal fluctuation study, a soil gas investigation including both sub-slab horizontal wells and vertical wells, cone penetration test (CPT) borings, microbial testing of site groundwater, enhanced in-situ bioremediation of groundwater, and installation of groundwater monitoring wells to delineate the lateral extent of dissolved-phase chlorinated solvents. Approximately 1,787 tons of soil were excavated and hauled offsite for disposal. The project includes frequent correspondence with the DTSC.

U.S. International Boundary and Water Commission, Biosolids Sampling at Nogales International Wastewater Treatment Plant – Rio Rico, AZ (Senior Project Geologist: November 2010)
Mr. Surrency conducted an evaluation of dewatered sludge at stockpile and land application sites (approximately 523 acres) for RCRA metals at the Nogales International Wastewater Treatment Plant in Rio Rico, AZ. His responsibilities included preparation of a Sampling and Analysis Plan, Quality Assurance Project Plan, soil sample location selection, collection and field screening of soil samples, data interpretation, and preparation of a technical report. The project involved full time field oversight by the state regulatory agency.

Confidential Client, Tire Fire Cleanup and Subsurface Evaluation, Maricopa, AZ (Senior Project Geologist: April-October 2010)
Mr. Surrency served as Senior Project Geologist overseeing the characterization and removal of approximately 21,000 cubic yards of stockpiled soil and debris resulting from a 2007 tire fire. A workplan was prepared and approved by the Arizona Department of Environmental Quality prior to beginning site activities. Frequent communication was made with the City of Maricopa Fire Department due to the possibility of flare ups from stockpiles that were continuing to smolder. The second phase of the project involved a subsurface investigation to determine if contaminants had migrated from the stockpiles into the underlying soil. This study was completed by establishing a 100 by 100-foot grid across the site and advancing direct-push soil borings to five feet below grade for the collection of depth-discrete soil samples. A total of 51 soil borings were advanced and 153 soil samples collected for laboratory analysis.

Burlington Northern and Santa Fe Railroad, Gatwick Properties Phase 2 Investigation, Commerce, CA (Senior Project Geologist: April 2010)
As Senior Project Geologist, Mr. Surrency conducted a Phase 2 site assessment of three properties. Assessment activities included drilling three 110-foot deep and two 60-foot deep soil borings. Soil and groundwater samples were collected for laboratory analysis.

ConocoPhillips Company, Anaheim Street Pipeline Investigation, Wilmington, CA (Project Manager: 2008)
Mr. Surrency served as Project Manager investigating a possible pipeline release along a 1,500-foot-long section of two abandoned crude oil pipelines. The pipelines were located in a highly traveled public street which presented logistical challenges. Site assessment activities included the following: target excavation to locate the pipelines, daily traffic control, and advancing 15 direct-push borings adjacent to the pipelines to collect soil and groundwater samples. Case closure was received from the regulatory oversight agency following review of the site assessment report.

Canners Steam Company, San Pedro, California (Senior Project Geologist: 2008-present)
As Senior Project Geologist, Mr. Surrency coordinated site assessment and remediation activities at the former steam production plant located in the Port of Los Angeles. Activities have included additional site assessment and feasibility testing, tidal fluctuation study, dewatering pilot test, and installation of groundwater monitoring and extraction wells to facilitate future remediation and delineate the lateral extent of dissolved-phase hydrocarbons. In addition, 6,402 tons of petroleum hydrocarbon-impacted soil were removed from the site for disposal.

ConocoPhillips Company, Site Management – Various Retail Sites, Southern CA (Project Manager: 2005-2008)
Mr. Surrency served as Project Manager managing site assessment or remediation activities for 30 retail gasoline stations located throughout Los Angeles and Orange Counties. He was responsible for scheduling all aspects of site work including frequent correspondence with various regulatory agencies. Mr. Surrency also conducted quarterly project status meetings with the ConocoPhillips site manager. Mr. Surrency achieved regulatory closure on six of the sites. He also coordinated the performance of due diligence site assessments at 15 additional sites throughout California.

ConocoPhillips Company, Marine Terminal - Wilmington, CA (Senior Project Geologist: 2007)
Mr. Surrency served as Senior Project Geologist coordinating site assessment activities at the 15 acre fuel terminal property. Activities included oversight of 16 CPT borings to collect discrete-depth groundwater samples and lithologic information. In addition, ultra-violet induced fluorescence was used to determine the vertical distribution of petroleum hydrocarbons in the subsurface. Mr. Surrency also coordinated a 72-hour tidal study to evaluate tidal influences on contaminant migration and determine net gradient.

ConocoPhillips Refinery, TBA Investigation - Wilmington, CA (Senior Project Geologist: 2005-2008)
As Senior Project Geologist, Mr. Surrency coordinated site-wide TBA investigation activities on the 424-acre refinery property. His activities included oversight of shallow direct-push soil borings, deep soil borings (up to 700 feet) using mud rotary drilling methods, monitoring well installation (up to 370 feet), aboveground storage tank release investigations, aquifer testing, downhole geophysics and video surveys, and waste disposal coordination.

California Department of Transportation, Aerially Deposited Lead (ADL) Studies – Riverside County, CA and Orange County, CA (Senior Project Geologist: 2008)
Mr. Surrency served as Senior Project Geologist coordinating ADL soil sampling efforts along a 20-mile section of Interstate 15 in Riverside County and a 4-mile

section of Interstate 405 in Orange County prior to planned freeway widening and HOV lane construction. The sampling program included marking approximately 440 locations, recording global positioning system (GPS) data at each location, directing two sampling teams consisting of direct-push drilling rigs, sampling technicians and traffic control. Mr. Surrency also prepared the summary reports for each project including a statistical evaluation of the laboratory data.

ConocoPhillips Los Angeles Terminal, Release Investigation – Los Angeles, CA (Senior Project Geologist: 2005-2007)
Mr. Surrency served as Senior Project Geologist conducting site assessment activities to assess an estimated 197,000 gallon gasoline pipeline release. His investigation activities included emergency response shallow soil borings around pipelines to determine point of release, installation of product recovery wells, installation of offsite monitoring wells and dual completion remediation wells to assess the extent of the product plume, and a soil gas survey. Mr. Surrency served as a liaison with adjacent property owners during offsite assessment activities.

City of Santa Ana, Fire Station No. 6 UST Project - Santa Ana, CA (Project Manager: 2007-2011)
Mr. Surrency served as Project Manager for a UST site assessment for the City. Project activities included monitoring well installation, quarterly groundwater sampling, groundwater over-purge events on select wells, quarterly report preparation, well abandonment, and regulatory agency negotiation. Case closure was obtained from the regulatory oversight agency.

City of Fountain Valley, Former Police Station UST Project – Fountain Valley, CA (Project Manager: 2007-2011)
Mr. Surrency served as Project Manager for a former UST release site owned by the City. Project activities included site assessment, monitoring well installation, remediation using a mobile vapor extraction unit, and quarterly groundwater monitoring, sampling and reporting.

Voit Anaheim Business Park, LLC, Former Kwikset Facility - Anaheim, CA (Project Geologist: 2005)
Mr. Surrency served as Project Geologist for remedial excavation of the 16-acre site. He was responsible for the excavation and disposal of soil containing tetrachloroethene, metals, and miscellaneous chemicals of potential concern related to the redevelopment of the property from industrial use to residential use. Other responsibilities included permitting; oversight and coordination of contractors, various consultants, and agencies during the excavation; and removal of approximately 95,000 tons of soil.

City of Santa Ana, Widening Project, Edinger Avenue at 55 Freeway - Santa Ana, CA (Project Geologist: 2005)
Mr. Surrency provided oversight for the removal of four USTs and remedial excavation in preparation for the widening of Edinger Avenue. He also collected soil samples beneath the USTs, product lines, and dispenser islands at the direction of the City Fire Department inspector.

Charleston Air Force Base, Charleston, SC (Senior Project Geologist: 2001-2002)
Mr. Surrency served as Senior Project Geologist for the characterization and closure of an inactive landfill at Charleston AFB. Characterization efforts included measuring the fill material thickness and lateral delineation, and groundwater characterization including monitoring well installation using the sonic drilling method. Mr. Surrency also prepared a feasibility study for the site to select the appropriate closure method.

U.S. Army Corps of Engineers Unexploded Ordinance Projects (Project Geologist 1998–2002)
Mr. Surrency assisted on U.S. Army Corps of Engineers clearance projects at unexploded ordinance sites in Brooksville, Florida; Carrabelle, Florida; Tampa, Florida; Durham, North Carolina; and Memphis, Tennessee. He worked on survey teams using various geophysical instruments (EM-61, EM-31, Schoenstadt) in tandem with global positioning system equipment on multi-acre sites to locate and map shallow buried ordinance for future removal or in-place detonation.

U.S. Army Corps of Engineers, Chemical Warfare Material Burial Site - Memphis, TN (Site Manager: 1998-1999)
Mr. Surrency served as Site Manager and Health and Safety Officer for an intrusive investigation at a chemical warfare material burial site in Memphis, Tennessee, under contract with the U.S. Army Corps of Engineers. He managed a group of 12 people performing various activities such as drilling and well installation, soil and groundwater sampling, geophysics, air monitoring, onsite laboratory analysis, and medical monitoring. Mr. Surrency also presented findings at a public meeting.

Department of Energy (DOE), Savannah River Site - Aiken, SC (Project Geologist: 1996-1998)
Mr. Surrency served as Project Geologist on several environmental assessment projects on the 310-square-mile nuclear facility. He oversaw field investigation activities at low-level radioactive burial sites and chlorinated solvent groundwater plume sites including monitoring well installation, down-hole geophysical logging, cone penetrometer soil borings, aquifer testing and soil sampling. Mr. Surrency obtained regulatory approval of workplans from the state agency and presented findings of select projects to DOE environmental staff.

Department of Defense, Natural Attenuation Demonstration – Eglin Air Force Base, FL (Project Geologist: 1995)
Mr. Surrency served as Project Geologist on natural attenuation demonstration projects at Department of Defense (DOD) facilities in conjunction with the Air Force Center for Environmental Excellence (AFCEE) and the EPA Robert S. Kerr Laboratory. His activities included petroleum hydrocarbon plume definition by collecting groundwater and soil samples using direct-push methods and performing onsite analyses.

Keesler Air Force Base, Biloxi, MS (Senior Project Geologist: 1995-2002)
Mr. Surrency served as Senior Project Geologist coordinating site investigation and assessment efforts and long-term groundwater monitoring efforts at the 1,500-acre installation during a RCRA Facility Investigation. Site assessments were conducted at eight UST sites, three landfills, a former fire training area, and seven solid waste management units at various locations across the Base.

Exide Batteries, Atlanta, GA (Project Geologist: 1996)
Mr. Surrency served as Project Geologist conducting site assessment activities at a former battery manufacturing facility. Activities included evaluating shallow soils for the presence of lead using XRF technology for onsite analysis of soil samples, and installing one shallow bedrock groundwater monitoring well.

Owens-Corning Plant, Anderson, SC (Staff Geologist: 1995)
Mr. Surrency served as Staff Geologist during site characterization efforts at this fiberglass manufacturing facility. Characterization activities included bedrock drilling and well installation using air rotary, and packer testing of fractured bedrock zones to estimate aquifer yield.

Chanute Air Force Base, Rantoul, IL (Staff Geologist: 1990-1992)
Mr. Surrency provided construction oversight during the removal of 21 USTs and over 13,000 linear feet of petroleum pipeline. He coordinated all soil and groundwater sampling activities and directed the remediation contractor when over excavation was necessary. Attended weekly project progress meetings with the U.S. Air Force resident engineer. As a follow-on to this project, Mr. Surrency coordinated and oversaw the installation of groundwater monitoring wells around several of the former UST sites to assess groundwater quality.

Various Clients, Site Investigations – Various Locations, GA, FL, SC, NC, MS, IL (Site Investigations: 1990-2001)
Mr. Surrency has performed site investigations, including RCRA Facility Investigations, site assessments at retail gasoline stations, UST removal activities, and DNAPL investigations at industrial chemical facilities. He has conducted investigations at DOD and DOE installations, landfills, fire training areas, industrial chemical facilities, petroleum pipeline sites, and sludge disposal pits.

SPECIALIZED TRAINING

- OSHA 40-Hour Hazardous Waste Health and Safety Training, 29 CFR 1910.120, 1990
- OSHA 8-Hour Hazardous Waste Supervisor Training, CCR Title 8, Section 5192, 2005
- OSHA 8-Hour Refresher Safety Training, 29 CFR 1910.120 and CCR Title 8, Section 5192, Annually
- MSHA 24-Hour Mine Safety Training, Part 46, New Miner Training, March 2012
- CAL-OSHA Trenching and Excavating Standards of California Competent Person Training, 2004
- DOE Order 5480.11 Radiation Worker, 1997
- Los Angeles Refinery Safety Overview (RSO), 2004

Kacey N. Swindle

EDUCATION
B.A., Biology, Hendrix College, 2006
A.A., Education, Central Baptist College, 2003

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS
EPA/AHERA (HIASB-3378) Accredited Asbestos Inspector - Hawaii
EPA/AHERA (HIASB-3378) Accredited Asbestos Contractor/Supervisor - Hawaii
EPA/AHERA (HIASB-3378) Accredited Asbestos Project Monitor – Hawaii
EPA (PB-0509) Certified Lead Inspector – Hawaii
NIOSH 582 Equivalent Sampling and Evaluating Airborne Asbestos Dust

AREAS OF EXPERTISE
Ms. Kacey N. Swindle has technical experience in the following general areas:

- Environmental Assessments and Audits
- Site Remediation Design and Implementation
- Asbestos Surveys
- Hazardous Material Surveys
- Microbial Investigations
- Lead Based Paint Inspections
- OSHA Compliance

REPRESENTATIVE EXPERIENCE
Ms. Swindle's responsibilities include large and small scale asbestos and lead (Pb) inspections for private, public, commercial and governmental agencies, air monitoring and compliance certification. Ms. Swindle is a certified lead inspector, AHERA inspector, contractor / supervisor, and project monitor.

In addition to asbestos and lead consulting, Ms. Swindle is also proficient in industrial hygiene air monitoring exposure and evaluations, including OSHA compliance and safety program development, as well as indoor air quality studies. Ms. Swindle has performed microbial investigations on multi-family residential and commercial structures. The investigations have encompassed microbial sampling, moisture mapping, project design, and coordination with company senior-level scientists (Ph.D.s, C.I.H.s). Ms. Swindle also performs microbial remediation oversight and post-remediation sampling. She is knowledgeable of construction practices, means, and methods. Ms. Swindle has performed Phase I Environmental Site Assessments including conducting site visits and generating reports.

ASBESTOS ASSESSMENTS

Lanai Resorts, LLC, Asbestos Surveys – Lanai, Hawaii (2014 - 2016)
Performed asbestos inspections prior to proposed renovation activities for various properties located on the island of Lanai. The investigations included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Highgate, Pacific Beach Hotel and Retail Spaces Asbestos Surveys - Honolulu, Hawaii (2014 - 2015)
Performed asbestos inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Kyo-Ya, Ltd., Princess Kaiulani Hotel and Retail Spaces Asbestos Surveys - Honolulu, Hawaii (2013 - 2014)
Performed asbestos inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Hawaii Pacific University, Aloha Tower Marketplace Asbestos/Lead Paint Surveys - Honolulu, Hawaii (2013 - 2014)
Performed asbestos/lead paint inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

General Growth Properties, Sears Asbestos/Lead Paint Surveys and Abatement Oversight - Honolulu, Hawaii (2012 - 2013)
Performed asbestos/lead paint inspections and asbestos abatement oversight during demolition activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal

characterizations and laboratory data interpretation to ensure that human health was protected.

Kyo-Ya, Ltd., Moana Surfrider Hotel Asbestos Surveys - Honolulu, Hawaii (2012 - 2013)
Performed asbestos inspections and asbestos remediation oversight of during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

Kyo-Ya, Ltd., Sheraton Waikiki Hotel Asbestos/Lead Paint Surveys - Honolulu, Hawaii (2011 - 2013)
Performed asbestos/lead paint inspections and asbestos remediation oversight during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

Hilton Hawaiian Village, LLC, Hilton Hawaiian Village Asbestos/Lead Paint Surveys - Honolulu, Hawaii (2011 - 2013)
Performed asbestos/lead paint inspections and asbestos remediation oversight during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

LEAD BASED PAINT ASSESSMENTS

Ala Wai Townhouse AOAO, Ala Wai Townhouse Lead Based Paint Inspection - Honolulu, Hawaii (2012)
Performed a lead based paint inspection of the above referenced residential building consisting of one hundred (100) similar dwellings as defined by the State

of Hawaii, Environmental Protection Agency (EPA) and United States Department of Housing and Urban Development. A written report was issued to the client detailing findings with regulatory recommendations.

PHASE I ENVIRONMENTAL SITE ASSESSMENTS

Lanai Resorts, LLC, Phase I Environmental Site Assessments – Lanai City, Hawaii (2014 – Present).
Performed Phase I Environmental Site Assessments for the development of various properties within Lanai City, HI. Responsibilities included assisting or conducting the site investigations and report generation.

APPENDIX G:
ENVIRONMENTAL PROFESSIONAL STATEMENT

DEFINITION OF ENVIRONMENTAL PROFESSIONAL AND RELEVANT EXPERIENCE THERETO PURSUANT TO 40 CFR 312

(1) A person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1(c)) on, at, in, or to a property, sufficient to meet the objectives and performance factors in §312.20(e) and (f).

(2) Such a person must: (i) hold a current Professional Engineer's or Professional Geologist's license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of three (3) years of full-time relevant experience; or (ii) be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of three (3) years of full-time relevant experience; or (iii) have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience; or (iv) have the equivalent of ten (10) years of full-time relevant experience.

(3) An environmental professional should remain current in his or her field through participation in continuing education or other activities.

(4) The definition of environmental professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).

(5) A person who does not qualify as an environmental professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

Relevant experience, as used in the definition of environmental professional in this section, means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1(c)) to the Site. TRC personnel resume(s) are included in **Appendix F**.

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature of Environmental Professional: Ross Sweeney   Date: 6/29/16

Draft Site Characterization Report

November 6, 2019

Lanai City Expansion, Lanai City

Prepared For:
Pulama Lanai
733 Bishop Street
Honolulu, HI 96813

Prepared By:
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Reviewed and Approved by: Carrie Plath, PG

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYM LIST

AOC	area of concern
bgs	below ground surface
COPC	chemicals of potential concern
CSM	conceptual site model
CY	cubic yard
DU	Decision Unit
EAL	Environmental Action Level
EHE	Environmental Hazard Evaluation
EHMP	Environmental Hazard Mitigation Plan
EPA	United States Environmental Protection Agency
ESA	environmental site assessment
FTC	Fast Track Cleanup
GPS	global positioning satellite
HEER	Hazard Evaluation and Emergency Response
HDOH	Hawaii Department of Health
MECO	Maui Electric Company
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MI	multi-increment
msl	mean sea level
OCPs	organochlorine pesticides
PCBs	polychlorinated biphenyls
QAPP	Quality Assurance Project Plan
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SVOCs	semi-volatile organic compounds
TEQ	toxicity equivalency quotient
TGM	Technical Guidance Manual
TPH	total petroleum hydrocarbons
TPH-G	total petroleum hydrocarbons as gasoline
TPH-D	total petroleum hydrocarbons as diesel
TPH-O	total petroleum hydrocarbons as motor oil
VOCs	volatile organic compounds

EXECUTIVE SUMMARY

Introduction

The site characterization was conducted by Pulama Lanai with the objective to characterize surface soils within the defined Site boundary to determine if the Site is suitable for residential use. In advance of planned construction activities at the Site, surface soil samples were collected according to guidance provided in the State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office Technical Guidance Manual (TGM [HDOH, 2017]) to evaluate the nature and extent of potential contamination due to historical operations, including the use of a large portion of the Site as pineapple growing fields. This Site Characterization Report documents all sampling activities, laboratory analysis, data validation, additional stockpile characterization, and soil removal actions performed to achieve the overall objective of concentrations of chemicals of potential concern (COPCs) in surface soils are below the screening levels. Screening levels used for the Site Characterization are the HDOH HEER Tier 1 Environmental Action Levels (EALs) for unrestricted/residential (unrestricted) land use for a site where groundwater is a potential drinking water resource and surface water is greater than 150 meters from the site boundary (Tier 1 EAL) (HDOH, 2017); or if there is no Tier 1 EAL, the Region 9, United States Environmental Protection Agency Regional Screening Levels for residential soil (EPA RSLs) (EPA, 2019).

Summary of Work

This site characterization was performed by TRC on behalf of Pulama Lanai and the documented work scope was proposed in the *Final Sampling and Analysis Plan, Lanai City Expansion, Lanai City, Hawaii* (TRC, 2017). The HDOH is providing regulatory oversight for this project and approved the work plan in correspondence dated December 20, 2017.

The site characterization was conducted according to guidance provided in the HDOH Hazard HEER Office TGM. For this site characterization, each area of concern (AOC) was subdivided into several decision units (DUs) and sampled using multi-increment (MI) methodology. Soil samples were analyzed for specific COPCs based on the AOC being characterized.

Summary of Results - Soil Sampling

With the exceptions of the former MECO Power Plant and the former Pesticide Shed, the results of the MI sampling indicate residual levels of COPCs are not present in surface soil at concentrations above screening levels and the site is suitable for unrestricted/residential use.

One DU from the pesticide shed (PS-DU2) and seven DUs from the former MECO Power Plant resulted in concentrations above the Tier 1 EALs. The remainder of the Site soils have no other exceedances of screening levels for the COPCs analyzed.

Additional Investigations and Removal Action

Site-Wide Stockpile Investigation

Over the course of the Site characterization, multiple stockpiles were discovered throughout the Site. Some of these stockpiles restricted access to DUs within the former agricultural area.

These site-wide stockpiles were comprised of raw construction materials (gypsum, cinder or mulch) and some were a combination of soil, construction debris, and refuse. No laboratory data was available for the stockpiles containing soil, therefore sampling and analysis was necessary to properly characterize prior to relocation or disposal.

Results of laboratory analysis were compared to the Tier 1 EALs and EPA RSLs for unrestricted/residential use. Concentrations of COPCs from the site-wide stockpiles were below screening levels for the COPCs analyzed.

Former MECO Power Plant – Demolition and Soil Sampling

Demolition activities associated with the decommissioning of the former MECO Power Plant resulted in the discovery and subsequent excavation of motion-dampening concrete footings beneath the plant structure. Removal of the footings led to the excavation and stockpiling of soil from beneath the building. Previous investigations in this area indicated the presence of hydrocarbon-impacted soil beneath the building which may have been removed during excavation activities.

The final excavation was measured at approximately 4,122 square feet to 10 feet below ground surface (bgs). TRC collected MI samples from the base and sidewalls of the excavation. A total of approximately 500 yds^3 of excavated soil was placed into seven stockpiles ranging from approximately 36 yds^3 to 128 yds^3.

From the excavation, laboratory analysis resulted in concentrations exceeding the Tier 1 EAL for total petroleum hydrocarbons as diesel (TPH-D) and TPH as motor oil (TPH-O) in the MI sample collected from the base of the excavation decision unit. No other exceedances were observed as concentrations were below screening levels for other samples collected from the former MECO Power Plant excavation.

Soil stockpile samples collected resulted in concentrations exceeding the Tier 1 EAL for TPH-D and TPH-O in two of stockpiles sampled. The remaining stockpile samples were below the screening levels.

Following the sampling and discussions with HDOH personnel, the excavation was first backfilled utilizing the stockpiled soil from the former MECO Power Plant with the soil exceeding Tier 1 EALs emplaced at 10 feet bgs. Soil from the Site-wide stockpiles located north of the Commercial Nursery was used to complete the backfill.

Pesticide Shed Removal Action

Based on laboratory results of the MI sampling at the Pesticide Shed AOC, a removal action was implemented to address impacted soil in one DU. Prior to the removal action, discrete-depth soil samples were collected at 1-foot intervals to a depth of 5 feet bgs to pre-characterize the depth of the excavation.

Based on the results of the subsurface soil samples, the impacted DU was excavated to a depth of approximately 2.5 feet bgs and approximately 25 cubic yards (CY) of soil was loaded directly into an onsite container for off-island disposal. Following completion of the excavation, confirmation soil sampling was performed on the base and the sidewalls of the excavation. Laboratory analysis of all confirmation soil samples resulted in concentrations below Tier 1 EALs.

Environmental Hazard Evaluation (EHE)

An EHE was performed to identify potential environmental hazards associated with contaminant concentrations in site soils through comparisons with established Tier 1 EALs for specific hazards and transport mechanisms. The evaluation of the MI soil data resulted in seven surface DUs at the former MECO Power Plant being flagged as potential hazards due to concentrations exceeding COPC Tier 1 EALs for either gross contamination, potential for leaching to groundwater, or human direct exposure. Additionally, three MI soil samples collected from the base of the MECO excavation and MECO stockpiles also exceeded COPC Tier 1 EALs.

Environmental Hazard Management Plan (EHMP)

Potentially unacceptable risks and hazards identified in the EHE must be managed with a site-specific EHMP. While most of the Site poses no environmental hazards for a proposed residential scenario, potential gross contamination, direct exposure, and leaching hazards are present at the former MECO Power Plant AOC. Hazards previously identified in the former Pesticide Shed area were subsequently addressed with the removal action and require no EHMP.

Based on planed future land use, these hazards require either corrective action or land use controls and long-term management of contaminated soil. During construction or Site activities which pose a potential risk of exposure for workers to contaminated dust, work must be supervised and performed by properly trained and certified personnel. Those working in the areas with a potential for contact and exposure shall have current HAZWOPER training. Potentially impacted soil handled during future construction activities within the MECO AOC, will need to me managed with a programmatic EHE/EHMP, as necessary. Soil to be removed should be evaluated for reuse, recycling, or disposal options.

Conclusions and Recommendations

With the exception of the former MECO Power Plant AOC, the remainder of the 85-acre site has been fully assessed for the purposes of residential redevelopment based on the results of this investigation. Concentrations of potential COPCs identified in the work plan for each AOC are either below Tier 1 EALs, EPA RSLs, or below laboratory detection limits and should have no restrictions for future use.

It is recommended impacted DUs within the former MECO Power Plant AOC undergo additional assessment and a removal action be conducted to adequately address hazards identified in this investigation. Additionally, hydrocarbon-affected soil at 10 feet bgs within the former MECO Power Plant excavation should be assessed for possible vapor migration to the surface and to confirm there are no vapor migration risks to human health.

1.0 Introduction and Background

This report documents the site characterization conducted for the proposed Lanai City Expansion (Site) located in Lanai City, Hawaii. See Figure 1 for the Site location and vicinity. This report was prepared by TRC on behalf of Pulama Lanai and the work scope was documented in the *Final Sampling and Analysis Plan, Lanai City Expansion, Lanai City, Hawaii* (TRC, 2017). The Hawaii Department of Health (HDOH) is providing regulatory oversight for this project and approved the work plan in correspondence dated December 20, 2017.

Information provided herein includes a site background, a summary of previous investigation work at the Site, and the results of the site characterization. This Site Characterization Report documents all sampling activities, laboratory analysis, data validation, additional stockpile characterization, and soil removal actions performed to achieve the overall objective of concentrations of chemicals of potential concern (COPCs) in surface soils are below the HDOH HEER Tier 1 Environmental Action Levels (EALs) for unrestricted/residential (unrestricted) land use for a site where groundwater is a potential drinking water resource and surface water is greater than 150 meters from the site boundary (Tier 1 EAL) (HDOH, 2017); or if there is no Tier 1 EAL, the Region 9, United States Environmental Protection Agency Regional Screening Levels for residential soil (EPA RSLs) (EPA, 2019).

1.1 Background

1.1.1 Site Location and Background

The Site is irregular-shaped and is located in the western portion of Lanai City in Maui County, Hawaii, approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaunakakai Highway (Figure 1). The surface elevation of the Site is approximately 1,545 feet above mean sea level (msl). The approximately 85-acre Site encompasses portions of parcels 2-4-9-014:001, 2-4-9-014:009, and 2-4-9-002:061. According to the Maui County Tax Assessor, the Site is zoned as open space and agricultural land, and is currently owned by Lanai Resorts, LLC.

The Site is bounded to the:

- East-northeast by a police station, churches, and Fraser Avenue.
- North by athletic fields and Lanai High School.
- South by 12th Street, followed by former agricultural land.
- South-southeast by a recycling center.
- Northwest by undeveloped land owned by Maui County.
- South-southwest by the Maui County Highway Department.
- West-southwest by a wastewater treatment plant.
- East-southeast by warehouses and an unpaved parking lot (former Emulsion Plant location) with storage containers.

1.1.2 Climate

The climate in Lanai City is considered subtropical rather than tropical. The island lies in the rain shadow of West Maui and East Molakai, so it is considered arid. The temperature for Lanai City ranges from 60 degrees Fahrenheit (° F) to 81° F, with temperatures rarely falling below 55° F or exceeding 84° F (Weather Spark, 2017). Lanai is subject to persistent northeasterly trade winds with southerly or "kona" winds interrupting the trade winds, especially during the winter.

The average rainfall on Lanai ranges from less than 10 inches along the coast to 38 inches at Koele and the summit. The summer marks the dry season on Lanai, and July is typically the driest month. Winter marks the wet season, and December is typically the wettest month, but heavy downpours during a single kona storm can account for a large part of the annual rainfall (Stearns, 1940).

1.1.3 Hydrology

Lanai is a small island, totaling approximately 140 square miles with only one significant stream, Maunalei Gulch. The island consists of a single volcanic shield. Lanai has groundwater levels that range from a few feet near the coast to over 1,500 feet above msl near the central portion of the island. Lanai relies on high-level groundwater where water level elevations of wells range between 520 feet above msl and 836 feet above msl based on well data in the vicinity of Lanai City (CWRM, 1996).

1.1.4 Regional and Site Geology

The island of Lanai is an inactive shield volcano formed by eruptions of magma that built up the shield and summit, and by eruptions along three rift zones. The primary rift zone is a broad northwest-trending ridge, approximately 5 miles long; two minor rift zones trend in the southwest and south-southeast directions. The Palawai Basin is located in the southern portion of Lanai and is the remnant of a caldera formed by the collapse of the shield summit (USDA, 1972).

The lava found on Lanai consists primarily of tholeiitic basalts. Lava flows range from 1 foot to 98 feet thick, with an average thickness of 20 feet, and appear to have been deposited relatively continuously, since there is little evidence of erosion or weathering between successive flows. Both pahoehoe (ropey) and a'a (chunky, angular) flows occur on Lanai, with pahoehoe flows predominating near vents and a'a flows occurring on the lower slopes (MacDonald, et al., 1983).

The climate of Lanai is considered arid since the island lies in the rain shadow of West Maui and East Molokai. The average annual rainfall at the summit is approximately 40 inches per year. The northeast portion of the island is sheltered from wave erosion, with broad expanses of alluvium and beaches. Conversely, the southwest portion of the island is fully exposed to waves generated by southwestern storms, creating the phenomenon of high sea cliffs, known as palis, along the leeward portion of the island (Macdonald, et al., 1983).

1.1.5 Regional and Site Hydrogeology

Drinking water for Lanai (and all the Hawaiian Islands) is primarily supplied by rainwater that has percolated down through soil and permeable volcanic rock, known as basal groundwater. The portion of the island that is below sea level, except within the rift zones, is saturated with salt water. The less-dense fresh water forms a basal lens above the salt water, known as the "Ghyben Herzberg" lens, and is referred to as a basal aquifer. A transitional zone occurs across the fresh water and salt water interface, which moves constantly due to tidal influence, seasonal fluctuations in recharge and discharge, and aquifer development (Macdonald, et al., 1983).

Perched or high-level aquifers that are not in contact with salt water occur as a result of downward percolation of rainwater being blocked by impermeable layers of dense lava, clay or volcanic ash. These aquifers are recharged by rainfall in high, mountainous areas. Groundwater flows from the recharge zones to discharge zones at the shoreline; however, frictional resistance to flow causes the groundwater to accumulate within the island, resulting in a basal groundwater gradient that slopes toward the shoreline (Macdonald, et al., 1983).

The Site is underlain by the Leeward Aquifer System, which is part of the Central Aquifer Sector on the island, and includes an unconfined, high-level aquifer in dike compartments. The groundwater in this aquifer is currently in use and contains groundwater with fresh salinity (<250 milligrams per liter of chloride [mg/L]). The groundwater is considered an irreplaceable drinking water source with a high level of vulnerability to contamination (Mink and Lau, 1993). The Site is above the underground injection control (UIC) line and therefore, the groundwater is considered a source of drinking water. Groundwater was not encountered during this investigation.

1.1.6 Land Use History

According to a Phase I Environmental Site Assessment (ESA) report (TRC, 2016), and information provided by Pulama Lanai, historic land use on the Site is summarized as follows:

- 1920-1941: Lanai City was reportedly first developed in the early 1920s, which is when pineapple plantation activities most likely began on the Site.
- 1942-1947: The Maui County Tax Assessor indicates a Quonset shed was built on the Site in 1942. It is unknown what the shed was used for.
- 1948-1988: The power plant was built on the Site in 1948 and was reportedly operated by the Dole Company to support pineapple plantation operations until 1988. In the 1980s, the former schoolhouse and former Boy Scout hall were relocated onto the Site.
- 1988-1996: The Maui Electric Company (MECO) operated the power plant. As of 1992, the pineapple plantations ceased operations, and the nursery and community gardens were developed on the Site.
- 1996-2003: The power plant stopped operating in 1996 and MECO vacated the premises in 2000 following the removal of the last two generating units. The facility was then utilized for storage. In 2003, an evaluation of the power plant was completed. The evaluation report (Maui Architectural Group, Inc., 2003) indicated petroleum-contaminated soil was present on the Site. Additionally, the evaluation report indicated that trace amounts of polychlorinated biphenyls (PCBs) were present in the soil on the Site. Based on interviews with knowledgeable Lanai personnel, the northwest area of the Site was used as a concrete batch plant for an unknown period. Later, this area was used to store obsolete pineapple harvesting equipment and scrap metal.
- 2003-2017: The Department of Land and Natural Resources (DLNR) leased the Quonset shed from Lanai Resorts to operate as offices and a storage facility in 2006. The MECO plant located on the Site continues to serve as a storage facility. The commercial nursery continues to operate on the Site. Residents of Lanai rent the community garden areas and use these areas to grow gardens and raise animals.

Hawaii Gas Company utilizes the northwest area of the Site for distribution of natural gas.

Reportedly, there was some historical military activity on Lanai that included the following:

- Army Air Corps and aviators making brief stops on the island;
- Military occupation during World War II;
- Development of machine gun and artillery emplacements to create furrows on open lands to prevent possible enemy landings;
- Bombing and target practice at Kapukaloa Hulopo'e and other sites; and
- Imprisonment of Japanese priests, teachers, and businessmen (personal communication from Pulama Lanai, 2017).

Based on inquiries with knowledgeable Lanai personnel, there is no indication that military activity was conducted within the Site area.

1.1.7 Current Site Use

The current land use in the immediate vicinity of the Site is light industrial, agricultural, and residential. The current activities conducted on the Site are described as follows:

- DLNR utilizes the Quonset shed as an office and storage facility.
- Prior to its demolition completed on January 21, 2019, Pulama Lanai utilized the former MECO Plant building as a storage facility. An electrical substation located to the northwest of the former MECO building is still in operation.
- A commercial nursery operates on a portion of the Site. Multiple single-story, wood and metal structures are utilized to facilitate nursery activities.
- Hawaii Gas Company operates a distribution area in the northwest area of the Site.
- Lanai residents utilize the community gardens for growing gardens and raising animals.

2.0 Investigation History

The following sections summarize Phase I and Phase II activities conducted previously at the site.

2.1 Phase I Environmental Site Assessment

A Phase I ESA was conducted for this Site in June 2016 in accordance with the American Society of Testing and Materials (ASTM) Practice E1527-13 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* and is documented in the TRC *Phase I Environmental Site Assessment Report* (TRC, 2016a). The ESA identified four recognized environmental conditions (RECs) where additional investigation was recommended. These RECs included the following:

- Former pesticide storage shed
- 55-gallon diesel fuel drum located in the northeast of the Commercial Nursery

- Former Emulsion Plant
- Former MECO power plant

In addition to these four RECs, it was decided to also assess former agricultural areas of the Site where historic pineapple growing operations occurred and a concrete pad used to wash down agricultural equipment located north of the Commercial Nursery at the intersection of the dirt roads.

2.2 Phase II Site Assessment

In September 2016, TRC performed Phase II Site Assessment activities at the Site. Details of this investigation are provided in the *Draft Site Assessment Report* (TRC, 2016b). Soil sampling consisting of both surface and subsurface samples was performed around the above-identified RECs and former agricultural areas listed below:

- Former pesticide storage shed: Soil samples were collected at 0.5 and 2 feet bgs.
- 55-gallon diesel fuel drum: two soil borings directly adjacent to the concrete pad the drum is resting on. Soil samples were collected at 0.5 and 2 feet bgs.
- Former Emulsion Plant: six surface soil samples were collected around the western and southern boundaries of the former plant.
- Former MECO plant: 10 surface soil samples were collected around the perimeter of the building and adjacent to various features.
- Former agricultural areas: surface soil samples were collected.
- Former wash-down pad: two surface soil samples were collected adjacent to the concrete pad to evaluate potential impacts related to the former use of this pad as an equipment wash-down area.

The laboratory results for soil samples collected during the Phase II investigation were compared to the Tier 1 EALs and EPA RSLs. The chemicals of concern that exceeded these Tier 1 EALs included the following:

- TPH-D at the 55-gallon diesel fuel drum location. The Tier 1 EAL for TPH-D is 200 milligrams per kilogram (mg/kg) and the maximum concentration detected in soil was 8,000 mg/kg.
- TPH-O at the 55-gallon diesel fuel drum location. The Tier 1 EAL for TPH-O is 500 mg/kg and the maximum concentration detected in soil was 1,000 mg/kg.
- Dioxins/furans at the former Emulsion Plant area. The Tier 1 EAL for dioxins/furans 2,3,7,8 TCDD Equivalence is 0.00024 mg/kg and the maximum concentration detected in soil was 0.0017 mg/kg (Sample collected at the perimeter).

The petroleum-impacted soil at the 55-gallon diesel drum location appeared to be of limited extent. Residual TPH-D and TPH-O concentrations observed in the surface soil samples collected from this area were not detected in the samples collected at 2 feet bgs.

Dioxins/furans were detected in the two samples from the perimeter of the former Emulsion Plant that were tested for these analytes. The result for one sample exceeded the Tier 1 EAL.

2.3 Former Emulsion Plant Site

At the intersection of Fraser Avenue and 12th Street is a site known as the former Dole Packaged Foods Company Emulsion Plant Facility (Emulsion Plant). This site is currently undergoing an environmental investigation with oversight by the HDOH. Several investigations and limited remediation have been performed at this site following the removal of two 10,000-gallon underground storage tanks (USTs) in 1989. (ETC, 2007 and 2015)

2.4 Former MECO Power Plant Investigations

2.4.1 PCB Investigation

On December 18, 1997, MECO collected one soil sample in the former transformer storage area and submitted it to a laboratory for PCB analysis. Aroclors-1254 and -1260 were detected at concentrations of 49.1 and 40.2 micrograms per kilogram (µg/kg), respectively. These results were documented in a letter from MECO to the Maui Architectural Group, Inc. dated February 26, 2003. (Maui Architectural Group, Inc., 2003)

2.4.2 UST Removal and Investigation

In October 1989, a 25,000-gallon UST was removed from the northeast corner of the former MECO power plant. Site investigations were conducted in 1991 and 1992. Subsequently, in 1993 an estimated 90 CY of petroleum-impacted soil was excavated from the southeast portion of the UST cavity. On January 13, 2003, a 5,500-gallon diesel fuel UST was also removed. Visibly stained soil was removed to the extent practical to a maximum depth of 23 feet bgs. Approximately 170 CY of soil was removed. Some stained soil in the west sidewall of the excavation could not be removed due to the presence of the power plant building. In this area, stained soil was observed from approximately 4 to 15 feet bgs (ETC, 2005).

In August 2006, three soil borings were advanced around the perimeter of the power plant building with a direct-push drilling rig to a depth of 20 feet bgs to further delineate the extent of the hydrocarbon-impacted soil. Soil samples were collected from each boring at 10 and 20 feet bgs and analyzed for TPH-D, benzene, toluene, ethylbenzene, and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs). Constituents were not detected above their respective laboratory detection limits (ETC, 2006). In a letter from HDOH Solid and Hazardous Waste Branch, UST Section dated February 2, 2007, it was stated that no further action was necessary for this release; however, the letter does acknowledge the area of petroleum hydrocarbon-impacted soil that remains in place beneath the building.

In April 2018, a total of 24 soil borings were advanced using a direct push rig to depths of up to 20 feet bgs both inside and outside the power plant building to conduct a more thorough site assessment and further evaluate subsurface conditions at the Site for potential redevelopment. Soil samples were collected and analyzed for organochlorine pesticides (OCPs), PCBs, TPH-D, TPH-O, and lead. Laboratory analysis resulted in concentrations of TPH-D and TPH-O exceeding Tier 1 EALs. These concentrations were observed in samples collected within the northeast and southern corners within the plant building at depths ranging from 3 to 5 feet bgs (TRC, 2018).

3.0 Summary of Data Quality Objectives

3.1 Problem Statement

The Site is being evaluated for redevelopment for future residential use with up to 100 single family homes and other multi-family units to be constructed, as well as parks and open spaces. Given the historic and current land uses on this property, and the limited amount of environmental investigations and data available, there were data gaps related to the presence or absence of COPCs in areas of concern (AOCs) identified at the Site. To determine if the Site is suitable for residential use, the following environmental investigation was performed to address the data gaps.

3.2 Objectives

The objective of this investigation was to characterize surface soils within the defined Site boundary to determine if the Site is suitable for residential use. The collection of surface soil samples was performed as technically defensible and representative of site conditions as possible. The investigation was conducted according to guidance provided in the HDOH HEER Office TGM (HDOH, 2017). During the site characterization, each AOC was subdivided into decision units (DUs; see Section 4.4) and sampled using MI methodology. The data collected during the site characterization was compared to the Tier 1 EALs for unrestricted land use in areas where a current or potential source of drinking water is threatened, and where the nearest surface water body is greater than 150 meters (approximately 500 feet) from the Site; or if there is no Tier 1 EAL, the Region 9, United States Environmental Protection Agency Regional Screening Levels for residential soil (EPA RSLs) (EPA, 2019) were used.

3.3 Data Information Needs

Based on the preliminary identification of data gaps (see Section 4.1 above), additional data was needed for site characterization, health and safety planning, advanced evaluation of potential environmental hazards (e.g., need for a human health risk assessment), and the development of remedial alternatives. Data needs were continually re-evaluated and refined as more information about the Site was gained and potential environmental hazards were identified. Data information needs included the following:

- Data Needs for Purposes of this Work Scope:
  - Based on the COPCs determined for each of the proposed DUs (see Section 4.4 and 4.5) at the Site, surface soil samples were collected via MI sampling for laboratory analysis at detection limits that facilitate comparison with screening levels.
- Additional Data Needs and Evaluations:
  - Locate soils that have COPC concentrations that are above screening levels and may pose a significant threat to human health and the environment.
  - Determine the need for subsurface delineation based upon review of the data from the surface soil investigation.

  - Continued updates of the conceptual site model (CSM) and identification of potential exposure pathways for human and ecological receptors, human health and environmental risks, and data gaps.
  - Perform an Environmental Hazard Evaluation (EHE) and evaluate the need for:
    - Further site assessment including the need for shallow subsurface soil sampling.
    - Further evaluating the locations and depths of soils that are above screening levels.
  - Evaluate the need for removal actions, including potentially utilizing the Fast Track Cleanup (FTC) process with the HEER Office to streamline and expedite site cleanup and the No Further Action determination.

3.4 Decision Unit Determination

The Site was subdivided into seven AOCs (see Figure 2). The following is a list of AOCs and their associated COPCs:

AOC	COPCs
Former agricultural (pineapple growing) areas	Organochlorine pesticides, arsenic, bioaccessible arsenic*
Former MECO Power Plant	PCBs, TPH-D, TPH-O, lead, pesticides
Former pesticide shed	SVOCs, TPH-D, dioxins/furans, organochlorine pesticides, triazine pesticides, herbicides, arsenic, lead, carbamates
Commercial Nursery	Organochlorine pesticides, arsenic, bioaccessible arsenic*
Community Gardens	Organochlorine pesticides, arsenic, bioaccessible arsenic*
East Dirt Access Road	Dioxins/furans, organochlorine pesticides, arsenic, bioaccessible arsenic*
Former Storage Area	TPH-D, organochlorine pesticides, arsenic, bioaccessible arsenic*

Notes:
* Samples collected for bioaccessible arsenic analysis were held pending the results for total arsenic. If a total arsenic result exceeded the Tier 1 EAL of 24 mg/kg, the sample was analyzed for bioaccessible arsenic.

Each AOC was subdivided into several decision units (DUs) up to 1 acre in size. Since the Site is approximately 85 acres and is considered a "very large area for redevelopment," the size of each DU in the former agricultural area was 1-acre pursuant to HDOH guidance. DUs in other AOCs were sized according to the area being investigated. The DUs for each AOC are shown on Figures 3 through 9 and described in detailed field data sheets provided in Appendix A.

3.4.1 Former Agricultural Areas

Fifty-six (56) DUs ranging in area from 8,517 square feet/0.2 acres to 1.35 acres were sampled to characterize former agricultural areas of the Site surrounding the other AOCs. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 3.

3.4.2 Former MECO Power Plant

A total of eleven (11) DUs ranging in area from 1,439 square feet to 4,644 square feet were sampled at the former MECO Power Plant, consisting of nine DUs in the area around the building and two DUs in the footprint of the former building/warehouse. These DUs were sampled following the demolition of the power plant, subsurface structure removals, and backfill. Since PCBs are a COPC in this AOC, seventy-five (75) increments were collected from each DU. The DUs are shown on Figure 4.

3.4.3 Former Pesticide Shed Area

Three (3) DUs ranging in area from 291 square feet to 408 square feet were sampled for the former pesticide storage shed area. This area consists of an enclosed shed, a covered storage structure (removed during soil removal action), and a loading/parking area. One DU was sampled for each structure/area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 5.

3.4.4 Commercial Nursery

Four (4) DUs ranging in area from 2.36 acres to 2.76 acres were sampled to characterize the commercial nursery area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 6.

3.4.5 Community Gardens

Eighteen (18) DUs ranging in area from 1,266 square feet to 9,420 square feet were sampled to characterize the community gardens area. Since the individual garden plots are still being used by community members, and following a site visit by HDOH on February 28, 2017, it was decided to characterize this area with DUs situated on the network of dirt roads that crisscross the area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 7.

3.4.6 East Dirt Access Road (Northwest of Former Emulsion Plant)

The East Dirt Access Road (DAR) area is located northwest of the former Emulsion Plant (see Figures 2 and 8). Based on previous investigation results at the former Emulsion Plant site, a data gap was identified, and dioxins/furans required delineation in the area adjacent to the Emulsion Plant in the area of the dirt access road (within the Site boundary) during the site characterization. During site characterization activities, it was observed that the former Emulsion Plant site is used as a storage area, is paved with gravel, and fenced to reduce pedestrian access. DU1 was 8,599 square feet and DU2 was 8,813 square feet and located immediately adjacent to former Emulsion Plant (TRC, 2017) and within the dirt access road, as shown on Figure 8.

3.4.7 Former Storage Area

The Former Storage Area (SA) is located at the north/northwest Site boundary and north of the Commercial Nursery (see Figure 2). Fourteen (14) approximately 1-acre DUs were sampled to characterize this area based on the location adjacent to former agricultural lands and storage of equipment. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 9.

4.0 Field Investigations

This section summarizes the investigation procedures followed for the site characterization. Investigation activities were conducted in general accordance with the *Sampling and Analysis Plan* (TRC, 2017) and were performed using an MI sampling approach within the AOCs described in Section 4.0. Photos of each DU are incorporated into the field data sheets which are included in Appendix A.

4.1 Pre-Field Activities

Pre-field activities included the following:

- Pre-field reconnaissance visit to assess Site access, locate Site and DU boundaries, and field execution logistics.
- Mowing and brush clearing of dense vegetation. Vegetation removal was conducted by using a brush cutter attachment to a skid steer. No soil grubbing or grading was performed.

4.2 Surface Soil Sample Collection

Before sampling began at each DU, the boundaries were identified and marked using hand held Trimble global positioning satellite (GPS) units and survey flags. GPS coordinates for each DU endpoint are included in Appendix B. In some DUs, boundaries were adjusted to account for obstructions, changes in surface layout, or other site features not anticipated during DU selection and map preparation. Significant changes are summarized as follows:

- CN-DU1 and CN-DU2 were extended to the northeast to account for additional areas adjacent to the fence.
- AG-DU22 was altered to remove paved portions of 9th Street or Police Station property. This area of the Site will remain as-is based on design of the Site redevelopment.
- AG-DU41 was amended to add the small triangular area of AG-DU42. This alteration made both DUs more symmetrical and improve collection of MI soil samples.
- AG-DUs 13, 14, 15, 24, 25, and 26 required alterations to their boundaries due to the presence of soil and debris stockpiles.
- MECO-DU10 was altered to make a symmetrical rectangle shape; and MECO-DU3 was extended to the northwest to cover the area removed from MECO-DU10.
- MECO-DU4 was extended to cover remaining areas within the fence in the southern corner.

Once the DU boundary was delineated, MI samples were collected using a systematic random grid method. Sample collection within square, rectangular, or irregularly shaped DUs used an evenly spaced, square sampling grid, and the sample was collected from the same area of each cell within the grid (e.g., the lower left-hand corner). For sample collection in long, narrow DUs (such as the east dirt access road DUs), a triangular sampling grid was used.

Triplicate samples were collected at a rate of approximately 10% with a minimum of one triplicate sample per AOC. A total of 108 DUs were completed and 14 DUs were sampled in triplicate (28 additional quality control/quality assurance samples), for a total of 136 samples. Triplicate samples were collected by taking the first sample at the designated location within the DU, and then shifting the grid 2-3 feet of the calculated increment spacing in the direction of the X axis and then the Y axis to collect the second and third samples. Field data sheets detail the location of the increments (Appendix A).

Surface soil samples were collected from DUs using precleaned stainless steel trowels, stainless steel hand cores, or a hand-held drill. Soil increments consisted of soil from the ground surface to 0.5 feet deep. Care was taken to ensure that each increment had a representative amount of soil from the entire 0- to 0.5-foot column of soil and that the volume of each increment was consistent. Rocks and debris were not included with each increment. The soil increments were collected using a stratified, random pattern within each decision unit, ensuring the overall sample represented all portions of the decision unit area. Each MI sample was placed into a new, 1-gallon sized resealable polyethylene bag and each bag was labeled with the sample identification, date/time of sample collection, and the initials of the collector. The samples were then placed in a designated sample cooler with ice pending off-island shipment and delivery to the laboratory. Field data sheets documenting the collection of the samples are included in Appendix A.

4.3 Laboratory Analysis and Data Validation

To achieve the project objectives, site characterization MI samples were collected and analyzed in accordance with the Work Plan and the project specific *Quality Assurance Program Plan* (QAPP) (TRC, 2017). Samples were analyzed by SGS Laboratory, in Orlando, Florida, and APPL, Inc. in Clovis, California, both of which have been certified by the California Environmental Laboratory Accreditation Program to perform these services. In summary, all data is valid as reported and may be used for decision-making purposes. Reported issues are noted, qualifiers added and relative standard deviations (RSDs) are discussed in detail in Appendix C.1.

Analytical methods were completed in accordance with the method-specific requirements as described in the project-specific QAPP. Analytical data was provided to TRC as Level IV data deliverables in portable document format (PDF) as well as in electronic data deliverable format. Results were validated by TRC chemists for compliance with QAPP requirements. Level IV data validation was performed on 32 MI soil samples (including field replicates and lab replicates) which included validation of samples submitted for analysis to include at least one sample delivery group for each analytical method required for this site characterization. Level II data validation was performed on the remaining 89 MI soil samples including field triplicates. Level IV Data Validation Memorandums/Reports, Level II Data Validation Checklists, and analytical laboratory reports are included in Appendices C.1 to C.3.

5.0 Findings

5.1 Data Evaluation Criteria

MI soil analytical results for this investigation are compared to the current HDOH Tier 1EALs for sites with unrestricted land use, groundwater is a current or potential source of drinking water and a surface water body is located greater than 150 meters from the site (HDOH, 2017). If no EAL was available for an analyte, then EPA Region 9 Regional Screening Levels (RSLs) for residential soil were used.

5.2 Results of Multi-Incremental Sampling

5.2.1 Former Agricultural Area

A total of 68 MI samples (56 primary and 12 replicates) were collected from the former agricultural area. See Figure 3 for DU locations. Samples collected from the former agricultural area were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

At the request of HDOH, two DUs from the former agricultural area (AG-DU20 and AG-DU21) were also analyzed for lead by EPA Method 6010. Sample AG-DU21 was also collected in triplicate. These two areas contained former historical structures (former school buildings) with lead-based paint, so lead was a COPC for these specific DUs.

OCPs, arsenic, and lead concentrations were detected in surface soil in the former agricultural area DUs. However, all concentrations were below the Tier 1 EALs.

See Table 1 for results summary of laboratory analysis from the former agricultural area.

5.2.2 Former MECO Plant

A total of 15 MI samples (11 primary and four replicates) were collected from the former MECO plant. See Figure 4 for DU locations. These samples were collected following the demolition of the former MECO Power Plant and subsequent excavation and backfill (excavation details to follow in Section 8.0). Samples collected from the former MECO Power Plant were analyzed for the following:

- TPH-D by EPA Method 8015
- TPH-O by EPA Method 8015
- OCPs by EPA Method 8081B
- PCBs by EPA Method 8082
- Lead by EPA Method 6010

During demolition work, soil was observed to be stockpiled in the location of AG-DU39 which is immediately adjacent to the former MECO plant area and had been previously sampled. As such, a second MI sample was collected from AG-DU39 and analyzed for the MECO AOC suite of analyses.

TPH-D, TPH-O, OCPs, PCBs, and lead were detected in surface soil in the former MECO plant. Concentrations were below Tier 1 EALs and EPA RSLs except for the following:

- Sample MECO-DU1 resulted in a concentration of 223 mg/kg TPH-D.
- Sample MECO-DU2 resulted in concentrations of 1,320 mg/kg TPH-O and 290 mg/kg lead.
- Sample MECO-DU3 resulted in concentrations of 416 mg/kg TPH-D, 1,810 mg/kg TPH-O, and 639 mg/kg lead.
- Sample MECO-DU4 resulted in concentrations of 263 mg/kg TPH-D, 1,630 mg/kg TPH-O, and 735 mg/kg lead.
- Sample MECO-DU5 resulted in concentrations of 277 mg/kg TPH-D and 440 mg/kg lead.
- MECO-DU9 resulted in a concentration of 1.37 mg/kg total PCBs.
- MECO-DU11 resulted in a concentration of 637 mg/kg lead.

No exceedances of Tier 1 EALs or EPA RSLs were detected from the resampling of AG-DU39.

See Table 2 for the results summary of laboratory analysis of the former MECO Power Plant and AG-DU39.

5.2.3 Former Storage Area

A total of 16 MI samples (14 primary and two replicates) were collected from the former MECO plant. See Figure 9 for DU locations. Samples collected from the former storage area were analyzed for the following:

- TPH-D by EPA Method 8015
- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

TPH-D, OCPs, and arsenic concentrations were detected in surface soil in the former storage area DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 3 for results summary of laboratory analysis of the former storage area.

5.2.4 Commercial Nursery

A total of six MI samples (four primary and two replicates) were collected from within the commercial nursery. See Figure 6 for DU locations. Samples from the commercial nursery were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

OCPs and arsenic concentrations were detected in surface soil in the commercial nursery DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 4 for completed results of laboratory analysis of the commercial nursery.

5.2.5 East Dirt Access Road

A total of four MI samples (two primary and two replicates) were collected from the east dirt access road. See Figure 8 for DU locations. Samples from the east dirt access road were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010
- Dioxins and Furans by EPA Method 8290A

OCPs, arsenic, dioxin and furan concentrations were detected in surface soil in east dirt access road DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 5 for results summary of laboratory analysis for the east dirt access road.

5.2.6 Former Pesticide Shed

A total of five MI samples (three primary and two replicates) were collected from the former pesticide shed. See Figure 5 for DU locations. Samples from the former pesticide shed were analyzed for the following:

- SVOCs by EPA Method 8270
- TPH-D by EPA Method 8015
- OCPs by EPA Method 8081
- Triazine pesticides by EPA Method 8141A
- Propiconazole by EPA Method 8081A
- Carbamates by EPA Method 8321
- Chlorinated herbicides by EPA Method 8151A
- Arsenic and lead by EPA Method 6010
- Dioxins and furans by EPA Method 8290A

SVOCs, TPH-D, OCPs, carbamates, chlorinated herbicides, arsenic, lead, and dioxins and furans were detected in surface soil. Concentrations were below the Tier 1 EALs and EPA RSLs, except for the following:

- Sample PS-DU2 resulted in concentrations of 531 mg/kg TPH-D, 149 mg/kg arsenic, and 162 mg/kg bioavailable arsenic.

See Table 6 for results summary of laboratory analysis for the former pesticide shed.

5.2.7 Community Gardens

A total of 22 MI samples (18 primary and four replicates) were collected from the community gardens. See Figure 7 for DU locations. Samples from the community gardens were analyzed for the following:

- OCPs by EPA Method 8081A
- Arsenic by EPA Method 6010

OCPs and arsenic concentrations were detected in surface soil in the community garden DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 7 for complete results of laboratory analysis for the community garden.

6.0 Site-Wide Stockpile Characterization

During the initial mobilization in October 2018 to perform the MI sampling outlined in the SAP, a total of 10 stockpiles were discovered throughout the Site restricting access to six proposed DUs within the former agricultural area AOC and two proposed DUs within the Commercial Nursery AOC. Four of the stockpiles were comprised of raw construction materials (gypsum and cinder) or mulch. Six of the stockpiles were generated from historical construction activities and contained a combination of soil, construction debris, and refuse. Therefore, sampling and analysis was necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation, and the completion of the site characterization.

6.1 Field Activities and Laboratory Analysis

Samples from the site-wide stockpiles were collected using MI methods as outlined in HDOH HEER *Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material*, dated October 2017. As per the HDOH guidance, each stockpile was approximately 400 CY or less, therefore each stockpile was to be treated as an individual DU. The MI samples were identified by their stockpile number (i.e., Stockpile 1 = SP-1, etc.) and thirty (30) increments were collected from each DU. Please see Figures 10A and 10B for the location of stockpiles sampled.

Samples were submitted to Enthalpy Analytical in Berkeley, CA and were analyzed for the following:

- TPH as Gas (TPH-G), TPH-D, and TPH-O by EPA Method 8015
- OCPs by EPA Method 8081
- Metals by EPA Method 6010/7174
- SVOCs by EPA Method 8270C
- Dioxins/Furans by EPA Method 8290

Based on field observations, two stockpiles (SP-6 and SP-7) were suspected to have been generated from soil excavated at the local service station. Therefore, these two stockpiles were also analyzed for:

- Volatile Organic Compounds (VOCs) by EPA Method 8260B

Copies of the laboratory reports and chain-of-custody records are provided in Appendix C.3.

6.2 Laboratory Analytical Results

The soil sample analytical results for this investigation were compared to the site characterization screening levels.

A total of six MI samples (one from stockpiles SP-1, SP-2, SP-6, SP-7, SP-9, and SP-10) were collected. Laboratory results were as follows:

- TPH-G, TPH-D, and TPH-O were detected in the soil samples collected. All concentrations were below the Tier 1 EALs.
- One VOC compound (bromomethane) was detected in one of the two samples analyzed for VOCs. This concentration is below the Tier 1 EAL. No other VOCs were detected in the two samples SP-6 and SP-7.
- Sixteen different OCPs were detected in the soil samples collected. All concentrations were below the Tier 1 EALs or EPA RSLs.
- Fifteen different metals were detected in the soil samples collected. All concentrations were below the Tier 1 EALs.
- Seven different SVOCs were detected in the soil samples collected. All concentrations were below the Tier 1 EALs or EPA RSLs. No other SVOCs were detected in the soil samples.
- Dioxins and furans were detected in the soil samples collected. All toxicity equivalency quotients (TEQs) were below the Tier 1 EAL.

Please see Table 9 for results summary of laboratory analysis for the Site-wide stockpile characterization.

7.0 Former MECO Power Plant Demolition and Excavation

Demolition and earthwork associated with the decommissioning of the former MECO Power Plant began in November 2018 and was performed by Ohana Environmental Construction, Inc (OECI). During the demolition activities around December 21, 2018, concrete footings were discovered beneath the structure. The footings were approximately 10 feet deep by 40 feet long, with spacing between approximately 4 feet wide. They were poured in a parallel position with the building.

Demolition continued by OECI with heavy equipment (excavator with hammer attachment and trencher) to remove the concrete footings. During the concrete removal, soil surrounding and between the footings was excavated and placed around the perimeter of the excavation. Based on results of previous assessment activities at the site, it was possible hydrocarbon-impacted soil was excavated from beneath the former MECO Power Plant building. A site visit with Pulama Lanai, OECI, and TRC on January 9, 2019 was held to determine safe entry into the excavation for confirmation soil sampling, possible reuse of MECO site soils for backfill, and stockpile characterization.

7.1 Excavation and Confirmation Sampling

Plant demolition and concrete excavation activities were completed on January 21, 2019. The corners of the excavation were located with a GPS and the excavation area was measured at approximately 4,122 square feet (See Figure 13). Post excavation soil management was recommended by TRC and a Soil Management Plan (SMP) was prepared and provided to Pulama Lanai and OECI on January 23, 2019. The SMP outlined the process for stockpile generation and air monitoring activities; stockpile soil sample collection procedures; proposed analytical methods to characterize the soil; and soil screening criteria to evaluate whether material is suitable for reuse on site or should be transported off site for recycling or disposal. A copy of this SMP is included in Appendix D.

A site visit was held on January 24, 2019, with TRC and OECI to evaluate the status of the excavation. It was determined the excavation could not be accessed safely by field personnel to collect excavation confirmation samples due to the potential for caving of sidewalls. The perimeter security fence did not allow for the required sloping of the excavation; therefore, the excavator was used to collect soil for incremental sampling.

On January 25, 2019, TRC collected MI samples with OECI operating an excavator with a 2-foot wide bucket. The following confirmation sampling DUs were sampled in the following order:

- Excavation floor – DU-EX1
- West Excavation Sidewall – DU-EX2
- South Excavation Sidewall – DU-EX3 (collected triplicate at this location)
- East Excavation Sidewall – DU-EX4
- North Excavation Sidewall – DU-EX5

For the excavation DUs, the excavator bucket scraped the top 4 to 6 inches of soil and increments were collected from within the top 12 inches of soil in the bucket and placed in a plastic Ziploc® bag. A total of 75 increments for approximately 30 grams per increment of soil were collected for each MI sample. For the excavation floor, the DU was split into two sections divided by east and west. In both sections, the excavator bucket collected soil from three rows (orientated east-west and each bucket was divided into 12 to 13 increments. For the east and west sidewall DUs, the DU was split into six vertical sections, and each bucket was divided into 12 to 13 increments. For the north and south DUs, the sidewalls were split into 38 (south) to 43 (north) vertical sections, and each bucket was divided into 1 to 2 increments. One primary and two field replicates were collected at DU-EX3.

A photoionization detector (PID) was used during sampling activities to monitor for potential VOCs. Only one detection from the excavator bucket of 0.1 parts per million (ppm) was observed from the southern sidewall excavation, at approximately 32 feet from the southwest corner.

7.2 MECO Soil Stockpile Characterization

As it was unknown if the excavated soil has been impacted by petroleum hydrocarbons, the excavated soils were stockpiled for further characterization. On January 26, 2019, the stockpiles were staged at least four feet from the edge of the excavation and flattened to approximately four feet high to prepare the stockpiles for incremental sampling.

Soil was located around the perimeter of the MECO concrete footing excavation and had a total volume of approximately 500 CY. There were seven stockpiles (MECO-SP1 through MECO-SP7) at the site ranging from 36 CY to 128 CY (see Figure 13). Each stockpile was divided into three sampling zones (divided horizontally lengthwise) to collect 25 increments per layer, for a total of 75 increments per stockpile. Increments were collected from depths ranging from 3 inches to 36 inches from the surface of the stockpiles. One primary and two field replicates were collected from MECO-SP7. Increments were collected placed in a plastic Ziploc® bag, and 75 total increments of approximately 30 grams per increment of soil were collected. A PID was used to monitor sampling activities however, no measurable readings were detected.

7.3 Laboratory Analysis

A total of seven MI samples (five primary and two replicates) were collected from the excavation and nine MI samples (seven primary and two replicates) were collected from the stockpiles. See Figure 13 for DU and stockpile locations. Samples collected from the former MECO Power Plant were analyzed for the following:

- TPH-D by EPA Method 8015
- TPH-O by EPA Method 8015
- OCPs by EPA Method 8081B
- PCBs by EPA Method 8082
- Lead by EPA Method 6010

7.4 Laboratory Analytical Results

The soil sample analytical results were compared to Tier 1 EALs and EPA RSLs. Laboratory results were as follows:

<u>Excavation Confirmation Samples</u>

- TPH-D was detected in the confirmation soil samples collected. Sample DU-EX1 resulted in a concentration of 890 mg/kg, which exceeds the Tier 1 EAL. The remaining confirmation samples were below the Tier 1 EAL.
- TPH-O was detected in the confirmation soil samples collected. DU-EX1 resulted in a concentration of 890 mg/kg, which exceeds the Tier 1 EAL. The remaining confirmation samples were below the Tier 1 EAL.
- Eleven different OCPs were detected in the confirmation soil samples collected but did not exceed their respective Tier 1 EAL or EPA RSL.
- PCBs were detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.

- Lead was detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.

<u>Soil Stockpile Characterization</u>

- TPH-D was detected the stockpile samples collected. Samples MECO-SP1 and MECO-SP2 resulted in concentrations of 2,700 mg/kg and 610 mg/kg, respectively. These concentrations both exceed the Tier 1 EAL for TPH-D. The remaining stockpile samples were below the Tier 1 EAL.
- TPH-O was detected in the stockpile samples collected. Samples MECO-SP1 and MECO-SP2 resulted in concentrations of 920 mg/kg and 630 mg/kg, respectively. These concentrations both exceed the Tier 1 EAL for TPH-O. The remaining stockpile samples were below the Tier 1 EAL.
- Fifteen different OCPs were detected in the confirmation soil samples collected but did not exceed their respective Tier 1 EAL or EPA RSL.
- PCBs were detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.
- Lead was detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.

Please see Table 10 for results summary of laboratory analysis of the excavation and stockpile characterization samples.

7.5 Excavation and Backfilling

Following completion of the sampling and after conferring with HDOH personnel, the excavation was backfilled with the soil originally removed from beneath the former MECO Power Plant and soil located in the Site-wide stockpiles north of the Commercial Nursery (see Section 7.0). Stockpiles MECO-SP1 and MECO-SP2 were utilized first and placed at a depth of approximately 10 feet bgs. The other five MECO stockpiles were then added to the excavation. The remainder of the excavation was backfilled using soil from north of the commercial nursery, which was screened and cleared of construction debris to conform with the HDOH guidelines for acceptable fill (i.e., soil with inert materials [concrete, brick, other debris] less than eight inches in diameter).

8.0 Former Pesticide Shed Additional Site Assessment and Removal Action

Laboratory analysis of the surface MI Sample PS-DU2 resulted in concentrations of 531 mg/kg for TPH-D and 149 mg/kg for arsenic, which both exceed the Tier 1 EAL for their respective analytes. Based on the exceedances at the Pesticide Shed AOC, a removal action was implemented to excavate impacted soil at PS-DU2.

8.1 Discrete-Depth Sampling

Prior to the implementation of the removal action, two hand-auger borings were advanced within PS-DU2 to guide the depth of the excavation. Discrete-depth soil samples were collected on one-foot intervals to a total depth of 5 feet bgs and analyzed for TPH-D and arsenic. Laboratory analysis of these samples indicated concentrations of TPH-D and arsenic exceeding Tier 1 EALs were limited to the surface of the PS-DU2 (see Table 8 for results summary of the discrete-depth samples).

8.2 Excavation and Confirmation Sampling

Based on results of the discrete-depth samples, the removal action was implemented at PS-DU2 beginning April 1, 2019. A wooden canopy located in this DU was removed and the area was excavated to a total depth of approximately 2.5 ft bgs. A total volume of approximately 25 CY was removed and directly loaded into an onsite container for disposal. Following completion of the excavation, confirmation soil sampling was performed on the base and the sidewalls of the excavation and confirmation MI samples were collected.

A total of seven MI samples of 30 increments each were collected following the excavation. One primary sample and two replicates were collected from the base of the excavation and one sample was collected from each of the four sidewalls.

Samples were submitted to SGS Laboratories in Orlando, Florida and were analyzed for the following:

- TPH-D by EPA Method 8015
- Arsenic by EPA Method 6010

The confirmation soil sample analytical results following the removal action were compared to the Tier 1 EALs and confirmation sampling results were all below the Tier 1 EALs for TPH-D and arsenic. See Table 8 for results summary from the former Pesticide Shed removal action and Appendix C.3 for copies of the laboratory reports.

8.3 Excavation Backfilling

Following completion of the confirmation soil sampling, the excavation at the former Pesticide Shed was backfilled to grade using soil taken from the Site-wide stockpiles located to the north of the Commercial Nursery which was screened and cleared of construction debris to conform with the HDOH guidelines for acceptable fill (i.e., soil with inert materials [concrete, brick, other debris] less than eight inches in diameter). This soil was sampled prior to use with no exceedances over Tier 1 EALs (see Section 7.0).

9.0 Conceptual Site Model

The CSM for the Site has been updated based on the results of the investigation conducted and available historical information for the Site. The elements of the CSM are described in the subsections below.

9.1 Site Land Use

The Site is located in a mixed-use area that has included agricultural, industrial, and residential. Land use within the Site boundary (see Figure 2) has consisted of the following:

- Historically occupied by a former:
  - Agricultural area used for pineapple growing fields
  - Emulsion Plant
  - MECO Power Plant
  - Pesticide Shed
  - Storage Area/Concrete Batch Plant
- Currently occupied by the following:
  - Commercial Nursery
  - Community Gardens
  - Quonset shed used by DLNR
  - Hawaii Gas Company
  - Open Space

The current and reasonably anticipated land use for the Site is unrestricted/residential use.

9.2 Contaminants of Potential Concern

In this report, COPCs are defined as those compounds with concentrations above the Tier 1 EAL or EPA RSLs. Based on investigation and confirmation sampling results, the COPCs at the Site are the following: TPH-D, TPH-O, PCBs, and Lead.

9.3 Sources of Contamination

Based on the historical data and data collected during this investigation, the most likely sources of impacts at the site are the former USTs located at the former MECO Power Plant, historical power plant operations, and historical agricultural operations at the former Pesticide Shed. While trace levels of other contaminants were detected throughout the site, no other COPCs were detected in the remainder of the Site at concentrations above their designated Tier 1 EAL or EPA RSL.

9.4 Transport Mechanisms

Transport mechanisms for COPCs found in soil from the surface and approximately 10 feet bgs at the Site include the following:

- Leaching of COPCs from surface/subsurface soil to deeper soil
- Leaching of COPCs from subsurface soil to groundwater

9.5 Potential Receptors and Exposure Pathways

Based on current and reasonably anticipated future land use of the Site and the investigation results, potentially complete exposure pathways exist for the following human and ecological exposure scenarios:

- **Future hypothetical residents:** Potential exposure of hypothetical residents to COPCs in surface soil and subsurface soil (down to 10 feet bgs) could occur by incidental ingestion, dermal contact, and inhalation of soil particles if contaminated soil was removed and reused outside the proposed Hokuao Housing project in a residential area.

- **Trespassers/recreational users:** Potential intermittent exposure of trespassers and recreational users to COPCs in surface and subsurface soil (down to 1 feet bgs) could occur during project construction by incidental ingestion, dermal contact, and inhalation of soil dust particles.

- **Construction workers:** Exposure of construction workers to COPCs in surface and subsurface soil (down to construction depths estimated to be shallow subsurface) could occur during project construction by incidental ingestion, dermal contact, and inhalation of soil dust particles.

- **Ecological Receptors:** Since the Site is located greater than 150 meters from surface water bodies, no aquatic ecological receptors would be impacted. There are no known terrestrial ecological habitats in the immediate vicinity of the site and the site has historically been located in an area used for commercial agricultural operations. Anticipated future use does not include plans that would be conducive to terrestrial or ecological habitats and/or use by endangered species.

10.0 Environmental Hazard Evaluation

The Environmental Hazard Evaluation (EHE) process was developed by HDOH to serve as a link between site investigation activities and the proposed remedial response activities to be undertaken and evaluated. The EHE is intended to identify potential environmental hazards associated with contaminant concentrations in site media through comparison with DOH EALs established for common environmental hazards. This section evaluates potential hazards associated with COPC concentrations in soil at Site.

10.1 Soil Evaluation

Soil analytical data were compared to the appropriate Tier 1 EALs for the following potential hazards:

- Gross contamination
- Leaching to groundwater
- Human direct exposure

Drinking water resources EALs are not considered in this evaluation because the aquifer system beneath the Site is anticipated to be at a depth of 600 feet bgs or greater and the COPCs detected in soil are not volatile. Additionally, as discussed in Section 9.5, the Site is proposed to be redeveloped and no terrestrial ecological receptors would be present at the Site. Therefore, soil terrestrial ecotoxicity EALs do not apply for the Site. As the proposed Site development is for residential, the land use/exposure scenarios evaluated for this EHE are for unrestricted land use and a construction/trench workers scenario. Outcomes of the EHE for soil are discussed below and are summarized in Table 11.

10.2 Gross Contamination

Gross contamination of soil generally refers to the presence of LNAPL, offensive odors, unaesthetic appearance, general resource degradation, and generation of explosive vapors (HDOH, Fall 2017). Soil data were initially compared to gross contamination EALs for "Exposed or Potentially Exposed Soil" provided as Table F-2 in the HDOH EAL Surfer (HDOH, Fall 2017). Additional evaluation was then conducted based on field observation of soils encountered during the site investigation.

Based on comparison to gross contamination EALs (Table 10 and Table 11), surface soil samples from MECO-DU2, MECO-DU3, MECO-DU4, and MECO-DU11 were flagged as posing potential gross contamination hazards under a hypothetical residential scenario because they exceed the TPH-O EALs of 500 mg/kg. Additionally, the soil sampled during the MECO excavation (excavation base and impacted stockpiled soil placed at 10 feet bgs) also exceeds the gross contamination EALs for TPH-D and TPH-O. No other samples throughout the Site resulted in concentrations exceeding gross contamination EALs for soil.

<u>Light Non-Aqueous Phase Liquids</u>

No evidence of LNAPL (i.e., petroleum-saturated soil or strong odor/staining) was observed during soil sampling activities at any of the DUs throughout the site.

<u>Odor Concerns</u>

No odor concerns were observed during the soil sampling activities at any of the DUs throughout the site.

<u>Unaesthetic Appearance and General Resource Degradation Concerns</u>

Based on no staining, odor or other unaesthetic appearance, surface soil contamination at the site has not caused any resource degradation concerns at any of the DUs throughout the site.

<u>Explosive Vapor Concerns</u>

The COPCs in soil at the Site are not volatile. Therefore, no explosive vapor concerns exist at the Site.

<u>Summary of Gross Contamination Concerns</u>

It is concluded that gross contamination concerns in soil at the Site are limited to the area within the former MECO Power Plant where elevated levels of TPH-O were detected in soil samples from four DUs.

10.3 Leaching to Groundwater

Soil data were compared to the leaching EALs (Table E in the HDOH EAL Surfer, HDOH, Fall 2017) to evaluate whether contaminants in the soil could potentially leach to groundwater. As shown in Table 11, this evaluation resulted in the flagging of MECO-DU2, MECO-DU3, and MECO-DU4 from the surface soil and MECO-SP1 from the excavation stockpiles as posing potential leaching concerns due to exceedances of TPH-D or TPH-O. The determination of leaching potential from soil impacts from lead should ultimately be determined by laboratory analysis using the toxicity characteristic leaching procedure (TCLP) which was not performed in this investigation. However, with a depth to groundwater of at least 520 feet bgs or greater, it is unlikely that concentrations of TPH-D, TPH-O, or lead in soil is impacting groundwater beneath the site.

10.4 Direct Exposure

Soil data were compared to the direct exposure EALs (Table I-1 in the HDOH EAL Surfer; HDOH, Fall 2017) to evaluate whether contaminants in soil potentially pose risks to human health by direct contact. Table I-1 in the HDOH Guidance provides EALs based on a target risk of 10^{-6} for carcinogen compounds, soil saturation levels, risk with target hazard quotient (HQ) of 0.2 (0.5 for TPH), or risk with a HQ of 1.0 for non-carcinogen compounds.

As shown in Table 11, this evaluation resulted in flagging of seven DUs within the former MECO Power Plant AOC from Table 10 as posing potential direct exposure hazards under the current and reasonably anticipated residential scenario due to exceedances of these COPCs (TPH-D, TPH-O, lead, and/or PCBs). The concentrations from the surface soil do not exceed the direct exposure EALs for construction or trench workers.

Additionally, three MI samples collected during the MECO excavation (base of excavation and stockpiled soil placed at 10 feet bgs) have exceedances of the direct exposure EAL and construction worker exposure EAL for TPH-D. However, as this soil is located at 10 feet bgs it will not likely be encountered as during the redevelopment activities or by future residential occupants

As previously discussed, these results are likely the result of historical power plant operations and the former USTs located within this AOC. The remaining samples collected from the former MECO Power Plant and other Site AOCs resulted in concentrations below unrestricted use EALs for human direct exposure.

11.0 Environmental Hazard Management Plan

The EHE, described in Section 10.0, identified potentially unacceptable risks and hazards in soil including human direct exposure and gross contamination, and these potential risks must be addressed through an Environmental Hazard Management Plan (EHMP). This site-specific EHMP describes the proposed strategy for management of contaminated soil at the Site.

11.1 Summary of Environmental Hazards

Based on the site investigation data and the EHE, it is concluded that while most of the Site poses no environmental hazards for a proposed residential development, potential gross contamination, direct exposure concerns (including construction worker exposure), and potential leaching concerns are isolated to the former MECO Power Plant AOC within the surface soil and also at a depth of 10 feet bgs at the location of the MECO excavation. Soil impacts discovered within the former Pesticide Shed AOC were subsequently removed during the removal action and therefore pose no remaining hazard. As discussed in Section 6.0, site-wide stockpiles of soil and debris were also confirmed to have no exceedances of Tier 1 EALs for any COPCs.

The environmental concerns requiring either corrective action or long-term management in the former MECO Power Plant area are summarized as follows:

Direct human exposure hazard in surface soil (0 to 0.5 feet bgs) under a residential scenario:

- MECO-DU1
- MECO-DU3
- MECO-DU4
- MECO-DU5
- MECO-DU9

Gross contamination hazards in surface soil (0 to 0.5 feet bgs) under a residential scenario:

- MECO-DU2
- MECO-DU3
- MECO-DU4

Leaching hazard in subsurface soil (10 feet bgs):

- Soil from MECO Excavation (DU-EX1 [excavation base], MECO-SP1, and MECO-SP2)

11.2 Site Controls Implementation and Management of Contaminated Media

Based on planned future use of the Site, the environmental hazards and concerns identified above require either corrective action (i.e. excavation) or land use controls (LUCs) combined with long-term management of contaminated soil during construction and future Site activities.

Construction activities that pose a potential risk of exposure for construction workers to contaminated soil or dust (such as grading of soil) must be supervised by properly trained and certified personnel. Personnel working in areas where there is potential for direct contact with contaminated media shall have current 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certification and annual 8-hour HAZWOPER refresher training. The contractor's written health and safety plan will also be required to identify HAZWOPER-

regulated tasks, associated hazards, monitoring and control measures, and emergency response requirements.

Contaminated soil handled during future construction activities would need to be managed in accordance with a Programmatic EHE/EHMP, as necessary. Soil removed during construction should be evaluated for reuse, recycling, or disposal options.

11.2.1 Former MECO Power Plant

The area of the Former MECO Power Plant is included in the proposed construction of the Site into a residential development. Therefore, prior to the onset of construction, it would be necessary to remove or remediate this soil from the affected DUs to meet the HDOH requirements for unrestricted (residential) use. The table below summarizes the affected DUs and proposed soil removal action.

Summary of Surface DUs

DU	Unrestricted Scenario Hazard Concern	COPC	Appx. Volume per Foot (cubic ft)	Appx. Volume per Foot (CY)
MECO-DU1	Direct Human Exposure	TPH-D	2,200	82
MECO-DU2	Gross Contamination and Direct Exposure	TPH-O and Lead	4,725	180
MECO-DU3	Gross Contamination and Direct Exposure	TPH-D, TPH-O, and Lead	1,575	58
MECO-DU4	Gross Contamination and Direct Exposure	TPH-D, TPH-O, and Lead	4,035	150
MECO-DU5	Direct Exposure	TPH-D and Lead	2475	92
MECO-DU9	Direct Exposure	PCBs	3,300	122
MECO-DU11	Gross Contamination	TPH-O	2,280	85

Soil impacts may be localized within these DUs and a focused assessment within each area may lead to the detection of isolated impacts ("hotspots"). Additionally, as the depth of impacted soil is unknown, discrete-depth sampling should be performed prior to any removal action in affected DUs to guide the limits of the excavation. Once the removal is complete, confirmation soil samples completed using MI sampling methods would be required to verify the effectiveness and completeness of the removal action.

12.0 Conclusions and Recommendations

This report documents the site characterization investigation conducted from October 2018 to April 2019 for the proposed Lanai City Expansion located in Lanai City, Hawaii. The Site is being evaluated for possible redevelopment for residential use with up to 100 single family homes and other multi-family units to be constructed, as well as parks and open spaces.

Per the HDOH TGM (HDOH, 2017), the site characterization was completed on various sized DUs utilizing a multi-increment (MI) sampling approach. With the exceptions of the former MECO Power Plant and the former Pesticide Shed, the results of the MI sampling analyses indicated residual levels of COPCs are not present in surface soil at concentrations above Tier 1 EALs for unrestricted site use.

Additionally, in the course of the investigation, ten stockpiles were discovered throughout the Site restricting access to DUs within the former agricultural area and commercial nursery AOCs. Four of the stockpiles contained raw materials (gypsum, cinder, mulch) and six were comprised of soil, construction debris, and refuse. Sampling and analysis were necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation. Concentrations of COPCs from the sampled stockpiles were below HDOH Tier 1 EALs for unrestricted site use.

During the initial mobilization in October 2018 to perform the MI sampling outlined in the SAP, a total of 10 stockpiles were discovered throughout the Site restricting access to six proposed DUs within the former agricultural area AOC and two proposed DUs within the Commercial Nursery AOC. Four of the stockpiles were comprised of raw construction materials (gypsum and cinder) or mulch. Six of the stockpiles were generated from historical construction activities and contained a combination of soil, construction debris, and refuse. Therefore, sampling and analysis was necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation, and the completion of the site characterization.

Concentrations of TPH-D and arsenic were reported in the MI sample from one DU at the former Pesticide Shed. After delineating possible vertical impacts, the impacted DU was excavated to a total depth of approximately two feet bgs and MI samples were collected from the base and sidewalls of the excavation to confirm the effectiveness of the removal action. Results of the confirmation sampling indicated remaining concentrations of TPH-D and arsenic were below Tier 1 EALs for unrestricted use.

During the demolition of the former MECO Power Plant, concrete footings were discovered emplaced beneath the building's structure. While removing the concrete footings, soil surrounding the footings was excavated and placed around the perimeter of the excavation. Confirmation soil samples (including one triplicate) were collected from the base and the sidewalls of the rectangular excavation. Additionally, seven stockpiles of excavated soil totaling approximately 500 CY were sampled for characterization of COPCs associated with the former MECO Power Plant AOC. Concentrations of TPH-D and TPH-O exceeding Tier 1 EALs for unrestricted use were present at the base of the excavation (approximately 10 feet bgs) and from two of the seven stockpiles. No other Tier 1 EAL exceedances were reported for other COPCs in the samples from the excavation or the stockpiles. Following discussions between

HDOH and Pulama Lanai, it was decided to return the soil to the excavation. The hydrocarbon-impacted soil was placed at 10 feet bgs, followed by the remainder of the soil from MECO which was below the Tier 1 EALs. The remainder of the excavation was backfilled with soil from a stockpile located north of the Commercial Nursery which had also been characterized with results below Tier 1 EALs and screened of debris prior to being used.

Following the completion of the plant demolition and backfill, the surface MI sampling was performed within the former MECO Power Plant AOC. An additional MI sample was also collected from AG-DU39 at this time as soil excavated from the former MECO Power Plant had been staged within this DU following its original sample collection (resample concentrations were below Tier 1 EALs). Laboratory analysis of surface soil from the former MECO Power Plant resulted in concentrations of TPH-D, TPH-O, lead, and/or PCBs present at levels exceeding HDOH Tier 1 EALs for unrestricted use in seven DUs. These concentrations resulted in hazards both for gross contamination and direct human exposure based under the current and reasonably anticipated residential scenario.

With the exception of the former MECO Power Plant AOC, the remainder of the Site has been fully assessed for the purposes of residential redevelopment based on the results of this investigation. Concentrations of COPCs identified in the *Final Sampling and Analysis Plan* (TRC, 2017) for each of the AOCs are either below HDOH Tier 1 EALs, EPA RSLs, or below laboratory detection limits. To proceed with the proposed residential development as planned, it is recommended impacted soil from the DUs within the former MECO Power Plant AOC undergo additional focused assessment and a removal action to adequately mitigate the hazards identified during this investigation. Additionally, hydrocarbon-affected soil at 10 feet bgs within the former MECO Power Plant excavation should be assessed for possible vapor migration to the surface and to confirm there are no vapor migration risks to human health.

13.0 References

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TABLES

FIGURES

APPENDIX A

Field Data Sheets and Site Photos (USB Flash Drive)

APPENDIX B

Decision Unit GPS Coordinates

APPENDIX C

Laboratory Analysis and Data Validation

APPENDIX C.1

Level IV Data Validation Memorandums/Reports

APPENDIX C.2

Level II Data Validation Checklists

APPENDIX C.3

Laboratory Analytical Reports (USB Flash Drive)

APPENDIX D

Former MECO Power Plant Soil Management Plan Site Plan